PatentEval: Understanding Errors in Patent Generation

Anonymous ACL submission

Abstract

In this work, we introduce a comprehensive 002 error typology specifically designed for evaluating two distinct tasks in machine-generated patent texts: Claims2Abstract generation and the generation of subsequent claims given previous ones. We have also developed a benchmark, PatentEval, for systematically assessing 007 language models in this context. Our study includes a comparative analysis, annotated by humans, of various models. These range from those specifically adapted for tasks within the patent domain to the latest general-purpose language models. Furthermore, we designed and 013 evaluated metrics to approximate human judgments in patent text evaluation, analyzing the extent to which these metrics align with expert assessments. These approaches provide 017 valuable insights into the capabilities and limitations of current language models in the spe-019 cialized field of patent text generation.

1 Introduction

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A patent is a legal instrument that grants inventors or entities exclusive rights over their invention for a designated period. This exclusivity is said to stimulate innovation by safeguarding the intellectual property of the inventors. Patent drafting refers to the process of writing a detailed description of an invention in a legal document that meets the requirements of patent law. It is a complex and time-consuming task that requires a thorough understanding of the invention and the relevant patent laws, and the cost of obtaining a patent can be significant (Karhad, 2023), with the drafting process being the biggest part of the cost.

With the progression of deep learning technologies, a multitude of complex challenges in the patent domain have been ameliorated. Computational techniques have notably enhanced patent prior art searches (Risch et al., 2020; Buckley, 2021; Vowinckel and Hähnke, 2023) and facilitated efficient patent classification (Lee and Hsiang, 2019b; Huang et al., 2019).

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However, the generation of patent texts and the assessment of the quality of text produced by neural models remain underexplored areas of research. This can be attributed to the exigent demands for precision and accuracy within the legal domain, and it is clear that the evaluation of machinegenerated patent texts necessitates an extensive domain-specific acumen, attainable only by experts within the field. This additional layer of complexity poses significant hurdles for researchers from allied disciplines, seeking to venture into and assess their contributions to this niche, unlike in more generic text applications such as machine translation or generic dialog systems. Nonetheless, recent strides made by large language models, such as OpenAI's GPT-3.5, GPT-4 (OpenAI, 2023), and other open-source variants like llama2 (Touvron et al., 2023) and Falcon (Penedo et al., 2023), have demonstrated promising capabilities in generating high-caliber legal texts (Choi et al., 2023). These developments signal a promising horizon for enhanced performance and nuanced evaluation in the domain of patent text generation.

In our study, we focus on evaluating and understanding the quality of patent text generation by various language models. We have developed **PatentEval**, a benchmark annotated by human experts, tailored for assessing language models of different sizes and capacities. This includes pairwise comparisons and detailed analysis of error types in each output. Our goal is to narrow the gap between human-written and machine-generated patents, offering a clearer view of the potential uses of large language models in this field.

2 Preliminaries and Background

A patent is a structured document that typically includes several sections, such as a title, abstract,

Independent claim	Dependent claim
1. A lighted pencil, comprising:	2. The lighted pencil of
a pencil shaft; and	claim 1, wherein the
a light attached to the pencil	light is removably
shaft.	attached to the pencil
	shaft.

Table 1: Examples¹ of independent/dependent claim.

background, brief summary of the invention, detailed description, one or more claims, drawings, and classification information, among others. In this study, our primary focus is on the generation of patent abstracts and claims.

The **abstract** of a patent is a concise summary that offers a straightforward overview of the invention's main features. It is typically used for informational and search purposes, helping individuals quickly understand the essence of the patented technology without delving into the detailed description found in the patent specification.

Patent claims stand as the cornerstone of a patent document. Claims meticulously define the specific features and associated rights of an invention. Written in a unique combination of legal jargon and patent-specific language, these claims serve to concisely and unambiguously detail the novel elements of an invention. This could relate to its construction, composition, or operational methodology. These claims set the boundaries for what others can or cannot do without permission from the patent holder. In this sense, writing the claims is a strategic choice of the patent council that depends on outside, e.g. economic factors, and is not as a whole automatizable. Nonetheless, a system that proposes subsequent claims can be of great use for the council to ensure the quality and completeness of the claim set.

In addition, claim dependency is another variable to look at (table 1 shows examples of both types):

- **Independent Claims:** These claims encapsulate the invention's core features without referencing other claims. They represent the invention's essence autonomously.
- Dependent Claims: These claims reference and build upon one or more prior claims, either independent or dependent. The dependent claims include everything recited in their independent claims. They augment the base claims by introducing extra details, variants,

or features, resulting in a more circumscribed protection ambit as they adopt the restrictions of the claims they refer to. 121

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According to United States Patent and Trademark Office (USPTO) drafting regulations, a patent can have multiple independent claims embodied in the invention.

3 Related Work

Recent advancements in natural language generation (NLG) have seen significant progress across various domains, yet generating and evaluating patent texts remains a challenge due to the intricacies of legal knowledge.

Initial strides in this field were made by the PatentTransformer project (Lee and Hsiang, 2020a), which explored adapting the GPT-2 model (Radford et al., 2019) to generate patent claims, aiming to assist patent writers with an "augmented inventing" tool. A subsequent version of Patent-Transformer (Lee and Hsiang, 2020b) expanded this capability to generate different patent sections from given parts (e.g., converting an abstract into a title or claim).

To evaluate the effectiveness of these generated claims, (Lee and Hsiang, 2019a) fine-tuned a Bert model (Devlin et al., 2018) for binary classification, assessing the relevance of consecutive claim segments. Building on this, (Lee, 2020) developed a two-Transformer model framework for quality control in patent text generation, proposing an "auto-complete" feature to facilitate idea exploration from existing patents. Additionally, their study (Lee and Hsiang, 2020c) investigated the origins of generated content by applying priorart search techniques to the training data, laying groundwork for future assessments of text novelty in patents.

The IBM research team introduced the Patent Generative Transformer (PGT) (Christofidellis et al., 2022), enhancing the GPT-2 model for multifaceted tasks in the patent domain, such as part generation, text infilling, and coherence checking. To assess PGT, they employed methods like semantic similarity comparison, expert evaluations², and analysis of the model's zero-shot performance on novel generation tasks. More recently, (Lee, 2023) experimented with various sizes of PatentGPT-J, rooted in GPT-J (Wang and Komatsuzaki, 2021),

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¹Examples taken from: https://www.wipo.int/edocs/ mdocs/aspac/en/wipo_ip_mnl_3_18/wipo_ip_mnl_3_ 18_p_5.pdf

²Their evaluation, however, was limited to 44 patents in the chemistry domain and remains unpublished.

and introduced a novel metric that gauges the ef-169 ficiency of language models in generating patent 170 claims by quantifying the reduction in keystrokes 171 for autocomplete functions. 172

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However, the variation in evaluation methodologies and datasets across studies, including those focusing on patent summarization or claim generation, makes it difficult to compare results consistently.

Several datasets and benchmarks have been developed for patent-related tasks. The Big Patent dataset (Sharma et al., 2019) focuses on patent summarization and includes about 1.3 million U.S. patent documents sourced from the Google Patent Public Datasets via BigQuery. Its text coherence and abstractiveness were evaluated using n-gram occurrence rates and entity distribution metrics. The Harvard USPTO Dataset (HUPD) (Suzgun et al., 2022) is another crucial resource, comprising English-language utility patent applications filed with the USPTO between 2004 and 2014. It features benchmarks for binary patent decision classification, multi-class IPC/CPC classification, masked language modeling, and abstractive summarization, with task-specific metrics like ROUGE for summarization.

Furthermore, (Casola and Lavelli, 2022) emphasized the challenges in ensuring factual consistency in patent texts, suggesting alternative evaluation methods like QAGS (Wang et al., 2020) and FactCC (Kryściński et al., 2019), and FactGraph (Ribeiro et al., 2022), aligning also with our research focus.

Recent advancements in large language models (LLMs), exemplified by OpenAI's GPT-3.5, GPT-4 (OpenAI, 2023), and other open-source alternatives such as Llama2 (Touvron et al., 2023) and Falcon (Penedo et al., 2023), have showcased their capabilities for zero-shot learning and their adeptness at handling a wide array of tasks when provided with straightforward instructions.

In light of these developments, our study aims to comparatively assess the performance of these models, with a particular emphasis on shared tasks like claims generation and abstract generation. We benchmark these models against their contemporary generative counterparts using a dedicated evaluation dataset. Moreover, we delve into a nuanced analysis of their outputs by investigating the characteristics and distribution of the errors they produce.

Tasks and Criteria 4

4.1 Tasks

To evaluate the capabilities of different models more comprehensively, we selected two tasks targeting distinct generation content formats: one for abstracts and another for claims. We intentionally chose one generation task as a summarization task given input (claims2abstract), while the other lacks a standardized answer (next claim generation). This design ensures a more nuanced assessment of the models' capabilities.

Claims2Abstract

In patents, a claim is a legally binding description defining the patent's protection written in a formal legal style. A patent often has multiple claims specifying its scope. Conversely, a patent's abstract offers a brief summary of its technical details and implications. Hence, the claims-to-abstract task is highly relevant in the context of patent summarization, where the objective is to transform the juridical language of claims into more generic and concise abstracts.

In the Claims2Abstract task, the input consists of the full set of claims. The objective is to generate an abstract that encapsulates the patent's main elements.

Next Claim Generation Previous studies (Lee and Hsiang, 2020a,b; Lee, 2023) have approached claims generation as a means of "augmented inventing," aiming to develop a tool that assists human patent practitioners by providing autocomplete suggestions during the drafting process. These works aimed to let large language models generate claims from scratch or with minimal input, with evaluation metrics concentrated on word-level or span-level aspects of the claims. Instead of incremental generation or evaluation, we focus on producing the entire subsequent claim in one go. This approach not only tests the models' capabilities in a more holistic manner but also aligns more closely with the practical needs of patent drafting, where each claim needs to be fully formulated and coherent in itself.

In the generation phase of our models, we varied the input by providing either the first claim alone (claim 1), the first and second claims together (claims 1-2), or the first three claims (claims 1-3). The objective for the model in each scenario is to generate the next sequential claim.

One of the key evaluation criterion is the model's ability to produce a subsequent claim that not only 266

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follows logically but also matches the dependency 270 type (independent or dependent) of the corresponding original claim in the patent. This means if the original subsequent claim in the patent is an independent claim, the model-generated claim should also be independent, and similarly for a dependent claim. This approach ensures that the generated claim maintains the same structural and legal relationship as the original set of claims, and easier for us to do the evaluation and comparison with human-drafted patents.

