Did they direct the violence or admonish it? A cautionary tale on contronomy, androcentrism and back-translation foibles

Abstract

The recent raft of high-profile gaffes involving neural machine translation technology has brought to light the unreliability and brittleness of this fledgling technology. These revelations have worryingly coincided with two other developments: The rise of back-translated text being increasingly used to augment training data in so termed low-resource natural language processing (NLP) scenarios and the emergence of 'AI-enhanced legal-tech' as a panacea that promises 'disruptive democratization' of access to legal services. In the backdrop of these quandaries, we present this cautionary tale where we shed light on the specifics of the risks surrounding cavalier deployment of this technology by exploring two specific failings: Androcentrism and Enantiosemy. In this regard, we empirically investigate the fate of the pronouns and a list of contronyms when subjected to back-translation using the state-of-the-art Google translate API. Through this, we seek to highlight the extent of prevalence of the defaulting-to-the-masculine phenomenon in the context of engendered profession-related translations and also empirically demonstrate the scale and nature of threats pertaining to contronymous phrases covering both current-affairs and legal issues. All of the code and datasets generated in this paper have been open-sourced for the community to build on here: https://bit.ly/3cw42gq.

1 Introduction: Enjoining caution

Consider the following sentence: "*The trial court **enjoined** the violence but specifically exempted peaceful picketing from the scope of the injunction*" (Editors 1941). According to *The People's Law Dictionary* by Gerald and Kathleen Hill (Hill and Hill 2002), the verb **enjoin** is defined as: *v. for a court to order that someone either do a specific act, cease a course of conduct or be prohibited from committing a certain act.* Upon setting the target language to be Kannada [1], the Google translate output for this sentence reads "ವಿಚಾರಣಾ ನ್ಯಾಯಾಲಯವು ಹಿಂಸಾಚಾರವನ್ನು ಆದೇಶಿಸಿತು ಆದರೆ ಶಾಂತಿಯುತ ಪಿಕೆಟಿಂಗ್ ಅನ್ನು ತಡೆಯಾಜ್ಞೆಯ ವ್ಯಾಪ್ತಿಯಿಂದ ವಿನಾಯಿತಿ ನೀಡಿತು ." As seen, the contronym *enjoined* is translated as ಆದೇಶಿಸಿತು (Ādēśisitu) which, while colloquially acceptable, happens to be the exact ***wrong*** interpretation of the word in this legal context and the translated sentence implies that the court ***ordered*** the violence! Further, upon translating back to English, the translation now woefully reads: *The trial court **ordered** the violence but exempted peaceful picketing from jurisdiction*.

Besides the obvious threat of misinformation promulgation, we would like to situate the above specific mistranslation foible in the context of the co-temporal emergence of two worrisome developments:

1. The rise of back-translation as a crucial data-augmentation module in low-resource Natural Language Processing (NLP) applications.
2. The emergence of the so-termed *AI-enhanced legal tech* as a "disruptive democratizing force" that has "demonstrated the potential to revolutionize legal-services delivery" (Jr. 2019).

By carrying out detailed experiments that demonstrate two specific vulnerabilities pertaining to contronymy and androcentric defaulting-to-the-masculine, we motivate caution on the part of the purveyors of AI-enhanced legal-tech as well as LLM (Large Language Models) - NMT (Neural Machine Translation) dilettantes alike. To this end, we use a state-of-the-art algorithmic translation service that purportedly incorporates "*next-generation Neural translation technology*"(Google 2021b) and perform both language-specific longitudinal explorations as well as breadth-wise cross-language analyses to highlight the shortcomings.

All the experimentation code and the dataset(s) generated in this paper are duly open-sourced here: https://bit.ly/3cw42gq to facilitate reproducing the results and further critique.

1.1 Paper organization

The rest of the paper is organized as follows. In Section 2, we cover the background surrounding Back-translation literature in NLP and Enantiosemy. In Section 3, we cover the first vector of vulnerability that we empirically explore pertaining to Contronymy. In Section 4, we cover the second vector of vulnerability pertaining to Androcentrism and conclude the paper in Section 5.

2 Background and related work

Back-translation (BT), simply put, entails a translator (a human or an algorithm) re-translating textual content that was

[1] One of the scheduled languages of India of Dravidian origin spoken predominantly by the people of Karnataka in south western region of India

translated into an intermediate target language back to the original source language. In the Section 2.1 below, we sift through the background literature with regards to BT that helps motivate the nature of empirical analysis we later carry out in the paper. In Section 2.2, we provide a brief introduction with regards to the linguistic phenomenon of Enantiosemy to help better understand the experiment involving contronyms.

