

## Development of a robot arm for bone processing

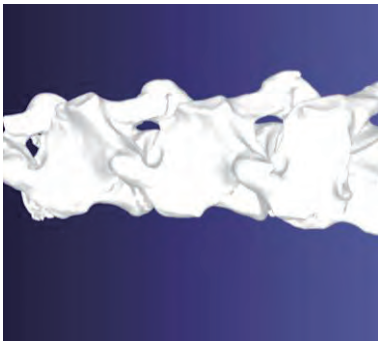
### Principal Investigator

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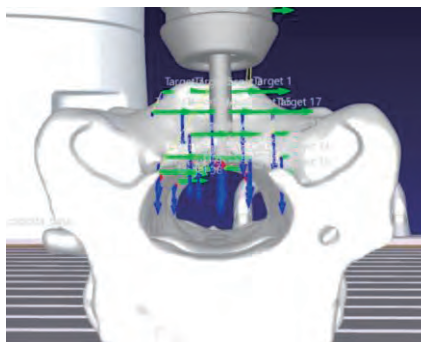
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### Project Outline

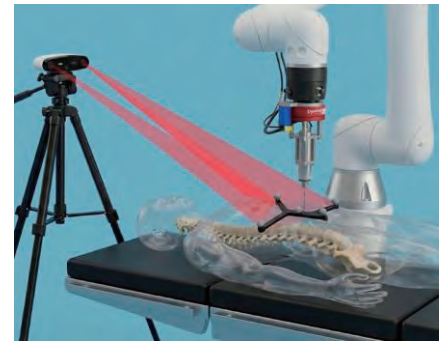
Bone drilling, cutting, and resection are fundamental yet highly complex procedures in spinal surgery, carrying significant risks of damage to surrounding nerves and blood vessels. In recent years, advancements in robotic technology have been increasingly recognized for their ability to improve accuracy and safety compared to manual techniques. Driven by the global adoption of robotic surgery and expanding insurance coverage, the demand for surgical assistant robots is projected to continue growing.



3D Modeling from CT Images



Pre-operative Simulation



Automated Execution via NDI tracking and ROS2 control

This project involves the development of an AI control system that automates bone processing procedures, utilizing a general-purpose industrial robotic arm as the base platform.

**[Effectiveness]** Achieving Safe and Rapid Bone Resection and Standardization of Surgical Techniques

**[Principle]** The AI system analyzes time-series data from force sensors and motor voltage to infer bone cutting status (e.g., cortical bone breakthrough) in real-time. Based on these predictions, the Robot Operating System 2 (ROS 2) integrates with the NDI Lyra tracking system to provide millisecond-level feedback control, ensuring precise execution according to the pre-operative plan.

**Target :** lumbar spinal canal stenosis, cervical myelopathy, osteoarthritis, limb fractures

**Patent information:** Domestic application filed

**Technical features:** AI-based integrated processing of information from various sensors

**Desired type of corporate collaboration:** collaboration with companies that have obtained Type 1 manufacturing and sales licenses