4.2 Typology of Errors

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While prior studies have delved into specific aspects of generated content, such as relevance among spans of claims (Lee and Hsiang, 2019a) or the semantic similarity between generated and actual components (Christofidellis et al., 2022), the process of patent drafting encompasses a broader set of criteria. Beyond ensuring syntactic accuracy and semantic relevance, the content must be patentable under prevailing regulations, avoid the use of prohibited terms specific to patent language, and the patent application should articulate the invention with both clarity and comprehensiveness.

To better understand and categorize these multifaceted errors, we established a typology based on the issues observed in outputs from various models. Our error types also refer to the guidelines from the second edition of the WIPO Patent Drafting Manual³. As we use USPTO data, we have based this work primarily on the USPTO's patent drafting standards as well. More detailed explanations of each error type with examples are demonstrated in appendix **D**.

4.2.1 Abstract Generation

A good abstract gives a quick overview of the invention's key technical points. It's often the first thing seen on a patent's first page and is used in search databases, guiding automated search tools with its keywords. Therefore, the abstract should be short but also accurate, offering a clear snapshot of the invention's details. We thus summarize the following dimensions for errors in abstract drafting:

Grammatical Errors: Occurrences of incorrect grammar, punctuation, or sentence structure, including hallucinated repetitive sequences produced

by language models.

Irrelevant Content: Introducing content that deviates or digresses from the primary subject matter of the patent claims.

Incomplete Coverage: Occurrences where the abstract omits essential components or concepts, failing to encapsulate all key points from the patent claims.

Overly Wordy or Lengthy: Abstracts falling into this error type are not succinct, containing unnecessary details. Jurisdictions often impose word limits on abstracts — for example, in many Englishspeaking countries, abstracts are typically restricted to 150 words.

Contradictory Information: Instances when the abstract introduces factual details that contradict the content found in the original claims.

Unclarity: The abstract contains vague or ambiguous descriptions, making it difficult to grasp the intended message or details.

Ineffective Summarization: Relates to abstracts that inadequately summarize the invention, often replicating one or more of the claims verbatim instead of providing a concise and comprehensive overview of the patent.

Claim Generation 4.2.2

Patent claims are structured sentences that distinctly describe the invention seeking protection. To be patentable, these claims must show novelty, be non-obvious compared to existing "prior art," and have practical application. Due to the extensive time and resources required for prior art searches and verification, our study focuses on the inherent structure that can be evaluated without access to exterior databases (patents, scientific articles, and so on). We leave the evaluation of novelty and nonobviousness of generated claims for future work.

Given the complexity and stringent drafting rules of claims compared to other patent sections, we have developed a detailed typology of error types. This allows for a deeper understanding and analysis of the performance of various language models in generating these claims.

Grammatical Errors:

- Grammatical Inaccuracy: Misuse of grammar and hallucinated repetitive sequences produced by language models.
- Punctuation Discrepancy: Incorrect or inconsistent use of punctuation marks, deviating from standard patent drafting conventions.

³https://www.wipo.int/edocs/pubdocs/en/ wipo-pub-867-22-en-wipo-patent-drafting-manual. pdf

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- Excessive Parentheticals: Over-reliance on parentheses for non-essential information, potentially detracting from claim clarity.

Formatting Errors:

- Claim Numbering Error: Incorrect or inconsistent numbering of claims.

- **Preamble**⁴ **Inconsistency Error:** Inaccurate reflection of subject matter in the preamble, disrupting the conceptual flow between independent and dependent claims.

- Transitional Phrase⁵ Error: Improper use of transitional phrases, impacting the scope of the claim.
- Claim Body Disconnection: Presence of fewer than two elements or a lack of a coherent, logical connection between listed elements in the claim body.

Dependency Errors:

- Non-compliant Dependency with instruction: Dependency of the claims not matching the required dependency as instructed.
- Dependency Clarity Error: Utilization of unclear multiple dependencies or an incorrect singular dependency.
- Broad Scope Dependent Claims: Dependent claims that insufficiently narrow the scope of the independent claim they depend on.
- Insufficient Differentiation of Independent **Claims:** Independent claims that cover the same or similar scope as previous claims.

Clarity Errors:

- Vagueness: Usage of ambiguous, vague, or relative terms or expressions that render the claim's scope indefinite.
- Terminological Inconsistency: Use of multiple terms or different reference numerals for the same element.
- Wishful Claiming: Claims that express objectives without concrete methods, leading to speculative or abstract language.

Brevity Errors:

 Verbose Redundancy: Excessive wordiness without adding substantive content.

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- Sub-Optimal Claim Structure: Claims with complex language that could be more clearly expressed as multiple, simpler claims.

Content Relevance Errors:

- Irrelevant Matter Introduction: Introduction of matter unrelated to the disclosed embodiments, potentially broadening the claim beyond the invention's scope.

Effectiveness Error:

- Contradictory Claims: Claims that conflict with previous claims or do not follow a logical flow themselves.
- Non-Distinctive Claim Repetition: Claims that lack effectiveness, primarily repeating content from earlier claims without adding new scope or detail.

Dataset Creation 5

5.1 Data Selection

Our experimental dataset used for constructing input during inference originates from the Harvard USPTO Dataset (HUPD) (Suzgun et al., 2022). This comprehensive corpus encompasses Englishlanguage utility patent applications submitted to the USPTO spanning January 2004 through December 2018.

Given that HUPD comprises both granted and rejected patent applications, we selectively included only those patents that had been granted, ensuring the inclusion of high-quality patent text. Additionally, we eliminated entries bearing "(canceled)" claims, as they tend to be non-informative for patent drafting and could introduce undesirable noise into the dataset. Subsequently, we formed evaluation datasets by randomly sampling 400 granted patents - equating to 50 from each of the eight primary IPC 6 sections – from the years 2017 and 2018, ensuring a balanced representation across all patent domains. We use claims from these patents for constructing inputs of models for both tasks of Claims2Abstract and next-claimgeneration.

5.2 Models under Evaluation

Table 2 compares basic information and the tasks supported among the selected models for our evaluation. In order to provide a comprehensive assess-

⁻ Antecedent Reference Errors: Failure to provide a clear antecedent basis for each term.

⁴The preamble of a patent claim provides an introductory description of the invention, setting the context or intended use. For example, in a claim for a new type of smartphone, the preamble might state: "A communication device designed for handheld use, ..." to establish the device's general category and purpose.

⁵Transitional phrases in patent claims, such as "comprising," "consisting of," and "consisting essentially of," define the scope of the invention. For example, a claim stating "A device comprising A, B, and C" allows for additional elements beyond A, B, and C, whereas "A device consisting of A, B, and C" restricts the invention to only those three components.

⁶https://www.wipo.int/classifications/ipc/en/

Models	Size	Context length	Claims2Abstract	next-claim
PatentTransformer	1.5B	1024	1	1
PGT	1.5B	1024	✓	✓
HUPD T5-Small	60M	512	✓	X
PatentGPT-J	1.6B	2048	X	✓
Falcon	7B, 40B	2048	✓	✓
Llama 2	7B, 13B, 70B	4096	✓	✓
gpt-3.5-turbo-0613		4097	✓	1

Table 2: Overview of language models selected for patent generation evaluation.

ment, our selection encompasses both specialized models (Lee and Hsiang, 2020b; Christofidellis et al., 2022; Suzgun et al., 2022; Lee, 2023) designed explicitly for patent-related tasks and the latest Large Language Models (LLMs), such as Llama 2 (Touvron et al., 2023) and Falcon (Penedo et al., 2023) of various sizes. The majority of these models are built upon decoder-only architectures, whereas the model introduced in (Suzgun et al., 2022) adopts an encoder-decoder architecture based on T5 (Raffel et al., 2020) for patent summarization tasks.

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In addition to the open-source models tailored specifically for patents, we incorporate OpenAI's latest fixed version GPT-3.5, GPT-3.5-turbo-0613, into our evaluation. To minimize randomness, we set the temperature parameter to 0, while keeping default values for other hyperparameters.

During inference, each relevant model produces a single output for each of the 400 chosen patents across the two tasks. Detailed model inferences can be found in Appendix A.

5.3 Annotation Data

Our human evaluation concentrated on domains where we have the most expertise, analyzing 50 patents each from domain A (human necessities) and domain G (physics)⁷. In our next-claimgeneration task, we particularly examined whether the models could accurately generate claims according to the required dependency criteria. Due to a limited number of independent subsequent claims in these domains, we also included additional examples from other domains, adding eight more instances to our analysis.

Some of the primary objectives of our research include 1) assessing the capabilities of various models in generating patent texts, and 2) exploring whether human evaluators can distinguish between content generated by humans and machines.

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To achieve these objectives, our annotation process involved comparative evaluations. Annotators were presented with two types of paired outputs for each input claim or set of claims:

- A comparison between two different models (model₁₁, model₁₂);
- 2. A juxtaposition of a model's output against the original abstract or subsequent claim (model₂₁, original abstract/next claim).

Models for each pair were randomly selected to ensure variety and prevent bias, with model11 and model12 always being different, and $model_{21}$ chosen independently from them.

6 Results and Analysis

The annotation process involved two primary annotators: a seasoned patent lawyer with over 15 years of experience in relevant domains, and a PhD student. In cases of disagreement, a third expert was consulted to reach consensus. Our analysis is structured around addressing three key questions: **Q1: What are the error distributions of each model?**

Figure 1 shows the error distribution in 416 pairs for both tasks. The top section of the bars represents the proportion of error-free outputs by the models. Below that, the segmented bars illustrate the likelihood of specific error types occurring. Notably, ChatGPT excelled in minimizing errors in both quantity and diversity.

In the Claims2Abstract task, ChatGPT and other models often failed to cover all elements in lengthy claims, leading to "incomplete coverage" errors. This is due to the fact that for some longer sets of claims (more than 20), models sometimes choose to summarize them in longer abstracts if one wants to include as many key elements as possible. Models like Llama-70b and Llama-13b also faced grammar issues and frequently repeated claims verbatim. Falcon models, while less repetitive, struggled with

⁷Model outputs for the other six domains are reserved for future studies and can be accessed at https://github.com/xxxxxxx.



Figure 1: Error distribution of different models evaluated on two tasks.

clarity, and Falcon-7b sometimes introduced irrelevant content. The HUPD T5-small model, due to its limited encoder and decoder capacity, often missed key claim components and included non-factual information. Other models displayed various errors to differing degrees.