2.1 Back-translation in linguistics and NLP

The early 1950s saw the emergence of BT as an invaluable tool for checking translation errors (Ervin and Bower 1952). Later in the late 1960s, Richard Brislin, in the pioneering work on *Back-Translation for Cross-Cultural Research* (Brislin 1970), carried out one of the earliest large-scale back-translation projects when with a team of "[n]inety-four bilinguals from the University of Guam, representing ten languages, translated or back-translated six essays incorporating three content areas and two levels of difficulty". In recent years, within the larger ambit of *Deep learning driven Natural Language Processing (NLP)*, BT is increasingly seen as an important module in Statistical Machine Translation (SMT) pipelines. In the context of phrase-based translations with monolingual data, Bojar and Tamchyna (Bojar and Tamchyna 2011) harnessed BT in what they term as the "reverse self-training" procedure that " ... *improves the decoder's ability to produce grammatically correct translations into languages with morphology richer than the source language especially in small-data setting*". In the context of training Neural Machine Translation (NMT) models, Sennrich et al (Sennrich, Haddow, and Birch 2016) paired monolingual training data with synthetic back-translated data (as additional parallel training data) to achieve " ... *substantial improvements on the WMT 15 task English<->German (+2.8-3.7 BLEU), and for the low-resourced IWSLT 14 task Turkish->English (+2.1-3.4 BLEU)*" as well. BT also features prominently in the context of recent advances in Unsupervised Machine Translation (UMT) models that are trained using only monolingual corpora. In (Lample et al. 2017), the authors motivated by the issue of *low-resource language pairs*, investigated whether it was possible to train a translation model even without any parallel data by taking sentences from previously constructed monolingual corpora in two different languages and mapping them into the same latent space. They reported " ... *BLEU scores of 32.8 and 15.1 on the Multi30k and WMT English-French datasets, without using even a single parallel sentence at training time*". Inspired by the above-mentioned works, researchers from Facebook AI Research and Google Brain, in their work titled *Understanding Back-Translation at Scale* (Edunov et al. 2018) sought to *broaden the understanding of back-translation* and investigated a number of methods to generate synthetic source sentences and concluded that in all but resource poor settings, BT techniques (obtained via sampling or noised beam outputs) were in fact the most effective. Besides scaling their experiments to *hundreds of millions of monolingual sentences* that did result a new state of the art score of 35 BLEU on the WMT'14 English-German test set, they also demonstrated that " ... *synthetic data can achieve up to 83% of the performance attainable with real bitext!*".

These highly cited works have set the stage for BT being an indispensable technique in the context of achieving state-of-the-art scores (and worryingly if we may add) in what are deemed to be resource-poor or low-resource settings. In (Feldman and Coto-Solano 2020), the authors used the iterative BT technique (Sennrich, Haddow, and Birch 2016) for data-augmentation to train an NMT model for the *Chibchan* language, *Bribri*, that achieved an average performance of BLEU 16.9±1.7 inspite of being trained on an extremely small dataset of 5923 Bribri-Spanish pairs. Similarly, the authors in (Xu et al. 2019) harnessed BT for NMT involving the *resource-poor* Lithuanian and Gujarati languages. Li et al (Li, Sha, and Shi 2020) investigated the effects of synthetic back-translated data for what they terms as *low resource less related language pairs* that is Chinese and Vietnamese.

Outside of SMT, BT is being increasingly used as the data-augmentation strategy of choice for various downstream tasks in low-resource settings. In (Shleifer 2019) back-translated and augmented data was used to improve the accuracy of text-based movie review classification. Levi et al (Levi et al. 2020) used Google-Translate©as the translation engine to back-translate and augment data (with German being the intermediate language) in the context of narrative analysis with news corpora. BT-augmented data generated using NLP cloud APIs was used to improve the accuracy of text polarity prediction in (Coulombe 2018). BT was also an integral part of the pioneering work in (Prabhumoye et al. 2018) where textual style-transfer was attempted. Today, back-translation augmentation is available as an off-the-shelf module in popular Python NLP packages such as `NLPAug` (Ma 2019) (that uses Facebook-AI's fairseq (Ott et al. 2019) as the backend translation engine) and the `BackTranslation`-PyPi package (that offers Google-translate as well as Baidu Translation APIs as backend options).

2.2 Enantiosemy and related work

Contronyms, (also termed as *autoantonyms, antagonyms, antilogies* and *Janus words*), are words that inspire contradictory meanings depending on the ***context*** of their usage. As per (Lederer 1978), it was Jack Herring, who in an article in the February 1962 issue of the World-study magazine, introduced the term contronym. The linguistic phenomenon that encompasses contronyms is often termed enantiosemy or contronymy. DuBois in (DuBois 2018) viewed enantiosemy as "*special form of polysemy wherein a lexeme has two directly opposing senses*", thus situating the phenomenon at the intersection of antonymy and polysemy. As stated in (Ozyumenko 2019), this phenomenon has especially attracted the attention of Slavic semanticists that has resulted in works such as (Filipec 1985; Klégr 2013). It has been speculated that inverse semantic processes entailing semantic broadening, polarization of actants and idiosyncratic conflation of two hitherto-unrelated homographs give rise to the emergence of contronyms in spoken language (See (Shmelev 2016, 2012)). Parsing through the examples provided in online repositories such as (Wiktionary 2021; Burkardt 2020), we gather that contronyms take opposite meanings on account of reasons such as persistence of archaic interpretations, native-versus-non-native usage differences, its usage in *legalese* (Hair 1991) as opposed to the colloquial usage, the American-British di-

chotomy, and also whether the word is being used as a verb or an adjective.

In the context of legal usage, works such as (Hjort-Pedersen and Faber 2001; Ozyumenko 2019; Ozyumenko and Chilingaryan 2015) have called for extreme caution and care to be deployed while translating and interpreting legal documents into other languages. Inspired by this body of work, in the forthcoming section, we carry out both latitudinal (across all languages) and longitudinal (with Kannada as the intermediate language) exercises to highlight the nature and extent of risks that back-translation begets in the context of contronymous sentences.

3 Vulnerability-1: Contronymy

The goal of this section is to investigate the fate of contronyms upon completing the *back-translation journey*. To this end, we design two experiments. The first experiment is a breadth-wise-latitudinal exploration across all the 109 languages using a specific sentence "*The court enjoined the violence!*". The second experiment in a depth-wise-longitudinal foray that focuses on a specific language, `Kannada`, using a hand-curated list of sentences entailing many contronyms. We hope the specifics and the extent of the shortcomings demonstrated in this section will help justify the tone of caution-and-skepticism with regards to NMT that has been the main theme in this paper.

