



Equipe MediCIS

LTSI UMR U1099 • INSERM/Université de Rennes I

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Internship Subject: Impact of visual guidance during surgical training

Localization: Laboratoire Traitement du Signal et de l'Image (LTSI), MediCIS Team

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Keywords: Eye tracking; Gaze tracking; Machine Learning; Deep Learning; Surgical training; Surgical simulator.

Context

Surgical simulation has become an important part of the training curriculum of surgeons. The trainees have to practice repeatedly on simulators to improve their skills and performance. In theory, they should be supervised by experienced surgeons to help the trainees to identify information relevant to realize the task. In practice, trainees are generally in partial or full autonomy. To help the training, virtual reality simulators propose to guide the trainees thanks to the addition of visual information.

This type of assistance is interesting but does not allow to know if the trainees only focus on the visual information, or if they are acquiring the necessary automatism (recognition of anatomical points for example) to realize the task without assistance. We will study this during arthroscopic training sessions realized on a virtual simulator and during evaluation sessions realized on a phantom. During all sessions, trainees will be equipped with an eye-tracking system.

Objective of the internship

The objective of the internship is to study the relevance of this type of assistance. To achieve this goal, the internship will be divided into multiples steps:

- Help the data acquisition during Arthroscopic training sessions managed by a surgeon;
- Develop an automatic recognition/segmentation of Region of Interests by deep learning;
- Propose a gaze heatmap to provide feedback to trainees (e.g. video mosaicking);
- Study gaze profiles between guided and non-guided training sessions;
- Study gaze profiles between populations with and without regular training during evaluation sessions.

Profile researched

The candidate must know machine and deep learning, data analysis, and computer science.

Salary or allowance

Standard internship allowances