In the next-claim-generation task, improper punctuation usage was common across models, often influenced by the non-standard punctuation usage in the input claims. Except for ChatGPT and Llama-70b, most models exhibited basic grammatical errors typical in patent drafting. PatentTransformer and PatentGPT-J specifically struggled with consistent antecedent referencing and correct parenthesis usage, respectively. Falcon models had more frequent formatting errors, and PatentTransformer often incorrectly numbered claims or relied on nonexistent prior claim numbers. Most models broadened the scope of generated dependent claims, with Llama-2 models being particularly notable in this aspect.

Vagueness and redundancy were widespread, highlighting the difficulty in precise patent claim generation. Apart from ChatGPT and Llama-70b, models occasionally produced irrelevant or factually incorrect content. Llama-2 and Falcon models often repeated previous claims, contradicting the task instructions.

Q2: Do Human Evaluations Show Bias Towards Human- or Machine-Generated Content?

Figure 2 provides insights into whether human evaluators favor human or machine-generated content. For the claims2abstract task, models such as ChatGPT, Falcon-40b, and Falcon-7b often produced abstracts preferred over human-written ones. In the next-claim-generation task, ChatGPT's outputs were chosen over human-generated claims more than 60% of the time, while Llama2-7b achieved a 50% preference rate. These results sug-



Figure 2: Winning Rate of different models evaluated on two tasks (compared to original abstract/claim and to all other models in sampled dataset).

gest that, despite their imperfections, these LLMs possess significant potential and can offer valuable assistance in patent drafting tasks.

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Q3: Which Model Best Adheres to Patent Generation Standards?

To evaluate the models' compliance with patent generation norms, we analyzed the radar plots in Figure 3, which depict various error types and their impact on performance. A key metric used in our analysis was "Perfection," signifying instances where models produced error-free content. In claim generation, we broadened our focus to cover major categories for a comprehensive understanding, contrasting with the detailed error breakdown seen in

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Figure 3: Models performances on two tasks according to our criteria.

earlier analyses.

From these plots, it's evident that while no single model excels in all aspects, some, like ChatGPT and Falcon-40b, show particular strengths in creating relevant and claim-aligned abstracts. The Llama-2 models display a commendable mix of clarity, formatting, and grammatical accuracy in next-claim generation, meeting the strict requirements of patent documentation. However, the universal challenge of achieving 'Perfection' except for ChatGPT across all models highlights the ongoing need for human input and review.

Interestingly, smaller models such as Llama-2-7b often perform remarkably well in complex tasks like next-claim-generation, suggesting that even less extensive LLMs can be effective in patent drafting. This variation in performance, particularly concerning brevity and adherence to claim dependencies in next-claim-generation tasks, points to the potential and areas for growth in employing LLMs for patent text creation. These insights not only showcase the progress in using LLMs for patent drafting but also guide future improvements in this evolving arena.

Evaluation of Metrics 7

In this section, we evaluate various metrics to assess patent generation, focusing on their alignment 615

with human judgments. Detailed information on 616 these metrics is available in Appendix C. This assessment aids in understanding the extent to which 618 automated metrics can accurately mirror human 619 evaluations in the context of patent text generation 620 to facilitate the future evaluation of patent genera-621 tion. Our table below highlights the correlation of 622 each metric with manual annotation for our main tasks, indicating their effectiveness in mirroring 624 human judgment. 625

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We found that in abstract generation, the semantic similarity metric fine-tuned on IPC classifications correlated most strongly with human evaluations. For claim generation, this metric, normalized against the rule-based checker score, also showed a high correlation, underscoring its utility in evaluating patent claim generation. These findings are crucial for selecting suitable metrics for patent text evaluation and understanding the effectiveness of current evaluative approaches.

Task	Metric	Kendall's Tau
	SemSim(fine-tuned on IPC)	.3968
	SemSim (without fine-tuning)	.3164
	Terms Coverage Recall	.3267
Abstract	Terms Coverage Precision	.2183
	Terms Coverage F1	.3275
	N-grams Coverage Recall	.2672
	N-grams Coverage Precision	.1876
	N-grams Coverage F1	.2681
	QAFactEval (Fabbri et al., 2022)	.2004
	Rule-based checker	.2562
Claim	SemSim(fine-tuned on IPC)	.0741
	SemSim(fine-tuned on IPC)*	.3230
	SemSim(without fine-tuning)	.1485
	SemSim(without fine-tuning)*	.3137

Table 3: Kentall's tau correlation of patent generation task evaluation metrics with manual annotation. (The * in the next claim generation task indicates that the metric score is normalized by the rule-based checker score.)

8 Conclusions

This study marks a pivotal advancement in generating and evaluating patent texts, especially abstracts and claims, created by diverse language models. We aimed to explore the potential of LLMs in patent drafting. Our investigation reveals the strengths of certain LLMs in generating quality patent texts and also identifies common errors and their frequencies. These insights lay the groundwork for future progress in this area, informing both the enhancement of existing models and the incorporation of AI into patent drafting practices.

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9 Ethical Considerations and Limitations

This study is confined to the claims-to-abstract as well as the next-claim generation tasks. We can easily extract claim-abstract pairs from the dataset, as these components are independently submitted by applicants and subsequently published by patent offices. Claims have to be numbered and are easily extractable. However, the main body of the patent application, known as the "description", poses more significant challenges due to its length, often extending to dozens of pages, and its mostly unstructured nature.

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Given the current capabilities of Large Language Models, an effective strategy might involve segmenting the patent description into smaller, more manageable sections. These sections, which could include areas like "Background Art", 'Problem Statement', or 'Definitions of Technical Terms', could then be generated using specific models designed for their particular characteristics. Existing work is currently underway to construct expansive datasets of patent text with this level of granular division (Liu et al., 2023), but the efficacy of this approach is yet to be definitively proven. It remains an open question whether the performance observed in more standardized sections will carry over to these less regimented areas.

It is important to acknowledge that the scope of this study is restricted to English language patent applications within the USPTO database. When considering other prominent patent languages, all except Chinese offer significantly smaller corpora. This size discrepancy raises uncertainty around the potential to replicate our findings in these languages, given that Language Models tend to demonstrate reduced effectiveness when applied to languages other than English.

Another potential limitation of our study is the inherent bias in comparing different models, particularly since the most recent Large Language Models (LLMs) might have already been exposed to extensive text data, including patents, during their pre-training phase. There's a substantial likelihood that these models have been trained on USPTO patent documents available in open-source datasets. This overlap could inadvertently skew the performance of these models, as they might not be generating content based on learned patterns but rather recalling previously seen data. To address this, future research could implement methods like those proposed by (Shi et al., 2023) to identify and mitigate potential data pollution. This would involve a thorough examination of the training datasets of these models to ensure the novelty and authenticity of their content generation capabilities, especially in specialized domains such as patent generation.

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A Model Details

This section outlines the specifics of the models used in the PatentEval tasks. Our selection includes transformer architecture-based language models fine-tuned for patent-related tasks, as well as several high-capacity Large Language Models (LLMs).

• **PatentTransformer** (Lee and Hsiang, 2020b): This model, akin to GPT-2 in architecture, was trained from scratch with approximately 390 million patents from Google Patents Public Datasets on BigQuery ⁸ (1976-2016). The model was trained on patent text-to-text generation flow (from a few words to a title, the title to an abstract, the abstract to an independent claim, and the independent claim to multiple dependent claims. The text flow can go backward as the relations are trained bidirectionally in their training process.) We used the M2 checkpoint from their GitHub ⁹ without altering other hyperparameters.

• Patent Generative Transformer (Christofidellis et al., 2022): This model is a GPT-2 (Radford et al., 2019) variant fine-tuned for multitasking with 11.6 million patents (1998-2020). The tasks included text infilling, textto-text suggestions, and coherence checks. We used their HuggingFace model checkpoint ¹⁰, setting the maximum decoder length to 1024 and truncating input text to 256 words.

• HUPD T5-Small (Suzgun et al., 2022): Two separate T5-Small (Raffel et al., 2020) models were fine-tuned on the HUPD dataset (2011-2016) for Description2Abstract and Claims2Abstract tasks. Claim-based summarization was observed to be more effective, which is also the task we tested in our work. We used the example codes from their GitHub ¹¹, maintaining default settings.

• **PatentGPT-J** (Lee, 2023) pre-trained different sizes of GPT-J from scratch with 147B US patent data ranges from 1976-2020. Since

⁹https://github.com/jiehsheng/ PatentTransformer/blob/master/v2/

PatentIransformer/blob/master/\ PatentTransformer v2 ipyph

PatentTransformer_v2.ipynb

¹⁰https://huggingface.co/christofid/pgt

the training data of claim generation is constructed within the schema of claim pairs as "claim n1</depl>claim n2" for explicating that claim n2 depends on claim n1. We kept this schema for each time the next claim generated depends on the previous claim. We tested the 1.6B model checkpoint from HuggingFace ¹², setting the maximum decoder length to 1024 and truncating the input claims to 512 words. 901

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Additionally, we included potential LLMs such as Llama 2 (Touvron et al., 2023) ¹³ and Falcon (Penedo et al., 2023) ¹⁴. For these models, we utilized text-generation-inference ¹⁵ for efficient inference, setting Falcon's maximum length to 2048 and Llama2's to 4096. We also tested the GPT-3.5 gpt-3.5-turbo-0613 version, setting the temperature to 0 to reduce randomness.

Uniform prompts were used for all three LLMs during inference to ensure a fair comparison: Generate abstract given claims.

Please draft a patent abstract from the
provided claims. The abstract should
concisely summarize the technical
disclosure, enabling any reader to
quickly understand the subject matter.
Claims: {claims}
Abstract:

Generate next dependent claim given previous claims.

Please assist me in drafting the next DEPENDENT claim based on the provided patent claims below. This claim should be written in a dependent format, precisely specifying its dependency on one or more preceding claims. It should be legally sound, in line with patent claim drafting conventions, and use the existing claims as a basis for your draft. Ensure that the claim you draft is clearly and explicitly dependent on a previous claim. Claims: {claims}

Generate next independent claim given previous claims.