3.1 The fate of enjoin: A latitudinal experiment

Certain use cases for contronyms can magnify the importance of accurate translations. One important subset of contronyms are those that have specialized uses, such as in law. An inaccurate back-translation for these words may have an outsized effect as word choice in these contexts tends to be highly deliberate, with technical consequences for choosing incorrectly (Way 2016; Drugan, Strandvik, and Vuorinen 2018). In the legal context, straying beyond normal legal language can impact the strength of a contract or court ruling and, from the perspective of one being legally bound, improper translation can cause unintentional violations of the law and as a result fidelity to the text is a primary concern (Emily 2005). Outside of their strict legal usage, many of these terms also appear in news headlines reporting on legal events, such as the outcome of a contentious court case. Improper translations can influence the perceptions of those unable to speak the language and shape English-language coverage and analysis (Wade and Tabatabai 2017).

To study a situation where mistranslation can have an especially problematic effect, we translate a sentence using the word "enjoined" into all 109 languages available through the Google Translate API and then back-translate into English. "Enjoined", which among other definitions can mean either prescribing an action or prohibiting it, is often used in legal documentation and court rulings, as well as subsequent reporting on them. Our sentence choice seeks to capture both a potential legal context and that of a news headline. We back-translate the sentence "The court enjoined the violence!" and categorize the results into results where the back-translation orders or prescribes violence, results where the back-translation prohibits it, and idiosyncratic translations or mistranslations.

We report the results across all 109 languages, including

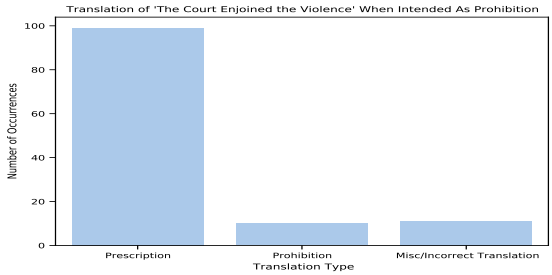

Figure 1: Bar-plot capturing the results of the translating "The court enjoined the violence!" across all the 109 languages.

English, in Fig.1 (a table of the translations is included in Table 7). Overall, there were 88 languages where the back-translation prescribed violence and only 10 that prohibited it. Only the English "back-translation" (included in the prohibition group) included "enjoined". In the non-mistranslated cases, one of the two contronymous meanings were chosen, and those choices skewed significantly towards prescribing violence. Among the back-translations that prohibited violence were Chinese, both with simplified and traditional characters, as well as Hindi, Irish, Pashto, Japanese, Turkish, and Ukrainian, which belies the belief that an obvious commonality can predict proper translation. Interestingly, some languages that use the same or similar characters, such as Russian and Ukrainian or Pashto and Persian, were back-translated to different meanings. Even other languages with many similarities to Ukrainian, such as Polish, are translated differently than it is. Identifying the reasons for this divergence among similar languages is an open area for further research. Some mistranslations are curious as well and also indicate a need for further study. For example, the Lao back-translation was "Court of Violence!" and Thai back-translated to "Police charge violence!". As with the languages that back-translated to prohibition, the languages associated with mistranslation do not have any obvious similarities, aside from the fact that we can speculatively talk about the relative paucity of data for some of them compared to some of the other languages.

3.2 Longitudinal BT exploration: Contronymous sentences with Kannada as an intermediate language

In this subsection, we present a longitudinal BT exploration where we track the fate of a **set of sentences** with contronymous components while fixing the intermediate target-language to be Kannada.

To begin with, we created a list of following contronyms from sources such as (Wiktionary 2021; Burkardt 2020): [*All Over, Adumbrate, Anxious, Apology, Aught, Buckle, chuffed, Discursive, Enjoin, Eventual, Fulsome, Garnish, Peer, With*]. For each of the contronyms in this list, we generated a news-like archetypal sentence that one might find in an article about governance or legislation. The goal of this

exercise is to not only make the reader innately aware of the idiosyncratic shortcomings with regards to translating into the Kannada language but to also motivate using specific examples the nature of misinformation that these technical frailties could potentially unleash, especially in the context of news-consumption in the global south.

The results of this experiment are presented in Table 6 that covers the contronym used, it's two plausible meanings, the news-like sentence we generated, it's translation into Kannada and the back-translation back to English. We hope that some of the examples we have presented such as `The President exhorted his ministers to buckle up as key opposition support for his economic plan about to buckle – The President instructed his ministers to support the main opposition party to their economic plan!` motivates the seriousness of the imminent threats that lurk on account of mistranslation. We also hope that this worrisome consistency with which the *other* interpretation of the contronym is repeatedly chosen across these examples that were generated with consummate ease will motivate NMT researchers to focus on enantiosemy as an important testing-ground to stress-test their claims of having achieved enhanced *contextuality* in their contextual text representations (Ethayarajh 2019).

4 Vulnerability-2: Androcentrism and defaulting to the masculine

One of the important recurring themes of AI-skepticism has been the fear of large-scale automated continuation, rebirth and reproduction of societal toxicities and archaic norms that risks undoing the progress made by decades of activism (Benjamin 2019; Noble 2018; Emspak 2017). One specific form of toxicity pertains to the ***male-as-norm*** principle that besieges modern language and one that "strengthens the perceptions that the male category is the norm and that the corresponding female category is a derivation and thus less important" (See (Laqueur 1992; Evans 1998; Spender 1985; Motschenbacher 2010)). As noted in (Zou and Schiebinger 2018), this manifests as defaulting to the masculine pronoun in automated-translation systems.

