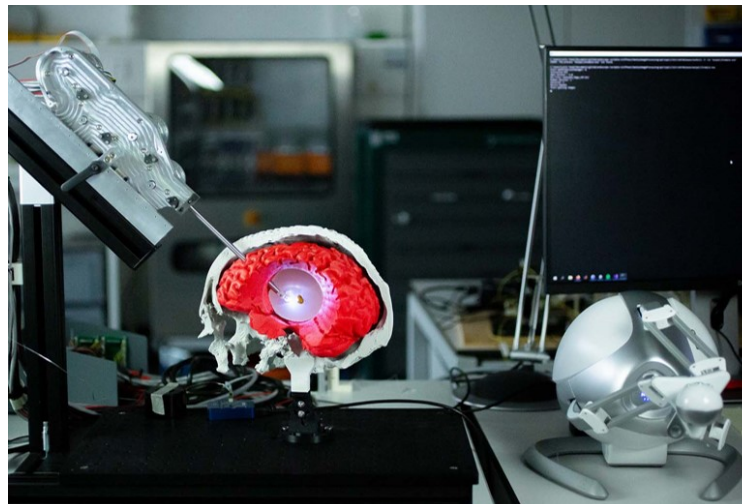




Master Thesis: Contact force evaluation of robotic endoscopic system based on Series Elastic Actuation

Context: In the BIROMED-Lab we have been developing an endoscopic system for safer neurosurgeries with inspiration from human finger anatomy. Its two degrees of freedom allow the endoscope to investigate areas of the brain that would be inaccessible with standard rigid endoscopes. Thanks to springs in the transmission between the motors and the movable endoscope tip, the interaction forces between the instrument and the brain tissue can be reduced. Furthermore the interaction forces can be estimated by measuring the deflection of the spring. To make the telemanipulation of the endoscope safer and more intuitive for the surgeon, force feedback was also implemented. Tests have to be performed to ensure that the forces applied are low enough and the third ventricle exploration is possible when telemanipulating the endoscope with the haptic device.

Task description: This master thesis project will focus on the implementation of an additional degree of freedom for insertion, and the following evaluation of the endoscope. Your task will be to develop a test strategy, using a sensorized brain phantom and perform the evaluation experiments.



Workpackages:

- Literature research on relevant aspects of the thesis subject,
- Add insertion degree of freedom,
- Manufacture necessary hardware components for tests,
- Test strategy design and carrying out tests.

Your profile:

- You are pursuing a master's degree in mechanical or biomedical engineering or related discipline,
- You have experience in hardware development,
- You have knowledge in C++ and Matlab,
- You are curious, motivated and self-driven,
- You want to work in and contribute to an interdisciplinary and applied research environment.

Student: TBD

Start: Upon agreement

Duration: 6 months

Supervision:

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