Please assist me in drafting the next INDEPENDENT claim in the series, directly following the provided patent claims below. This independent claim should be

¹²https://huggingface.co/patent/PatentGPT-J-1. 6B

¹³https://huggingface.co/meta-llama/ Llama-2-7b-hfhttps://huggingface.co/meta-llama/ Llama-2-13b-hfhttps://huggingface.co/meta-llama/ Llama-2-70b-hf

¹⁴https://huggingface.co/tiiuae/

falcon-7b-instructhttps://huggingface.co/tiiuae/ falcon-40b-instruct

¹⁵https://huggingface.co/docs/

text-generation-inference/index

⁸https://console.cloud.google.com/bigquery?p= patentspublic-data

¹¹https://github.com/suzgunmirac/hupd

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precise, legally sound, and in line with
patent claim drafting conventions. Please
continue the numbering scheme from the
previous claims and ensure that this
claim builds upon the previous claims
logically.
Claims: {claims}

B Annotation Details

B.1 Data Statistics

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Table 4 presents statistical details of the 400 patents selected from the refined HUPD dataset, including the average number of claims, average word count in claims, and average word count in abstracts for each domain determined by the main IPC section of the respective patent data.

domain	# claims	# words claims	# words abstract
А	15.2	952.86	101.72
В	14.04	983.52	116.22
С	17.36	1108.56	104.08
D	14.86	740.22	106.28
E	15.9	1059.1	123.26
F	15.2	994.32	135.56
G	14.7	1051.78	126.8
Н	15.36	1099.9	123.86

Table 4: Basic statistics of sampled patents.

Additionally, Figure 4 illustrates the pairs of data samples chosen for our pairwise comparative analysis. Moving forward, our efforts will extend to annotating a broader range of examples produced by models across various domains. This expansion aims to deepen our understanding and provide a more comprehensive evaluation of model performance in diverse patent contexts.

C Metrics

Reflecting on our analyses, we developed distinct evaluation metrics for two patent generation tasks.

For abstract summarization, we employed two evaluation strategies. The first revolves around semantic similarity, assessing how closely the generated abstracts mirror the input claims in terms of meaning and context. The second strategy emphasizes the overlap of key technical features, focusing on the extent to which critical terms from the input claims are included in the output abstracts.

In the task of claim generation, our metric evaluates the individual scope of each claim using language models. We then cross-reference these scopes with the established regulations for patent drafting to ensure compliance. The specifics of these approaches and their implementation are elaborated in the subsequent subsections.

C.1 Semantic Similarity Between Input Claims and Generated Abstracts

To assess the relevance of the generated content, we diverged from the methodology used by Christofidellis et al. (Christofidellis et al., 2022), which evaluated model performance using semantic similarity via sentence transformers (Reimers and Gurevych, 2019). Our approach involved fine-tuning BERTfor-patents (Srebrovic and Yonamine, 2020), a model specifically developed and trained for analyzing patent texts, with a focus on the patent IPC classification task. This fine-tuned classifier was then used to evaluate the correlation between the input claims and the generated abstracts. By adopting this strategy, we aim to provide a more specialized and relevant assessment tailored to patents. The use of BERT-for-patents, pre-trained and fine-tuned on patent-specific material, facilitates a more precise and contextually appropriate evaluation of semantic similarity.

C.1.1 Main IPC Classification

The "Main IPC" of a patent corresponds to its primary IPC label, typically the first one assigned. For subclass-level main IPC classification (with over 600 labels in the label space), we fine-tuned a classifier using bert-for-patents (Srebrovic and Yonamine, 2020). The training data consisted of abstracts and claims of 1,338,054 patents filed in 2016 and 2017 from HUPD (Suzgun et al., 2022), and we tested the model on 63,862 patents filed in 2018. For the fine-tuning process, we utilized the Py-Torch version checkpoint of bert-for-patents available on its HuggingFace page¹⁶.

The bert-for-patents model was originally trained using meta-structures with special tokens like [abstract], [claims], [summary], [invention], etc., to indicate the corresponding section of the text. During the fine-tuning process, we also incorporated this information by adding the appropriate section token at the beginning of each input text. For example, if the input text was an abstract, we added the [abstract] token, and if it was a claim, we added the [claims] token. Unlike other IPC patent classifications using bert-for-patents such as those described in (Zuo et al., 2022; Chikkamath et al., 2022) that consider both main and secondary

¹⁶https://huggingface.co/anferico/ bert-for-patents



Figure 4: Number of pairs selected for each task during human annotation.

IPC labels, we focused solely on the main IPC label. By doing so, we transform the task into a multi-classification problem rather than a multi-label classification problem.

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During the training phase, we configure the number of epochs to 3, set the learning rate to 1e - 5, and utilize a batch size of 64. To improve efficiency, we employ mixed precision training.

To evaluate the classifier's performance, we utilize data from HUPD filed in 2018. We test the fine-tuned model on three distinct test sets: one consisting solely of abstracts, another with only claims, and a final one with a mixture of both. We employ weighted precision, weighted recall, and weighted F1-score as metrics to measure the model's performance. Table 5 displays the results for abstracts and claims, which exhibit similar performance levels compared to the combined dataset.

Test set	Precision	Recall	F1-Score
Abstract	70.81	70.70	70.33
Claims	70.73	70.69	70.29
All	70.76	70.70	70.32

Table 5: Overall F1-score (weighted) of bert-for-patentfor main IPC Classification Task.

We then performed an error analysis by visualizing confusion matrices for both abstract and claim predictions made by the classifiers. Figure 5 displays the results. The plot reveals that for a given patent, our model makes nearly identical errors across different classes when predicting claims or abstracts. This suggests that the IPC classifier does not exhibit bias on certain labels based on the types of input texts.



Figure 5: Difference in errors made by classifier predicted solely on abstracts and claims.

C.1.2 Method

For determining the relevance between the provided claims and the generated abstract, we utilize the encoder from the fine-tuned BERT-for-patent model to obtain vectors in the embedding space.

The relevance score is computed using the finetuned encoder, denoted as Φ , following this equation:

Relevance Score_i = sim(
$$\Phi(x_i), \Phi(y_i)$$
) (1)

In this formula, $sim(\cdot)$ represents the similarity function used to gauge the relevance between two embeddings. We employ cosine similarity as our metric of choice. Here, x_i and y_i correspond to a pair of input claims and the generated abstract for a specific patent, labeled as patent *i*. This approach effectively quantifies the semantic closeness of the input and output, providing a clear measure of their 1071

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relevance. 1079

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Technical Features Coverage of C.2 Generated Abstracts

For a patent's abstract to be effective in search 1083 applications, it should encompass as many of the patent's technical features (key terms) as possible. 1084 To facilitate evaluating this, we utilized PyATE (Lu, 2021), a Python tool for Automated Term Extrac-1086 tion, employing its combo_basic algorithm to iden-1087 tify key terms in both the claims and $abstracts^{17}$. 1088 We then measured term coverage using this for-1089 mula: 1090

$$\text{Coverage}_i (\text{Recall}) = \frac{|\mathrm{U}(y_i) \cap \mathrm{U}(x_i)|}{|\mathrm{U}(x_i)|} \quad (2)$$

Here, x_i represents the input claims of the patent *i*, and y_i denotes the generated abstract. And $U(x_i)$ denotes the unique terms in the input claims x_i . This metric quantifies the extent to which the generated abstract captures the critical terms present in the original claims.

Equation 2 essentially reflects the recall of terms from the input claims that are included in the output abstract. Additionally, we computed precision and the F1 score for a more comprehensive analysis as follows:

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$$\operatorname{Coverage}_{i} \left(\operatorname{Precision}\right) = \frac{|\mathrm{U}(y_{i}) \cap \mathrm{U}(x_{i})|}{|\mathrm{U}(y_{i})|} \quad (3)$$

$$F1 = \frac{2}{\text{Precision}^{-1} + \text{Recall}^{-1}}$$
(4)

C.3 N-grams Coverage in Generated Abstracts

Similar to the method in C.2, the coverage rate of n-grams in generated abstracts was also analyzed. For this purpose, we considered n-grams ranging from n = 1 to 4 extracted by NLTK.

C.4 Verification of Basic Rules for Generated Claims

In the realm of patent claims, which are highly structured, rule-based evaluations can effectively 1114 identify errors in generated claims. We developed a set of rule-based checks to pinpoint various types of errors, such as grammatical inconsistencies, improper punctuation, incorrect use of parentheses, 1118

Algorithm 1 Rule-based Evaluation Process for generated Claims

- 1: Input: input_claims, generated_claim, required_dependency
- 2: Output: score
- 3: Extract numberings from input_claims
- 4: score $\leftarrow 0$
- 5: total_checks \leftarrow 5 ▷ Total number of checks excluding distinctiveness
- 6: if generated_claim is not distinctive then
- **return** 0 > Distinctiveness is a mandatory criterion 7: 8: end if
- 9: if generated_claim does not contain hallucinated content then
- 10: $score \leftarrow score + 1$
- 11: end if
- 12: if punctuation in generated_claim is correctly placed then
- 13: score \leftarrow score + 1 14: end if
- 15: if parentheses in generated_claim are correctly used then
- 16: score \leftarrow score + 1
- 17: end if
- 18: if numbering of generated_claim follows consecutively after input_claims then
- 19. score \leftarrow score + 1
- 20: end if
- 21: if dependency of generated_claim is as required then
- 22: $score \leftarrow score + 1$
- 23: end if
- ▷ Normalize score 24: score \leftarrow score / total checks 25: return score

sequential numbering errors, non-compliance with specified dependencies, lack of dependency clarity, and non-distinctive claim repetition.

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Notably, non-distinctive claim repetition, where the content of a generated claim exactly mirrors an input claim, is treated as a critical error. If this error occurs, the evaluation process immediately returns a score of zero. For other errors, a point is added to the score for each rule the generated claim successfully adheres to. The final score is then normalized by dividing by the total number of checks, excluding the distinctiveness criterion.

Semantic Similarity Between Input C.5 **Claims and Generated Claim**

In assessing the semantic relevance between the 1133 given input claims and the generated subsequent 1134 claim, we employed the model trained as detailed 1135 in Section C.2. The relevance score is calculated 1136 using the following formula: 1137

\cdot (\pm (\cdot) \pm (\cdot) (5) 11	(5)
$sim(\Phi(c_{i1},,c_{im}),\Phi(c_{i1},,c_{im},c_{i(m+1)}))$	(5) 1138 $(m+1)$))

In this equation, Φ denotes the fine-tuned Bert-1139 for-patents model (referenced in section C.1). The 1140

¹⁷https://github.com/kevinlu1248/pyate

sequence $c_{i1}, ..., c_{im}$ represents the input claims, 1141 while $c_{i1}, ..., c_{im}, c'_{i(m+1)}$ includes the input claims 1142 followed by the generated next claim. The function 1143 $sim(\cdot)$ computes the semantic similarity between 1144 the embedding of the concatenated input claims 1145 and the embedding of the input claims with the 1146 generated claim. This metric assesses how well 1147 the generated claim semantically aligns with the 1148 input claims, reflecting coherence and contextual 1149 relevance. 1150

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We implemented this metric in two distinct manners. The first approach directly applies the calculation as defined in Equation 5. The second approach normalizes the similarity score by the score from the rule-based checker described in the previous subsection. This adjustment lowers the score for generated claims that fail to comply with patent drafting standards or the required dependency, offering a more comprehensive evaluation of the generated claim's quality.