4.1 Using Hindi as a motivation point

Hindi is a *gendered* language that *defaults to masculine in mixed-gender situations, or situations where gender is unknown* (Woolford 2020). Google-translate translates the sentence *She is a doctor* as वह एक डॉक्टर है. While the usage of the third person distal formal word वह (with it's gender-neutral connotations) seems reasonable, the back-translated sentence in English now defaults to the masculine and reads *He is a doctor*. We note the fact that this translation is accompanied by a `Verified : Translation verified by Google Translate contributors` icon (See Fig.2) only worsens things.

In order to get an estimate of the extent of androcentrism in this neural translation technology, we performed an experiment using a dataset of sentences pertaining to 86 different

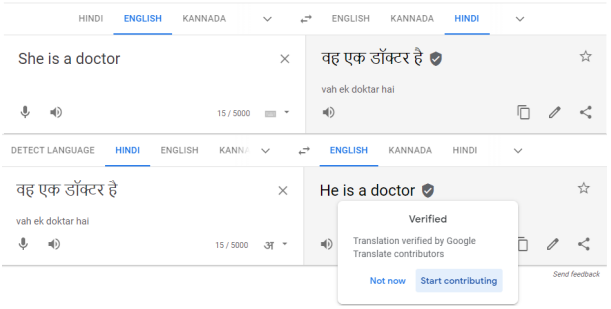

Figure 2: An example motivating caution in the presence of the `Verified` insignia

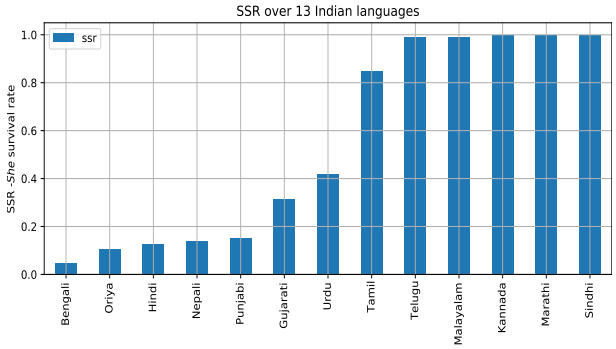

Figure 3: SSR variation across the 13 Indian languages

professions across the 109 languages on offer, the details of which are presented in the forthcoming sub-section.

Index	Language	ISO-639-1 Code	SSR
0	Bengali	bn	0.04651
1	Oriya	or	0.10465
2	Hindi	hi	0.12790
3	Nepali	ne	0.13953
4	Punjabi	pa	0.15116
5	Gujarati	gu	0.31395
6	Urdu	ur	0.41860
7	Tamil	ta	0.84883
8	Malayalam	ml	0.98837
9	Telugu	te	0.98837
10	Kannada	kn	1.0
11	Marathi	mr	1.0
12	Sindhi	sd	1.0

Table 1: Table containing SSRs across the 13 Indian languages considered

4.2 Dataset curation and experiment details

Our experimentation detailed here explores the nexus between profession and gender in the context of translation-tech and was informed by sociolinguistic scholarship such as Celia Davies' treatise on *The Sociology of Professions and the Profession of Gender* (Davies 1996) and Tracey L. Adams' *Gender and feminization in health care professions* (Adams 2010)

that helped theorize the relation between gender and profession. We first curated a dataset of 86 professions by combining the specific ones addressed in (Adams 2010) with the ones emanating from lists such as the *Merriam-Webster* list (Merriam-Webster 2021)(Bejda 2019). We then generated sentences of the format `She is a PROFESSION-PERSON` (Ex: 'She is an audiologist.' or 'She is a banker.'), which were then auto-corrected with the correct choice of article (a or an) using *lmproof* (Prasanna 2020). We then used the Google-translate API (via (Shan 2020)) to translate each of these sentences to each of the 109 languages on offer, there by, resulting in a 86×218 sentence-matrix.

4.3 Results and analysis

We first parsed the 109 back-translated columns in the 86×218 sentence-matrix generated above, to compute the probability that the pronoun 'She' *survived* the back-translation journey. We term this as ***SSR***: 'She' survival rate. In Fig4 we see SSR plotted across all the languages on offer via Google-translate. Here are the main takeaways from the results obtained:

- The mean SSR across all the 109 languages was a mere 58.5%. Only 35 languages ($\sim 32.1\%$ had an SSR of 1).
- For $\sim 45\%$ of the languages, the SSR was less than half.
- The Turkish clarification: For $\sim 86\%$ of the sentences, the Turkish-to-English back-translation returned both possibilities. For example: 'She is an advocate' got translated as 'O bir avukattır' which in turn resulted in ['He is a lawyer.', 'She is a lawyer.']. Interestingly, in some cases, the third-person, singular neuter pronoun *it* was preferred. For example, *She is a visual artist* became *Görsel bir sanatçıdır* which in turn was back-translated as *It is a visual artist*.
- Mutually intelligible *sister languages* written in different scripts yielded vastly different SSRs. For example, Hindi (written in *Devanagari*) and Urdu(written in *modified Perso-Arabic*) had SSRs of 0.128 and 0.419 respectively. Similarly, Farsi (written in the Persian alphabet, a derivation of the Arabic script) and Tajik (written in the Tajik alphabet, a derivation of Cyrillic), suffered even larger SSR disparities (0.058 and 0.919 respectively!)
- Of the 22 languages accommodated in the Eighth Schedule of the Indian Constitution, 13 were offered as part of Google-translate and seven of these had an SSR of less than 0.5! (See figure 3 and Table1)
- In Fig 5, we see SSR plotted across the 86 professions. The professions with the lowest SSR (of 0.38) were `human resource specialist`, `aircraft pilot`, `clergy advisor` and `medical laboratory scientist`. The 3 professions that had the highest SSR were `licensed practical nurse`, `midwife` and `registered nurse`, which further contextualizes Davies' assertion (Davies 1996) that ".. a key feature of profession, as presently defined, is that it professes gender."

