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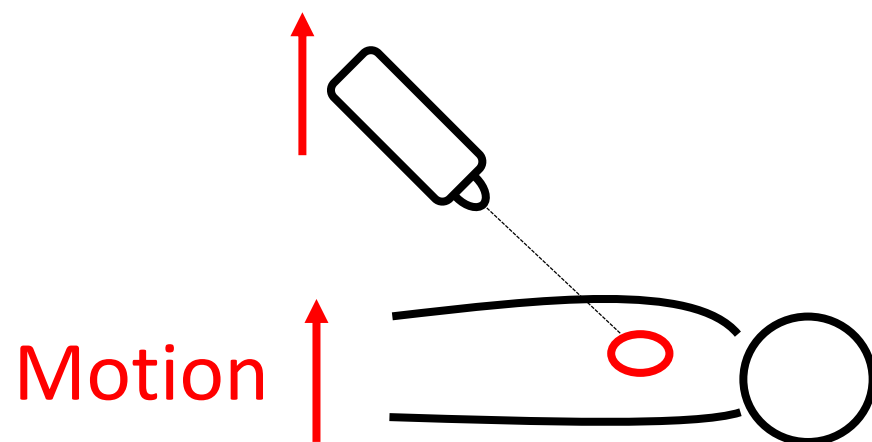
**Institute of Medical Technology and Intelligent Systems**