C.6 Other off-the-shelf metrics

QAFactEval (Fabbri et al., 2022) is a QA-based metric for factual consistency evaluation in summarization, which is composed of four key components: 1) selection of answers for question generation, 2) question generation conditioned on these answers, 3) question answering based on the source document, and 4) evaluating the overlap between QA model output and selected answers. The codes we used were from the authors' GitHub¹⁸.

FactGraph (Ribeiro et al., 2022) is specifically de-1171 signed for evaluating factuality in document sum-1172 marization tasks. This method utilizes advanced 1173 techniques for extracting Abstract Meaning Repre-1174 sentation (AMR) graphs. The abstract and claims' 1175 graphs are firstly encoded using a graph encoder 1176 with structure-aware adapters. Additionally, text 1177 representations are generated using an adapter-1178 based text encoder. These representations are then 1179 passed through a multilayer perceptron (MLP) to 1180 predict the factuality score. We obtained the imple-1181 mentation codes for the FactGraph method from 1182 the authors' GitHub repository¹⁹. 1183

> **EntityGrid** (Barzilay and Lapata, 2008) was grounded in the premise that the distribution of entities in locally coherent texts exhibits certain regularities, which can be formalized using entity

based theories of discourse. By leveraging these regularities, the proposed method can assess coherence as a machine-learning task. We refered to the codes from coheoka.²⁰ 1191

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D Examples of Typology of Errors

In this section, we show examples of each type of error to articulate better the real scenario of mistakes made by models.

Claims to abstract generation errors.

Given input claims as :

1. A computer system for selecting a version of 1198 a webpage to present to a user, the computer sys-1199 tem comprising: one or more computer processors, 1200 one or more computer readable storage media, and 1201 program instructions stored on the one or more 1202 computer readable storage media for execution by 1203 at least one of the one or more processors, the 1204 program instructions comprising: program instruc-1205 tions to receive an indication of a user accessing 1206 the webpage, wherein the webpage includes a plu-1207 rality of versions of the webpage, wherein the web-1208 page is comprised of one or more modules, and 1209 wherein each version of the plurality of versions 1210 of the webpage comprises a different layout of the 1211 one or more modules; program instructions to re-1212 trieve a predefined goal associated with the web-1213 page, wherein the predefined goal includes a higher 1214 number of sales, higher dollar amount per sale, 1215 length of time a user is on the webpage, usefulness 1216 of the webpage, and number of reviews written; 1217 program instructions to monitor usage information 1218 of the user accessing the plurality of versions of 1219 the webpage, based on the predefined goal associ-1220 ated with the webpage, wherein the usage information includes: cursor location, mouse clicks, idle 1222 time, HTML pages loaded, data accessed, widgets 1223 used, types of devices used to access the webpage, 1224 and presence of user interface artifacts; program 1225 instructions to generate a report that includes a col-1226 lection of user characteristics, web analytics, and 1227 the monitored usage information; program instruc-1228 tions to store the monitored usage information of 1229 the plurality of versions of the webpage and the 1230 generated report; program instructions to receive a 1231 request to access the webpage from a device; pro-1232 gram instructions to receive information about the 1233 device, wherein the information about the device 1234 includes: a device type, an Internet Protocol (IP) 1235

¹⁸QAFactEval: https://github.com/salesforce/ QAFactEval

¹⁹FactGraph: https://github.com/amazon-science/ fact-graph

²⁰EntityGrid: https://github.com/kigawas/coheoka/ tree/master

1236	address, cookies, and a web browsing history; pro-
1237	gram instructions to access the monitored usage
1238	information of the plurality of versions of the web-
1239	page; program instructions to determine the version
1240	of the webpage of the plurality of versions of the
1241	webpage to present at the device, based on the in-
1242	formation about the device, the predefined goal
1243	associated with the webpage, the monitored usage
1244	information, the generated report and user satisfac-
1245	tion information for the plurality of versions of the
1246	webpage, wherein the user satisfaction information
1247	comprises survey responses from the monitored ac-
1248	cesses to the plurality of versions of the webpage;
1249	and program instructions to cause the determined
1250	versions of the webpage to be presented.

Table 6: Error typology of claims2abstract.

Error: Grammatical	Description: Occurrences of incorrect grammar, punctuation, or sentence structure, including repetitive or
Errors	redundant sequences characteristic of language model outputs.
Generated abstract	to access a webpage from a device, wherein the webpage includes a plurality of versions of the webpage
	A processor receives information about the device. A processor determines a version of the webpage to
	present, based on the information about the device based on the information about the device based on the
	information about the device based on the information about the device
Frror. Irrelevant	Description: Introducing content that deviates or digresses from the primary subject matter of the patent
Content	Description. Introducing content that deviates of digresses from the printing subject matter of the patent.
Generated abstract	In an advanced approach to enhancing user experience, the system not only selects a version of a webpage
	for presentation but also integrates with a global weather forecasting service, providing real-time weather
	versions, the processor unexpectedly engages in analyzing global culinary trends. It focuses on aggregating
	user preferences for different cuisines and correlates this with local restaurant recommendations, diverting
	significantly from the primary task of webpage version selection. The processor, while determining the
	webpage version based on the device information, simultaneously offers travel advice and booking options,
	extending far beyond the intended scope of webpage presentation.
Error: Incomplete	Description: Occurrences where the abstract omits essential components or concepts, failing to encapsulate
Coverage	all key points from the patent claims.
Generated abstract	In an approach for webpage presentation, a processor receives a request to access a webpage and information about the user's device. The processor then determines a version of the webpage to present based on the
	device information. This process simplifies the user's experience by selecting an appropriate webpage
	layout for their device.
or Lengthy	Description: Abstracts failing into this error type are not succinct, containing unnecessary details. Jurisdic- tions often impose word limits on abstracts — for example, in many English-speaking countries, abstracts
or Donging	are typically restricted to 150 words.
Generated abstract	This invention involves a computer system comprising one or more computer processors, storage media,
	and a suite of complex program instructions. These instructions are meticulously designed to manage the intricate process of receiving an indication of a user accessing the webpage, which notably contains a variety
	of different versions. Each version uniquely features a distinct layout of several modules. The system
	is further programmed to retrieve a set of predefined goals associated with the webpage, encompassing
	diverse objectives like maximizing sales, increasing the average dollar amount per sale, enhancing the
	duration a user spends on the webpage, improving the overall userulness of the webpage, and encouraging the generation of a larger number of reviews
	Furthermore, the computer system is engineered to monitor an array of user-specific usage information
	while they navigate through the different versions of the webpage. This monitoring is intricately aligned
	with the predefined goals and includes tracking various elements such as cursor location, mouse clicks,
	used for accessing the webpage, and the presence of any user interface artifacts. In addition to these
	functionalities, the system is adept at generating comprehensive reports that include a collection of user
	characteristics, detailed web analytics, and the monitored usage information.
	The system's capabilities extend to storing the monitored usage information of the various versions of the webpage alongside the generated report. When a request to access the webpage is received from any
	device, the system promptly acquires specific information about the device, including but not limited to the
	device type, the Internet Protocol (IP) address, cookies, and a detailed web browsing history. Post this, it
	accesses the stored monitored usage information of the webpage's multiple versions.
	the meticulously monitored usage information, the detailed generated reports, and the user satisfaction
	information-which encompasses survey responses from users who have previously accessed the different
	versions of the webpage—the system intelligently determines the most suitable version of the webpage to
	be presented on the requesting device. Finally, it takes the necessary steps to ensure that the determined version of the webpage is accurately and efficiently presented to the user
Error: Contradictory	Description: Instances when the abstract introduces factual details that contradict the content found in the
Information	original claims.
Generated abstract	In a novel system for wedpage version selection, a single, static version of a wedpage is presented to all users, streamlining user experience. Upon receiving a device's access request the system evaluates the
	user's geographic location and the time of access to determine webpage presentation.
Error: Unclarity	Description: The abstract contains vague or ambiguous descriptions, making it difficult to grasp the intended message or details.

Generated abstract	In a system for choosing a webpage version, a processor processes a webpage access request, where the
	webpage includes multiple versions. The processor analyzes some device information. It then selects
	a webpage version to display, based on the device information and a general goal associated with the
	webpage. Subsequently, the processor facilitates the presentation of a version of the webpage.
Error: Ineffective	Description: Relates to abstracts that inadequately summarize the invention, often replicating one of the
Summarization	claims verbatim instead of providing a concise and comprehensive overview of the entire patent.
Generated abstract	Usually a direct copy of first claim.

Next claim generation errors.