5 Discussion and Conclusion

AI-powered automated translation systems have come under scrutiny in the recent past. While Google does mandate (Google 2021a) developers using their translation-API that the end-user be made aware they are interacting with a SMT system and not a human-translator powered one, we demonstrate in this paper that even when the `Verified`-insignia is present (indicating *Translation verified by Google Translate contributors*) androcentric biases do promulgate. The lack of *abstention class modeling* and the associated paucity of a confidence score being associated with translation, when combined with large scale real-world deployment sets the stage for real-world harm.

Recently, Facebook had to apologize for two major gaffes involving the translating of Chinese President Xi Jinping's name as "Mr. S–thole" (from Burmese to English) (Padilla 2020) and also a post saying "good morning" was erroneously translated as "attack them" in Hebrew ("hurt them" in English) leading to an innocent person's arrest. Similarly, WeChat had to apologize for its auto-translation API translating an emoji of the Canadian flag as "He's in prison" and the flag of the Democratic Republic of the Congo as "He's dead". A ProPublica investigation (Torbati 2019) revealed that U.S. Citizenship and Immigration Services (USCIS) instructed it's officers that "*the most efficient approach to translate foreign language contents is to utilize one of the many free online language translation services provided by Google, Yahoo, Bing, and other search engines*" in the context of sifting through non-English social media posts of refugee applicants.

In this work, we shed light on the continued frailties of a state of the art automated translation system through the lenses of androcentrism and enantiosemy. We contextualize our contribution in the backdrop of two worrisome and cavalier developments involving the rise of back-translation as a data augmentation strategy being advocated for low-resource scenarios and the rise of AI-enhanced legal tech that will be built on top of LLMs and auto-translation services. We posit that much work needs to be done before declarations such as *The greatest impact of AI will be in democratizing legal services* (Chang 2018) can come to fruition. For example, the real-world news-headline *She Said Her Husband Hit Her. She Lost Custody of Their Kids* from *The Marshall Project* legal case study (Joyce 2020) back-translates as *She said that her husband killed her. He lost his children's custody* via Hindi as an intermediate language.

Besides the empirical analyses, we are open-sourcing two datasets: The first is the 86×219 profession-translation matrix which can now be used to better understand the sociolinguistic nexus between the various professions, gender and the languages they are represented in. The second pertains to the dataset of contronymous-phrases that can be used as a sanity check for downstream NLP tasks including NMT. We have open-sourced all the code used and the dataset(s) generated in this endeavor at the following location: https://bit.ly/3cw42gq to ensure easy reproduction of the results and facilitate critique.

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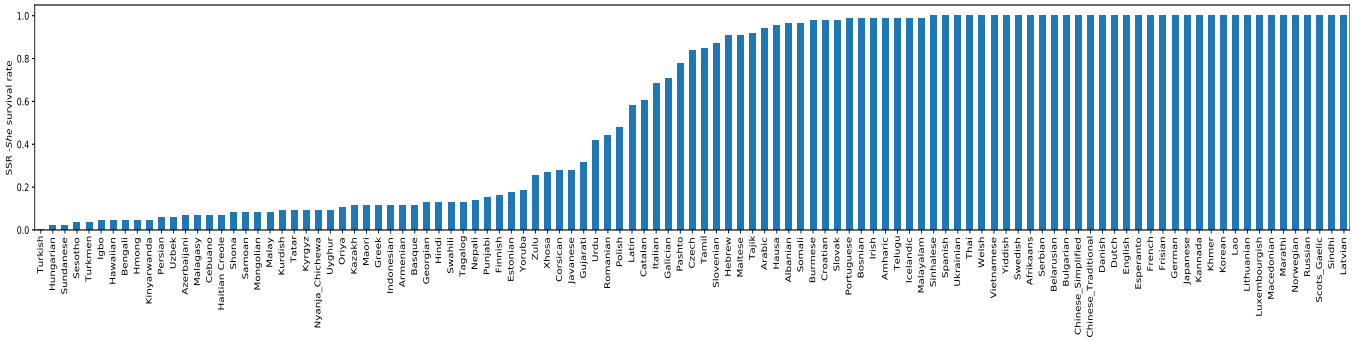

Figure 4: Plot of SSR (sorted) across all the 109 languages offered on Google-translate for the 86 sentence dataset