## **A Deep Learning Approach for Motion Forecasting Using 4D OCT Data**

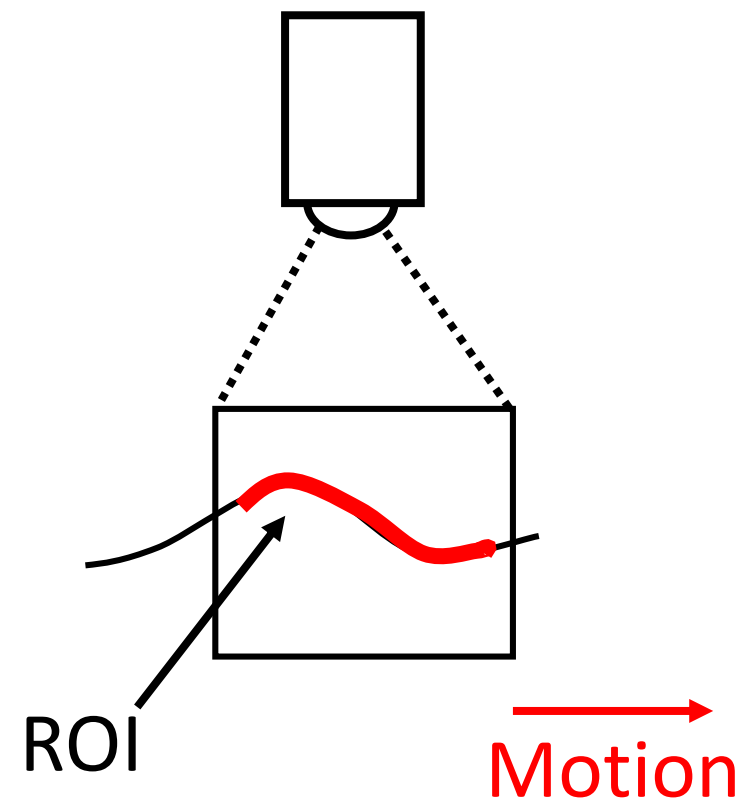
# Motivation: Motion Forecasting



## Radiotherapy



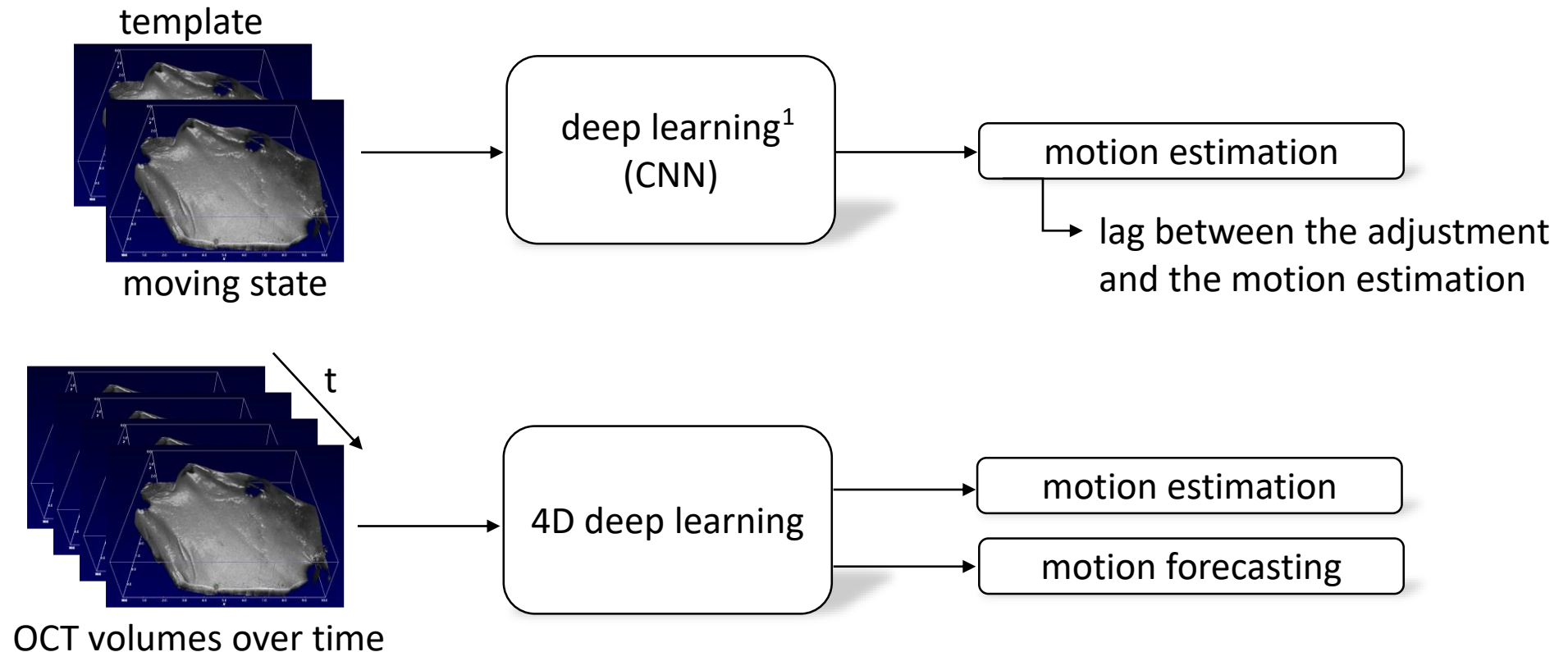
## Intraoperative Imaging



# Deep Learning and Spatio-temporal OCT



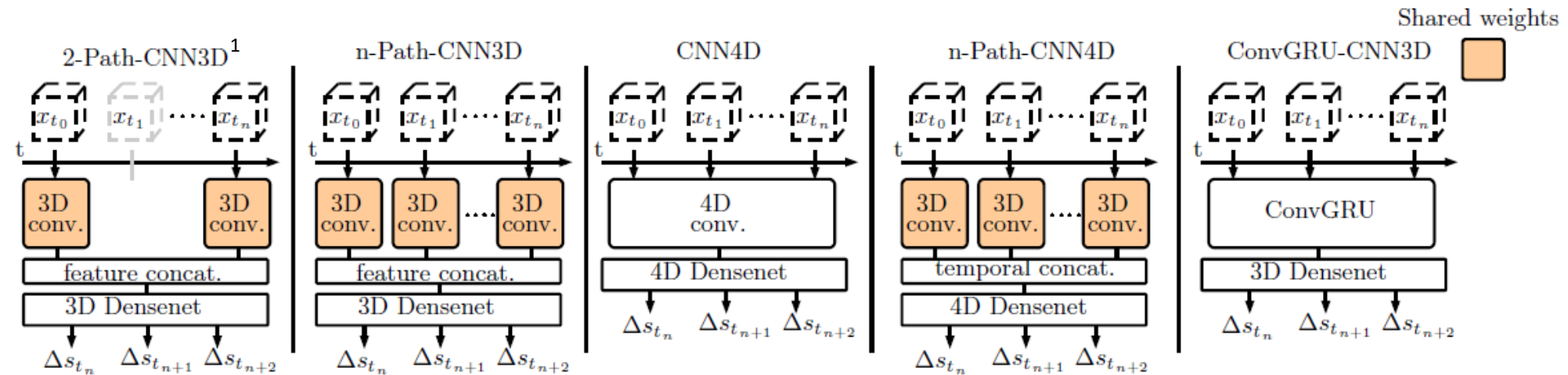
Optical Coherence Tomography (OCT)



**We propose a deep learning approach for motion estimation and forecasting using sequences of OCT volumes**

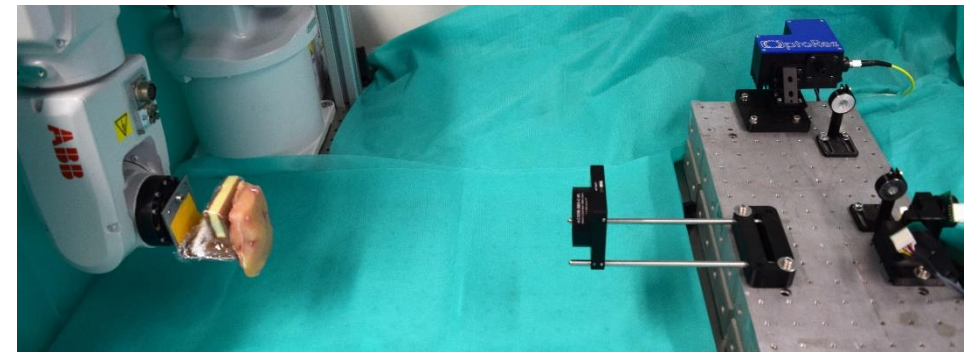
<sup>1</sup> Gessert, Nils, et al. Two-path 3D CNNs for calibration of system parameters for OCT-based motion compensation. In: Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling. International Society for Optics and Photonics, 2019. S. 1095108.

# Deep Learning Methods and Data Set



## Data Set

- Swept-source OCT device (OMES, OptoRes)
- 40 different ROIs of a chicken breast sample
  - 100 different trajectories each



<sup>1</sup> Gessert, Nils, et al. Two-path 3D CNNs for calibration of system parameters for OCT-based motion compensation. In: Medical Imaging 2019: Image-Guided Procedures, Robotic Interventions, and Modeling. International Society for Optics and Photonics, 2019. S. 1095108.

# Results and Discussion



Using a stream of volumes improves estimation performance and allows for forecasting