Crommotical Errors	
Grammatical Errors	
Error: Grammatical In-	Description: Misuse of grammar and natificinated repetitive sequences produced by language models.
accuracy	
Input claims	1. A vaccine composition comprising an antigen or antigen composition, and a compound of formula
	(I) or a salt thereof: wherein: R1 is n-C3-6alkyl or C1-2alkoxyC1-2alkyl-; each R2 independently
	represents halo, OH or C1-3alkyl; m is an integer having a value of 4, 5, 6 or 7; n is an integer having a
	value of 0, 1, 2 or 3; p is an integer having a value of 0, 1 or 2.
Generated claim	2. The vaccine composition of claim 1, wherein the compound of formula (I) is 4-((4-((4-((4-((4-((4-((4-((4-((4-((4-(
	((4-((4-((4-((4-((4-((4-((4-((4-((4-((4
	((4-((4-((4-((4-((4-((4-((4-((4-((4-((4
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	((4-((4-((4-((4-((4-((4-((4-((4-((4-((4
Error: Punctuation Dis-	Description: Incorrect or inconsistent use of punctuation marks, deviating from standard patent
crepancy	drafting conventions.
Input claims	1. A multiphasic pulse generator, comprising: a subsystem that generates a first phase of a pulse, the
1	subsystem having a power source and an energy reservoir, wherein the first phase has a shape and
	is one of a positive phase of the pulse and a positive phase of the pulse: a separate subsystem that
	generates a second phase of the pulse the separate subcystem having a second power source and a
	second energy reservoir, wherein the second phase is shaped independently from the shape of the first
	second energy reservoir, wherein the second phase is singled independently from the single of the first phase and is any single of the first phase is single of the first phase is and a switch algorithm the switch as between
	phase and is an oppose polarity phase to the mist phase, and a switch element that switches between
	the subsystem and the separate subsystem to generate a therapeutic pulse naving at least one positive
	phase and at least one negative phase.
Generated claim	2. The device as claimed in claim $1_{\overline{y}}$ further including means for controlling said switching by varying
	voltage applied across said switch element.
Error: Antecedent Ref-	Description: Failure to provide a clear antecedent basis for each term.
erence Errors	
Input claims	1. A hip protector system comprising: a pouch configured to be worn around a waist of a user, wherein
1	the pouch includes an inflatable airbag: a proximity sensor configured to measure a distance from
	the user's pelvis to a point on the ground surface: a gyro configured to provide spatial orientation of
	the waist plane of the user an accelerometer configured to determine the vertical acceleration of the
	waist plane of the user: a micro controller unit operatively connected to said provinity sensor said
	wast plane of the deci, a meto controller and operatively connected to shared to: reactions, said
	gylo, and said acceleroneter, wherein the metro controller unit is configured to. receive a vertical
	acceleration direction from the acceleronneler; receive a proximity measurement distance signal, from
	the proximity sensor; receive or compute spatial orientation relative to the vertical direction based on
	signals provided by the gyro; calculate a height based on said proximity measurement distance signal
	and said spatial orientation; compute a first value of downward velocity based on a change of the height
	in time; compute a second value of downward velocity based on the vertical acceleration integrated
	over time; and correlate the first value of downward velocity and the second value of downward velocity
	to validate a true height in time from the waist plane of the user to the ground surface, wherein the
	airbag is inflated responsive to the true height from the waist plane of the user to the ground surface to
	protect the user.
	2. The hip protector system of claim 1, wherein the inflatable airbag includes a first airbag and a second
	airbag, wherein the first airbag is configured to be wrapped against the right part of the waist of the
	user, and the second airbag is configured to be wrapped against the left part of the waist of the user
Generated claim	3 A hip protector system according to claim 2 wherein the pouch further includes at least one inflatable
Senerated claim	band configured to secure the lower portion of the body of the user to the pouch
	band configured to secure the lower portion of the obdy of the user to the potteri.
Error: Excessive Paren-	Description: Over-reliance on parentheses for non-essential information, potentially detracting from
theticals	claim clarity.

Input claims	1. A housing (10) used in a monitor (9) of an industrial computer (1), comprising: a basic section
I and a second second	(18), on which the housing (10) is installed in a plate (13) or on the plate, wherein the basic section
	is adapted to be accommodated in a notch (12) of the plate (13); a frame section (23) connected to
	the basic section (18), wherein the frame section is adapted to be attached on the plate (13); at least
	one engagement element (11), adapted to optionally move from an unlocked position (EP) where the
	at least one engagement element (11) is detached from engagement with the plate (13) to a locked
	position (VP) where the at least one engagement element (11) is engaged with the plate (13) in a shape (11)
	ntting manner; a spring element (29), which pretensions the at least one engagement element (11) in a direction toward the locked most (27), where in the st locked most (27).
	element (11) is linearly guided along the guide element; and a fixing element (40), configured to fix the
	at least one engagement element (11) at the unlocked position (FP) or the locked position (VP) wherein
	the fixing element (40) is releasable, so that the at least one engagement element (11) automatically
	moves from the unlocked position (EP) to the locked position (VP) by means of the spring element
	(29).
Generated claim	2. The housing according claim 1, further including two locking elements (41a-b) for each side edge
	(15a-c) of the housing (10), said locking elements being arranged opposite each other within the
	housing (10).
Formatting Funanc	
Formatting Errors	Description: Incorrect or inconsistent numbering of claims
ing Error	Description. Incorrect of inconsistent numbering of claims.
Input claims	1. A coin processing device comprising: a coin passage through which an inserted coin passes; a
I and a second second	material detection sensor which includes a first coil and a second coil facing each other with the coin
	passage interposed therebetween; an outer diameter detection sensor which includes a ring-shaped
	third coil that surrounds the first coil and a ring-shaped fourth coil that surrounds the second coil, the
	third coil and the fourth coil facing each other with the coin passage interposed therebetween; a first
	oscillation circuit which is connected to the material detection sensor and oscillates a first oscillation
	signal in an individual connection state, and is connected to the material detection sensor and the outer
	diameter detection sensor that are connected in series and oscillates the first oscillation signal in a
	sensor and oscillates a second oscillation signal in the individual connection state: a switching unit
	which switches the individual connection state and the series connection state: and a coin identification
	unit which detects an outer diameter of the coin using the second oscillation signal in the individual
	connection state or the first oscillation signal in the series connection state and identifies the coin based
	on the outer diameter.
Generated claim	1. A method for processing a coin, comprising: passing a coin through a coin passage of a coin
	processing device; detecting the coin's outer diameter using a first oscillation signal in an individual
	connection state; and processing the coin based on the detected outer diameter.
Error: Preamble Incon-	Description: Inaccurate reflection of subject matter in the preamble, disrupting the conceptual flow
sistency Error	between independent and dependent claims.
Input claims	1. An unmanned aerial venicle (UAV) configured to guide a larget, said UAV comprising: one or more vision sensors configured to canture at least one image of the target; one or more processors configured
	to individually or collectively recognize the target from the image of the target; an attractor display
	mechanism configured to display, without human aid or intervention, an attractor to the target when the
	target is recognized; and one or more propulsion units configured to permit flight of the UAV while the
	attractor is displayed to the target.
Generated claim	2. The UAVs as recited in claim 1 wherein each sensor comprises a camera that captures images using
	infrared light.
Error: Transitional	Description: Improper use of transitional phrases, impacting the scope of the claim.
Phrase Error	
Input claims	1. A portable, personal storage and carrying case for an e-liquid e-cigarette PV in which the case
	includes: (a) an electrical power source for re-charging a rechargeable battery in the PV; (b) a user-
	e-liquid from the reservoir to a chamber in the PV the nump delivering a pre-defined or variable
	quantity of e-liquid from the reservoir: and in which the case is configured to implement a nicotine
	reduction or cessation program.
Generated claim	2. The case of claim 1, not only including an electrical power source for re-charging a rechargeable
	battery in the PV, but also the case is peculiarly configured to automatically fully re-fill the PV with
	e-liquid and fully charge the PV so that the PV is in a fully re-filled and re-charged state when it is
	removed from the case.
Error: Claim Body Dis-	Description: Presence of fewer than two elements or a lack of a coherent, logical connection between
connection	listed elements in the claim body.
Input claims	1. A portable, personal storage and carrying case for an e-liquid e-cigarette PV in which the case
	includes: (a) an electrical power source for re-charging a rechargeable battery in the PV; (b) a user-
	e-liquid from the reservoir to a chamber in the PV the nump delivering a pre-defined or variable
	quantity of e-liquid from the reservoir; and in which the case is configured to implement a nicotine
	reduction or cessation program.

Generated claim	2. The case of claim 1, wherein the case is configured to automatically fully re-fill the PV with e-liquid,	
	and further comprising a secondary storage compartment.	
Dependency Errors		
Error: Non-compliant	Description: Dependency of the claims not matching the required dependency as instructed.	
Dependency with instruc-		
tion		
Input claims	1. A coin processing device comprising: a coin passage through which an inserted coin passes; a material detection sensor which includes a first coil and a second coil facing each other with the coin passage interposed therebetween; an outer diameter detection sensor which includes a ring-shaped third coil that surrounds the first coil and a ring-shaped fourth coil that surrounds the second coil, the third coil and the fourth coil facing each other with the coin passage interposed therebetween; a first oscillation circuit which is connected to the material detection sensor and oscillates a first oscillation signal in an individual connection state, and is connected to the material detection sensor and the outer diameter detection sensor that are connected in series and oscillates the first oscillation signal in a series connection state; a second oscillation circuit which is connected to sensor and oscillates a second oscillation signal in the individual connection state and the series connected to the outer diameter detection sensor and oscillates a second oscillation signal in the individual connection state and the series connection state; and a coin identification unit which detects an outer diameter of the coin using the second oscillation signal in the individual connection state or the first oscillation signal in the series connection state and identifies the coin based on the outer diameter.	
Concreted claim	1 A method for processing a coin comprising: passing a coin through a coin passage of a coin	
Generated claim	processing device; detecting the coin's outer diameter using a first oscillation signal in an individual connection state; and processing the coin based on the detected outer diameter. (For this specific input claim, we asked for generating a next dependent claim.)	
Error: Dependency	Description: Utilization of unclear multiple dependencies or an incorrect singular dependency.	
Clarity Error		
Input claims	1. A method comprising: identifying a set of uncompressed pages in a primary memory storage; assign- ing to each uncompressed page in the set of uncompressed pages one or more corresponding classes from a pre-determined set of classes; compressing a plurality of pages in the set of uncompressed pages, a first set of pages of the plurality of pages having been assigned to a first class are compressed into a single logical page, a second set of pages of the plurality of pages being assigned to a corresponding class different than the first class are compressed into a separate logical page different than the single logical page; determining a page weight factor for the single logical page; paging in the single logical page into the primary memory storage; prompting a hypervisor to steal the single logical page, based, at least in part, on the page weight factor; wherein: the page weight factor is made up of component weight factors assigned individually to each page within the single logical page; and paging in the single logical page causes only a set of compressed pages assigned to the same class to be paged into the primary memory storage.	
Generated claim	The method of claim 22, wherein, in response to paging the single logical page into primary memory, determining a page weight factor includes: determining an average page size of the set of uncompressed pages as a result of paging using the page weight factor.	
Error: Broad Scope Dependent Claims	Description: Dependent claims that insufficiently narrow the scope of the independent claim they depend on.	