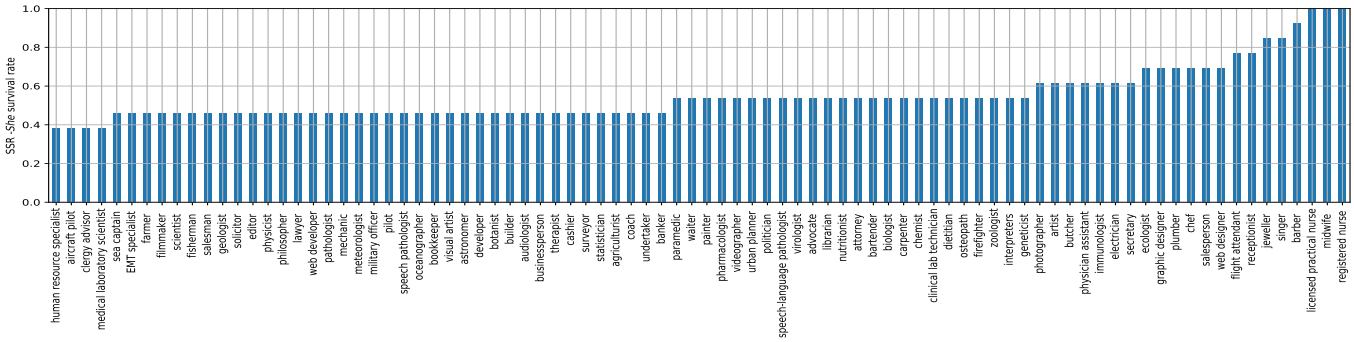

Figure 5: Plot of SSR (sorted) across all 86 professions used

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Contronym	Meanings	Sentence	Translation	Back-translation
All Over	(1) Available everywhere; (2) available no longer	The war cry for justice was all over - Much to the chagrin of the authorities.	ನ್ಯಾಯಕ್ಕಾಗಿ ಯುದ್ಧದ ಕೂಗು ಎಲ್ಲ ಮುಗಿಯಿತು - ಅಧಿಕಾರಿಗಳ ಕುಚೋದ್ಯಕ್ಕೆ.	The battle cry for justice is over - to the chagrin of the authorities.
Adumbrate	(1) To disclose; (2) To obscure	The regime's decision adumbrates the underlying agenda.	ಆಡಳಿತದ ನಿರ್ಧಾರವು ಆಧಾರವಾಗಿರುವ ಕಾರ್ಯಸೂಚಿಯನ್ನು ಸಂಯೋಜಿಸುತ್ತದೆ.	The decision of the administration incorporates the underlying agenda.
Anxious	(1) Looking forward to; (2) dreading	The community was anxious over the passing of the much needed reforms.	ಹೆಚ್ಚು ಅಗತ್ಯವಿರುವ ಸುಧಾರಣೆಗಳನ್ನು ಅಂಗೀಕರಿಸುವ ಬಗ್ಗೆ ಸಮುದಾಯವು ಆತಂಕಕ್ಕೊಳಗಾಯಿತು.	The community was worried about approving much-needed reforms.
Apology	(1) A statement of contrition for an action; (2) A defense of one	The think tank published a paper outlining their apology of capital punishment	ಥಿಂಕ್ ಟ್ಯಾಂಕ್ ಮರಣದಂಡನೆಯ ಕ್ಷಮೆಯಾಚಿಸುವ ಒಂದು ಕಾಗದವನ್ನು ಪ್ರಕಟಿಸಿತು	The Think Tank published a paper apologizing for the death penalty
Aught	(1) All; (2) Nothing or zero.	Aught was left of the petition's validity	ಅರ್ಜಿಯ ಸಿಂಧುತ್ವದಿಂದ ಸಾಕಷ್ಟು ಉಳಿದಿದೆ	There is plenty left out of the validity of the application
Buckle	(1) To connect; (2) To break or collapse	The President exhorted his ministers to buckle up as key opposition support for his economic plan about to buckle.	ಅಧ್ಯಕ್ಷರು ತಮ್ಮ ಮಂತ್ರಿಗಳಿಗೆ ತಮ್ಮ ಆರ್ಥಿಕ ಯೋಜನೆಗೆ ಪ್ರಮುಖ ವಿರೋಧ ಪಕ್ಷದ ಬೆಂಬಲವನ್ನು ನೀಡುವಂತೆ ಸೂಚಿಸಿದರು.	The President instructed his ministers to support the main opposition party to their economic plan.
chuffed	(1) Pleased; (2) Annoyed	The voters were chuffed to see the bill passed	ಮಸೂದೆ ಅಂಗೀಕಾರವಾಗುವುದನ್ನು ನೋಡಿ ಮತದಾರರನ್ನು ಚುಚ್ಚಲಾಯಿತು!	Voters were injected to see the passage of the bill!
Discursive	(1) Moving in an orderly fashion among topics; (2) Proceeding aimlessly in a discussion	The lawyer's discursive narration swayed the jury.	ವಕೀಲರ ಚರ್ಚಾಸ್ಪದ ನಿರೂಪಣೆಯು ತೀರ್ಪುಗಾರರನ್ನು ತಲ್ಲಣಗೊಳಿಸಿತು	The lawyer's debatable narrative disturbed the jury
Enjoin	(1) To impose; (2) To prohibit	The court enjoined the violence!	ಹಿಂಸಾಚಾರಕ್ಕೆ ನ್ಯಾಯಾಲಯ ಆದೇಶ ನೀಡಿತು!	The court ordered the violence!
Eventual	(1) Finally resulting or occurring (after a period of time), inevitable; (2) (nonstandard, non-native speakers' English or European Union) Possible, potential	The EU block opposed an eventual imposition of anti-dumping measures.	ಅಂತಿಮವಾಗಿ ಡಂಪಿಂಗ್ ವಿರೋಧಿ ಕ್ರಮಗಳನ್ನು ಹೇರುವುದನ್ನು ಇಯು ಬ್ಲಾಕ್ ವಿರೋಧಿಸಿತು.	Eventually the EU blocked the imposition of anti-dumping measures.
Fulsome	(1) Offensively flattering or insincere; (2) Abundant or copious.	A fulsome eulogy was delivered by the sly counsel.	ಮೋಸದ ಸಲಹೆಯಿಂದ ಪೂರ್ಣವಾದ ಶ್ಲಾಘನೆಯನ್ನು ನೀಡಲಾಯಿತು.	A full applause was given by the fraudulent counsel.
Garnish	(1) To furnish, as with food preparation; (2) To take away, as with wages	The gig-economy agency decided to garnish the refunds!	ಗಿಗ್-ಎಕಾನಮಿ ಏಜೆನ್ಸಿ ಮರುಪಾವತಿಯನ್ನು ಅಲಂಕರಿಸಲು ನಿರ್ಧರಿಸಿದೆ!	The Gig-Economy Agency has decided to decorate a refund!
Peer	(1) A person of the nobility; (2) An equal	Members of the anti-theocratic revolutionary movement overthrew the peers in power!	ಪ್ರಜಾಪ್ರಭುತ್ವ ವಿರೋಧಿ ಕ್ರಾಂತಿಕಾರಿ ಚಳವಳಿಯ ಸದಸ್ಯರು ಅಧಿಕಾರದಲ್ಲಿದ್ದ ಗೆಳೆಯರನ್ನು ಉರುಳಿಸಿದರು!	Members of the anti-democratic revolutionary movement toppled friends who were in power!
With	(1) Alongside; (2) Against	The traitors disappointingly decided to fight with the colonialists.	ದೇಶದ್ರೋಹಿಗಳು ನಿರಾಶಾದಾಯಕವಾಗಿ ವಸಾಹತುಶಾಹಿಗಳೊಂದಿಗೆ ಹೋರಾಡಲು ನಿರ್ಧರಿಸಿದರು	The traitors desperately decided to fight the colonists