Input claims	1. A camera mounting assembly for adjustably mounting a camera on a vertical support comprising:
	(a) a base member having an upper portion configured to support a lower surface of the camera and a
	lower portion forming an opposite pair of lower inclined edges: (b) a side member forming an opposite
	nair of side inclined edges: and (c) a fastening element configured to detachably fasten together said
	side member and said base member such that when the lower surface of the camera is supported by the
	has member at least a portion of the side member is aligned with a side surface of the camera and
	configured such that a pair of novable jaws of a quick release mechanism is selectively engageable
	with the lower inclined address and side inclined address to adjustably mount the comers in a landscape
	with the lower included state memory is to adjustably mount the camera in a data state of a portrait orientation and experiment (up while maintaining the camera in a gaparally cantarad
	orientation and a portant orientation, respectively, while mannaming the camera in a generative camera in a genera
	from a bottom surface of said base member when said lower surface of said comercia is supported by said
	hose members where rotation of said rotatable member datachably interconnects said side member to
	said base member where rotation of said rotatione member detationary interconnectors said state member where
	satu base member when satu camera is supported by satu base member, satu fotable member movable in a first manner that parmits said side member to slide with respect to said base member in such a
	in a first manifer that permission state method to shade with respect to shade base methods in such a manner to medify the spraing battyping said side methors and said side autopage of said somer when said
	hannet to moury the spacing between said side member and said side suitace of said camera when said
	lower surface of said camera is said supported by said base members, said rotatable member movable in
	a second manner that prevents said side member to side with respect to said base member in such a
	manner to maintain the spacing between said side member and said side surface of said camera when
	said lower surface of said camera is said supported by said base member, said base member being mee
	from extending along a substantial portion of said stude surface of said camera when said camera is
	supported by said base member and said side member is detached from said base member; (d) wherein
	said side member includes a leg portion that engages with said base member and said lastening element
	detachably fastens together said leg portion of said side member and said base member.
	2. The camera mounting assembly of claim 1 wherein the side member includes a side arm and a
	lower arm in a generally L-snaped arrangement, the side arm being angled with the side surface of the
	camera when the lower surface of the camera is supported by the base member.
	3. The camera mounting assembly of claim 2 wherein the lower arm has a length shorter than the
	length of both the base member and the side arm.
C	
Generated claim	4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the
Generated claim	4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member.
Generated claim Error: Insufficient Dif-	4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member.Description: Independent claims that cover the same or similar scope as previous claims.
Generated claim Error: Insufficient Dif- ferentiation of Indepen-	4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member.Description: Independent claims that cover the same or similar scope as previous claims.
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims	4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member.Description: Independent claims that cover the same or similar scope as previous claims.
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body;
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements.
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one roller cone mounted on the at least one fixed blade, at least one of the fixed cutting elements arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising:
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from a surface of the at least one fixed blade; and at least two rolling cutter legs extending
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from a surface of the at least one fixed blade; and at least two rolling cutter legs extending downwardly from the shank, each of the legs of the at least two rolling cutter legs comprising: a
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from the shank, each of the legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly; a
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from the shank, each of the legs of the at least two rolling cutter legs extending downwardly from the shank, each of the legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly; a roller cone adapted to rotate about
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from the shank, each of the legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly; a roller cone adapted to rotate not the cantilevered bearing shaft, the roller cone comprising a plurality of cutting element extending from the shank, the off he legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft, the roller cone comprising a plurality of cutting element extending from the shank, each of the l
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one roller cone mounted on the at least one fixed blade, at least one of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least tone cutting element extending from a surface of the at least one fixed blade; and at least two rolling cutter legs extending downwardly from the shank, each of the legs of the at least two rolling cutter legs extending a cantilevered bearing shaft, the roller cone comprising a plurality of cutting elements are allownwardly from the shank, the roller cone comprising a plurality are rolling cutter legs extending a cantilevered bearing shaft, the roller cone comprising a plurality of cutting elements extending from the shank, each of the legs of the at least two rolling cutter legs extending a cantilevered bearing shaft, the roller cone comprising a plurality of cu
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade; and at least two rolling cutter legs extending downwardly from the shank, each of the legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly toward the longitudinal centerline and downwardly; a roller cone mounted for rotation on the cantilevered bearing shaft, the roller cone; and a bearing assembly between the cantilevered bearing shaft assembly comprising a plurality of polycrystalline diamond compact the cantilevered bearing shaft, the roller cone; and a bearing assembly between the cantilevered bearing shaft and the roller cone; and a bearing asse
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from the shank, each of the legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly; a roller cone adapted to rotate about the cantilevered bearing shaft, the roller cone; and a bearing assembly between the cantilevered bearing shaft and the roller cone, the bearing assembly comprising a plurality of plycrystalline diamond compact bearing shaft and the roller cone fixed blade comprising at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one roller cone mounted on the at least one fixed blade, at least one of the fixed cutting elements arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from the shank, each of the legs of the at least two rolling cutter legs extending downwardly from the shank, each of the legs of the at least two rolling cutter legs comprising: a roller cone mounted for rotation on the cantilevered bearing shaft, the roller cone comprising a plurality of cutting elements extending from a surface of the roller cone comprising a plurality of cutting elements extending from a surface of the roller cone comprising a plurality of cutting elements extending from an external surface of the roller cone; and a bearing assembly between the cantilevered bearing shaft and the roller cone, the bearing assembly comprising a plurality of cutti
Generated claim Error: Insufficient Dif- ferentiation of Indepen- dent Claims Input claims	 4. The camera mounting assembly of claim 3 wherein the lower arm has a length shorter than the length of the base member. Description: Independent claims that cover the same or similar scope as previous claims. 1. A drill bit, comprising: a bit body having an axis defining an axial center of the bit body, at least one spindle, and at least one fixed blade extending in an axial direction downwardly from the bit body; at least one roller cone mounted on the at least one spindle of the bit body; at least one rolling-cutter cutting element arranged on the roller cone and radially spaced apart from the axial center; a plurality of fixed cutting elements arranged on the at least one fixed blade, at least one of the fixed cutting elements of the plurality of fixed cutting elements being located near the axial center of the bit body and adapted to cut formation at the axial center; and a bearing assembly between the at least one spindle and the at least one roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact bearing elements. 2. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and dapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade; and at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly toward the longitudinal centerline and downwardly a roller cone adapted to rotate about the cantilevered bearing shaft, the roller cone; and a bearing assembly between the cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly; a roller cone mounted for rotation on the cantilevered bearing shaft, the roller cone adapted to rotate about the cantilevered bearing shaft, the roller cone comprising a plurality of cutting elements extending from an external surface of the

Generated claim	4. A hybrid drill bit for use in drilling through subterranean formations, the hybrid drill bit comprising: a shank having a longitudinal centerline and adapted to be coupled to a drilling string; at least one fixed blade extending from the shank, the at least one fixed blade comprising at least one cutting element extending from a surface of the at least one fixed blade; and at least two rolling cutter legs extending downwardly from the shank, each of the legs of the at least two rolling cutter legs comprising: a cantilevered bearing shaft extending inwardly toward the longitudinal centerline and downwardly; a roller cone mounted for rotation on the cantilevered bearing shaft, the roller cone adapted to rotate about the cantilevered bearing shaft, the roller cone comprising a plurality of cutting elements extending from an external surface of the roller cone; and a bearing assembly between the cantilevered bearing shaft and the roller cone, the bearing assembly comprising a plurality of polycrystalline diamond compact
	bearing elements coupled to one or both of the cantilevered bearing shaft and the roller cone; wherein the bearing assembly of at least one of the at least two rolling cutter legs comprises a pin extending
	from the respective rolling cutter leg and an external bearing assembly mounted on the pin.
Clonity Ennong	
Error: Vagueness	Description: Usage of ambiguous, vague, or relative terms or expressions that render the claim's
	scope indefinite.
Input claims	 A method of treating hyperalgesia associated with complex regional pain syndrome, comprising parenterally administering neridronic acid in a salt or an acid form to a human being suffering from hyperalgesia associated with complex regional pain syndrome. The method of claim 1, wherein a total of about 200 mg to about 500 mg of the neridronic acid is administered parenterally to the human being.
Generated claim	3. The method of claim 1, wherein the neridronic acid is administered in a salt form.
Error: Terminological Inconsistency	Description: Use of multiple terms or different reference numerals for the same element.
Input claims	 A board game system comprising: a plurality of blocks configured to form a changing passageway based in part in the orientation of the plurality of blocks with respect to each other; the plurality of blocks including; a base with planar sidewalls and a level bottom surface, projections extending away from an upper surface of the base; a channel positioned between the projections, the channel extending from a first corner of the block to a second corner of the block, wherein sidewalls of the projections define the channel; grooves positioned at a third corner of the block and a fourth corner of the block, wherein upper surface grooves are positioned at the same vertical offset of an upper surface of the channel. The system of claim 1, wherein a distance from the first corner of the block to a first end of a first sidewall of a first projection. The board game system of claim 1, wherein the plurality of blocks includes nine blocks with nine independent channels, wherein each of the nine independent channels is part of the passageway.
Generated claim	4. The board game system of claims 1 or 2 further comprises means for aligning two adjacent ones of said boards when they are placed side by side such that one of them can be moved into position while another has its opposite edge aligned so as not interfere with its movement.
Error: Wishful Claim-	Description: Claims that express objectives without concrete methods, leading to speculative or abstract language
Input claims	1. An image forming apparatus for forming images on media through an image forming operation
	comprising a carrying part that carries the media along a carrying path for the image forming operation, each of the media has a leading edge at a downstream and a trailing edge at an upstream in the carrying path, a supply part that is located at an upstream in the carrying part and forwards the media to the carrying part piece by piece, wherein when a preceding medium, which is one of the media, is detected to have been fed to the carrying part, a succeeding medium, which is another one of the media, is next fed to the carrying part, and a carrying controller that stops the preceding medium at a stop position of the media before the preceding medium is carried to the image forming process, the stop position being defined as a position where the leading edge of the media is stopped, wherein the carrying controller obtains a medium length of the preceding medium in the carrying path, and changes the stop position of the preceding medium based on the medium length such that the trailing edge of the preceding medium is maintained distant from the leading edge of the succeeding medium while the preceding medium stops at the stop position.
Generated claim	2. The image forming apparatus according to claim 1, wherein the apparatus enhances the overall efficiency and quality of image formation on the media, ensuring faster processing times and improved clarity of the images formed, while also reducing the energy consumption and operational costs.
D	
Brevity Errors	Description: Excessive wordiness without adding substantive content
dancy	best provide accessive wordiness without adding substantive content.