Figure 6: Table demonstrating the results of Longitudinal BT exploration of contronymous sentences with Kannada as an intermediate language

Language	En2Language	Language2En
Afrikaans	Die hof beveel die geweld!	The court orders the violence!
Albanian	Gjykata urdhëroi dhunën!	The court ordered the violence!
Amharic	**ፍርድ ቤቱ አመፁን አዘዘ!**	The court ordered the protest!
Arabic	بالعنف! المحكمة أمرت	Court ordered violence!
Armenian	Դատարանը պատվիրեց բռնությունը:	The court ordered the violence.
Azerbaijani	Məhkəmə şiddəti əmr etdi!	The court ordered violence!
Basque	Auzitegiak indarkeria agindu zuen!	The court ordered violence!
Belarusian	Суд прызначыў гвалт!	The court ordered violence!
Bengali	আদালত সহিংসতার নির্দেশ দিয়েছে!	Court orders violence!
Bosnian	Sud je naredio nasilje!	The court ordered violence!
Bulgarian	Съдът нареди насилието!	The court ordered the violence!
Catalan	El tribunal va ordenar la violència!	The court ordered the violence!
Cebuano	Gisugo sa korte ang kapintas!	The court ordered the violence!
Chinese_Simplified	法院禁止暴力！	The court prohibits violence!
Chinese_Traditional	法院禁止暴力！	The court prohibits violence!
Corsican	U tribunale hà urdinatu a viulenza!	The court ordered the violence!
Croatian	Sud je naredio nasilje!	The court ordered violence!
Czech	Soud nařídil násilí!	The court ordered violence!
Danish	Retten pålagde volden!	The court imposed the violence!
Dutch	De rechtbank beval het geweld!	The court ordered the violence!
English	The court enjoined the violence!	The court enjoined the violence!
Esperanto	La kortumo ordonis la perforton!	The court ordered the violence!
Estonian	Kohus määras vägivalla välja!	The court ordered the violence!
Finnish	Tuomioistuin määräsi väkivallan!	The court ordered the violence!
French	Le tribunal a ordonné la violence !	The court ordered violence!
Frisian	De rjochtbank joech it geweld oan!	The court ordered the violence!
Galician	O xulgado impuxo a violencia!	The court imposed violence!
Georgian	სასამართლომ დააკისრა ძალადობა!	The court ordered the violence!
German	Das Gericht hat die Gewalt vorgeschrieben!	The court prescribed the violence!
Greek	Το δικαστήριο διέταξε τη βία!	The court ordered the violence!
Gujarati	કોર્ટે હિંસાનો આદેશ આપ્યો!	Court orders violence!
Haitian Creole	Tribinal la mande vyolans lan!	The court demanded the violence!
Hausa	Kotun ta ba da umarnin tashin hankali!	The court ordered violence!
Hawaiian	Ua kauoha ka ʻaha i ka hana ʻino!	The court ordered the atrocity!
Hebrew	האלימות! את צירף המשפט בית	The court attached the violence!
Hindi	अदालत ने हिंसा को किया स्थगित !	The court suspended the violence!
Hmong	Lub tsev hais plaub sau cov kev kub ntxhov!	The court recorded the violence!
Hungarian	A bíróság elrendelte az erőszakot!	The court ordered the violence!
Icelandic	Dómstóllinn boðaði ofbeldið!	The court announced the violence!
Igbo	Lọ ikpe ahụ nyere iwu ka e mee ihe ike!	The court ordered the violence!
Indonesian	Pengadilan memerintahkan kekerasan!	The court ordered violence!
Irish	Chuir an chúirt an foréigean i gcion air!	The court condemned the violence!
Italian	La corte ha ingiunto la violenza!	The court ordered the violence!
Japanese	裁判所は暴力を禁止しました ！	The court has banned violence!
Javanese	Pengadilan mrentah kekerasan kasebut!	The court ruled the violence!
Kannada	ನ್ಯಾಯಾಲಯ ಹಿಂಸಾಚಾರಕ್ಕೆ ಆದೇಶಿಸಿದೆ!	The court has ordered violence!
Kazakh	Сот зорлық-зомбылықты бұйырды!	The court ordered the violence!
Khmer	តុលាការបានរួមបញ្ចូលអំពើហឹង្សា!	The court included violence!
Kinyarwanda	Urukiko rwategetse ihohoterwa!	The court ordered the violence!
Korean	법원은 폭력을 조장했습니다!	Court promoted violence!
Kurdish	Dadgehê emrê tundiyê da!	The court ordered the violence!
Kyrgyz	Сот зомбулукка буйрук берди!	The court ordered the violence!
Lao	ສານລວມຄວາມຮຸນແຮງ	Court of Violence!

Latin	Et atrium per violentiam poterit scrutari vias !	The court will be able to examine ways of violence ?
Latvian	Tiesa piesprieda vardarbību!	The court condemned the violence!
Lithuanian	Teismas nurodė smurtą!	The court ordered violence!
Luxembourgish	D'Geriicht huet d'Gewalt beoptragt!	The court ordered the violence!
Macedonian	Судот нареди насилство!	The court ordered violence!
Malagasy	Nandidy ny herisetra ny fitsarana!	The court ordered the violence!
Malay	Mahkamah memerintahkan keganasan!	The court ordered the violence!
Malayalam	അക്രമത്തിന് കോടതി ഉത്തരവിട്ടു!	Court orders violence!
Maltese	Il-qorti ordnat il-vjolenza!	The court ordered the violence!
Maori	I whakahau te kooti ki te tutu!	The court ordered the violence!
Marathi	कोर्टाने हिंसाचाराचा आदेश दिला !	Court orders violence
Mongolian	Шүүх хүчирхийллийг даалгасан!	The court ordered the violence!
Burmese	တရားရုံးကအကြမ်းဖက်မှုကိုအမိန့်ပေးခဲ့သည်။	The court ordered the violence.
Nepali	अदालतले हिंसाको आदेश दियो!	Court orders violence!
Norwegian	Retten påkalte volden!	The court called for violence!
Nyanja_Chichewa	Khothi lidalamula zachiwawa!	The court ordered the violence!
Oriya	ହିଂସାକୁ କୋର୍ଟ ନିର୍ଦ୍ଦେଶ ଦେଇଛନ୍ତି!	The court ordered the violence!
Pashto	وکړ! امر تریخوالي تاو د محکمې	Court orders violence!
Persian	داد! خشونت به دستور دادگاه	The court ordered violence!
Polish	Sąd nakazał przemoc!	The court ordered the violence!
Portuguese	O tribunal ordenou a violência!	The court ordered the violence!
Punjabi	ਅਦਾਲਤ ਨੇ ਹਿੰਸਾ ਦਾ ਆਦੇਸ਼ ਦਿੱਤਾ!	Court orders violence
Romanian	Curtea a cerut violenței!	The court called for violence!
Russian	Суд предписал насилие!	The court ordered violence!
Samoan	Ua faatonuina e le faamasinoga le vevesi!	The court has ordered the riot!
Scots_Gaelic	Chuir a 'chùirt a-steach an fhòirneart!	The court ruled in violence!
Serbian	Суд је наредио насиље!	The court ordered violence!
Sesotho	Lekhotla le ile la laela pefo!	The court ordered the violence!
Shona	Dare rakaraira mhirizhonga!	The court ordered the riots!
Sindhi	ڏنو! حڪم جو تشدد عدالت	The court ordered the violence!
Sinhalese	අධිකරණය ප්‍රචණ්ඩත්වය අණ කළේය!	Court orders violence!
Slovak	Súd nariadil násilie!	The court ordered violence!
Slovenian	Sodišče je ukazalo nasilju!	The court ordered violence!
Somali	Maxkamaddu waxay amartay rabshadaha!	The court ordered the violence!
Spanish	¡El tribunal ordenó la violencia!	The court ordered violence!
Sundanese	Pengadilan maréntahkeun kekerasan!	The court ordered the violence!
Swahili	Korti iliamuru vurugu!	The court ordered violence!
Swedish	Domstolen förordade våldet!	The court recommended the violence!
Tagalog	Inutusan ng korte ang karahasan!	The court ordered the violence!
Tajik	Суд ба зӯроварӣ фармон дод!	The court ordered the violence!
Tamil	வன்முறையை நீதிமன்றம் கட்டளையிட்டது!	Court orders violence!
Tatar	Суд көч кулланырга кушты!	The court ordered the violence!
Telugu	హింసను కోర్టు ఆదేశించింది!	Court orders torture!
Thai	ตร. กำชับเหตุรุนแรง!	Police charge violent incidents!
Turkish	Mahkeme şiddeti yasakladı!	The court has banned violence!
Turkmen	Kazyýet zorlugy buýurdy!	The court ordered the violence!
Ukrainian	Суд наказав насильству!	The court punished the violence!
Urdu	دیا! حکم کا تشدد نے عدالت	Court orders torture!
Uyghur	بۇيرۇدى! زوراۋانلىقنى سوت	The court ordered the violence!
Uzbek	Sud zo'ravonlikni buyurdi!	The court ordered the violence!
Vietnamese	Tòa án ra lệnh cho bạo lực!	Court ordered violence!
Welsh	Cysylltodd y llys â'r trais!	The court contacted the violence!
Xhosa	Inkundla iyalela ubundlobongela!	The court orders violence!
Yiddish	גוואַלד! די באַשטימט האָט הויף דער	The court ruled the violence!
Yoruba	Kootu paṣẹ fun iwa-ipa!	Court orders violence!
Zulu	Inkantolo yayalela udlame!	The court ordered the violence!

Figure 7: Table containing the results of the latitudinal exploration across all the 109 languages with the sentence "The court enjoined the violence!".

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