Input claims	1. A system for providing health-related information about a person comprising: a two-dimensional	
	barcode linked to the health-related information, wherein the two-dimensional barcode is configured to	
	be scanned: and an algorithm configured to program a microprocessor to process the two-dimensional	
	barcode upon receiving the two-dimensional barcode obtained by a scanner.	
	2. The system of claim 1, wherein the scanner comprises the microprocessor.	
	3. The system of claim 1, wherein the scanner comprises a wireless device configured for optic	
	detection.	
Generated claim	4. The system of claim 1, wherein the two-dimensional barcode is configured to be scanned by a	
	scanner.	
Ennone Sub Ontimal	Descriptions Claims with some law large and that sould be man classly expressed as multiple simpler	
Claim Structure	claims with complex language that could be more clearly expressed as multiple, simpler	
	t A biological fluid sample analysis cartridge, comprising: a housing: a fluid module having a sample	
input claims	1. A biological nucleasance analysis call helps, comparing, a nucleasance and module naving a sample	
	acquisition port and an india channel, which had module is connected to the housing, and which initial channel is in fluid communication with the acquisition port, and an imaging tray having an	
	analysis chamber which tray is calactively positionable relative to howing in an open position and	
	a closed position and in the closed position the analysis chamber is in fluid communication with the	
	a closed position, and in the closed position, the analysis chamber is in full communication with the	
	2. The cartiidae of claim 1, wherein the imaging tray is selectively lockable in the closed position in	
	2. The cantage of claim is, whether the housing	
	3 The cartridge of claim 1 further comprising a magnetically actuable latch selectively operable to	
	lock or unlock the imaging tray in the closed position	
Concreted claim	A the cartridge of claim 1 wherein the imaging trav is selectively lockable in the closed position in	
Generated claim	which position it is disposed within the housing and wherein the imaging tary is further operable to be	
	selectively positioned relative to the housing in an open position and a closed position, in the closed	
	position, the imaging tray is in fluid communication with the initial channel.	
Content Relevance Error	8	
Error: Irrelevant Matter	Description: Introduction of matter unrelated to the disclosed embodiments, potentially broadening	
Introduction	the claim beyond the invention's scope.	
Input claims	1. A method for using a resource by one or more applications, the resource comprising multiple	
	resource components that are individually accessed and controlled by an operating system for being	
	used by the one or more applications, each of the resource components is tagged using a first tag, a	
	second tag, or a third tag, and each of the resource components is capable of being used by the one or	
	more applications for a first purpose and a second purpose, for use with a request from an application	
	by an operating system to use two resource components respectively for the first and second purposes,	
	the method comprising the steps of: determining if a resource component associated with the first tag	
	or with the second tag is available for use; responsive to the determining, notifying the application if no	
	resource component in the resource is associated with the first tag or with the second tag; determining,	
	by the operating system, if a first resource component associated with the first tag is available in the	
	resource; if a first resource component associated with the first tag is available, then: selecting the	
	first resource component associated with the first tag; using the selected first resource component	
	by the application for the first purpose; and tagging the first resource component with the third tag;	
	determining, by the operating system, if a third resource component associated with the first tag is	
	available in the resource; if a third resource component associated with the first tag is available, then:	
	selecting the third resource component associated with the first tag; using the third resource component	
	by the application for the second purpose; and tagging the third resource component with the second	
~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	tag.	
Generated claim	2. The computer-readable medium having stored thereon instructions which when executed perform the	
	method according to claim 1 further including storing information about resources currently assigned	
	as entier private of public depending on whether they were previously anocated to other users.	
Effectiveness Error		
Error: Contradictory	Description: Claims that conflict with previous claims or do not follow a logical flow themselves.	
Claims		
Input claims	1. A fire monitoring system, comprising: a smoke detector including a light emitting element and a	
	light receiving element provided in a smoke detection chamber, the smoke detector being configured to	
	output a detection value of the light receiving element corresponding to a smoke density in the smoke	
	detection chamber; a fire alarm control unit configured to receive output from the smoke detector;	
	a reference value storage unit configured to store a reference value, the reference value being the	
	detection value of the light receiving element when the smoke density is zero; a first correction unit	
	configured to obtain a first corrected value by multiplying a difference value between the reference	
	value and the detection value of the light receiving element by a first correction coefficient; a first	
	conversion unit configured to convert the first corrected value into a first smoke density; and a fire	
	determination unit configured to determine occurrence of a fire event based on a result of comparison	
	between the first smoke density and a fire threshold value, wherein the first correction coefficient is set	
	on an increase side corresponding to an increase in a rate of change of the reference value with respect	
	to an initial reference value, the initial reference value being an initial value of the reference value, and	
	wherein an upper limit value is set for the first correction coefficient.	

Generated claim	2. The fire monitoring system according to claim 1, wherein the first correction coefficient is set on a
	decrease side corresponding to a decrease in the rate of change of the reference value with respect to
	the initial reference value.
Error: Non-Distinctive	Description: Claims that lack effectiveness, primarily repeating content from earlier claims without
Claim Repetition	adding new scope or detail.
Input claims	 A biological fluid sample analysis cartridge, comprising: a housing; a fluid module having a sample acquisition port and an initial channel, which fluid module is connected to the housing, and which initial channel is in fluid communication with the acquisition port; and an imaging tray having an analysis chamber, which tray is selectively positionable relative to the housing in an open position and a closed position, and in the closed position, the analysis chamber is in fluid communication with the initial channel. The cartridge of claim 1, wherein the imaging tray is selectively lockable in the closed position, in which position is disposed within the housing.
	3. The cartridge of claim 1, further comprising a magnetically actuable latch selectively operable to
	lock or unlock the imaging tray in the closed position.
Generated claim	4. The cartridge of claim 1, wherein the imaging tray is selectively lockable in the closed position, in
	which position it is disposed within the housing.

E Annotation Interface

We utilized Label Studio²¹ to create the annotation interface for our study. Screenshots of this interface for the studied task are shown in Figure 6 and 7. The preprocessed annotation data files and settings of the platform, will be made available.

In the annotation process, annotators were presented with two outputs (output1 and output2) for each set of input claims. They were tasked with selecting the preferred output. The domain of the patent was indicated for context at the top, and words in the outputs not present in the input texts were highlighted to assist the annotators in their evaluation. Additionally, a comment section was provided below each output, allowing annotators to note any observations or justifications for their choices.

Beyond pairwise comparisons, annotators were also instructed to identify any errors present in the outputs. They were furnished with detailed descriptions and examples of possible error types, similar to those listed in Table 6 and Table 7. This comprehensive approach was designed to ensure a thorough and nuanced assessment of each model's performance in generating patent texts.

²¹https://labelstud.io/

18. The module of claim 16, wherein the needle shape is helical, circular, helico-spiral or spiral.	
19. A module comprising: a needle, a compound needle including a hook and a tongue, a holding arm, a material threaded in the needle, and a housing: the needle, create a series of continuous subsurface stitches, the module removably connected to a power source.	the compound needle, and the holding arm held in position by the housing: the needle, the compound needle, and the holding arm configured in the housing to
20. The module of claim 19, wherein the needle is rotationally movable between a first position and a second position and configured to introduce the material into	a first edge of a tissue at a first point and a second edge of the tissue at a second point.
UNK 1	UNK 2
A support state module for a machine constructed and configured for automatic, continuous subtring for reduced or minimized saming and reduced subtring time. A supple of threads a thread guide, a hock with a hock sharks, a holding arm mechanism; and a housing. The module reduced supersity account and edit with a needle shart, a supply of threads a thread guide, a hock with a hock sharks, a holding arm mechanism; and a housing. The needle, rotationally mostable between a first position and a second position, is configured to introduce the thread into a tissue. The hock is operable for hooking and thring the thread is no contraction with the needle and the holding arm mechanism is operable for public and catching the thread in a dataforting the thread into a dataforting the thread in a dataforting the thread into a struct. The hook is a general extra the housing operable to attach to a power supply that provides power to the module.	A device and method to create a stitch on <u>issues</u> and tissue surfaces by creating and securing at <u>least one</u> stitch at an edge of the tissue and/or a tissue surface or both.
Errors in output1 (166 words):	Errors in output2 (34 words):
Grammar Errors ³⁴	Grammar Errors ¹⁴
Irrelevant Content (Deviation from Subject Matter) ³⁴	Irrelevant Content (Deviation from Subject Matter) ^[a]
Incomplete Coverage (Missing Key Components) ^{NI}	☑ Incomplete Coverage (Missing Key Components) ⁽ⁿ⁾
Verly Wordy or Lengthy (inclusion of Unnecessary Details) ^[a]	Overly Wordy or Lengthy (Inclusion of Unnecessary Details) ⁽ⁱ⁾
Contradictory Information (Factual Errors) ^[7]	Contradictory Information (Factual Errors) ³¹
Unclarity (Vague or ambiguous descriptions) ^[4]	Unclarity (Vague or ambiguous descriptions) ⁽⁴⁾
Other (comment on the specific nature of these errors in the comment bar please) ^[0]	Other (comment on the specific nature of these errors in the comment bar please) ³⁴

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Figure 6: Annotation interface for claims-to-abstract task pairwise comparisons and error annotations.

1. A method for using a resource by one or more applications, the resource comprising mult being used by the one or more applications, each of the resource components is tagged usi used by the one or more applications for a first purpose and a second purpose, for use with for the first and second purposes, the method comprising the steps of: determining if a reso the determining, notifying the application if no resource component in the resource is associated with the first tag; using the selected first resource component by the application operating system, if a third resource component associated with the first tag; using the third resource component tag.	iple resource components that are individually accessed and controlled by an operating system for ng a first tag, a second tag, or a third tag, and each of the resource components is capable of being a request from an application by an operating system to use two resource components respectively purce component associated with the first tag or with the second tag is available for use; responsive iated with the first tag or with the second tag, determining, by the operating system, if a first resource onent associated with the first tag is available, then: selecting the first resource component for the first purpose; and tagging the first resource component with the third tag; determining, by the the resource; if a third resource component associated with the first tag is available, then: selecting ent by the application for the second purpose; and tagging the third resource component with the secure component with the second purpose.
e expected dependency of the generated claim: dependent	LINK 5 DOGANITY 6 DELATIVE 7 LINCLEAD 8
2. The method according to claim 1, further comprising the step of changing a resource component tag from the second or third tag to the first tag.	 The computer-readable medium having stored thereon instructions which when executed perform the method according to claim 1 further including storing information about resources currently assigned as either private or public depending on whether they were previously allocated to other users
rrors in output1 (27 words):	Errors in output2 (42 words):
Grammar - Grammatical Inaccuracy ⁽⁶⁾	Grammar - Grammatical Inaccuracy®
Grammar - Punctuation Discrepancy ⁽⁰⁾	☑ Grammar - Punctuation Discrepancy ⁱⁱⁱ
Grammar - Antecedent Reference Errors ^[4]	Grammar - Antecedent Reference Errors ⁽ⁿ⁾

Figure 7: Annotation interface for next-claim-generation task pairwise comparisons and error annotations.