ROBOT-ASSISTANCE FOR EYE SURGERY: INDUSTRIAL DESIGN INTERN

Category: Product design, industrial design engineering, design for usability, manufacturability, reliability and serviceability

Location of the internship: Preceyes B.V., Eindhoven, the Netherlands (www.preceyes.nl)

Internship time period: Winter 2016-2017 / Spring 2017 (minimum of 12 weeks)

DETAILS

Description of the internship
Preceyes develops a robotic system to assist in eye surgery. Eye surgery is highly delicate and can only be performed by the very best of the surgeons. Our technology helps to improve existing procedures and enables the development of new procedures. Students will join our hardware design activities with a focus on the design-for-usability challenges. Focus will specifically be on the ‘joystick’.

Student’s responsibilities
Students will have ownership over their project, being responsible for the realization of products within the specified requirements. You will be involved in the entire process from concept development and validation towards the start of production. There are multiple aspects of the product which means multiple project opportunities, although focus will be on one main project, being the design of the ‘joystick’, see the appendix. Furthermore, you will be assisting in the company in general.

The company is offering
The Industrial Design students will have the chance to collaborate with our multidisciplinary development team, working both independently and in collaboration with team members to develop high-quality designs. You will work on cutting-edge technology, actually contributing to our developments. The upcoming period we will be focusing on the design for usability, manufacturability, serviceability and reliability aspects of our technology.

Qualifications and skills
You are a passionate Industrial Design student that is eager to learn. Excellent understanding of the design process, starting from concept, via design research and further on to the technical production. Create high- and low-fidelity prototypes, manage multiple projects at different levels of involvement. You like technical drawing and are a solution-oriented team player. You are strong 3D CAD and are strong in reporting of concepts and results.

CONTACT

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How to apply: Please provide us with your motivation, resume and portfolio

November 2016, Preceyes B.V.
APPENDIX – JOYSTICK / MOTION CONTROLLER

Problem definition
The surgeon holds a motion controller (joystick), to provide position commands to the instrument manipulator. The design of the gripper part of the motion controller is highly important for i) ergonomy of the surgeon and ii) for control of the system. In Figure 1, the current gripper part is shown with a button that has to be pressed by the surgeon to activate the system [2]. In the initial design, focus has been on functionality rather than ergonomy. Subsequent user experiments have resulted in new insights regarding the requirements that are currently being incorporated in the design. A first update of the design has been proposed and realized, confirming ergonomy of the design, but also demonstrating that feasibility of realization is a problem [3,4]. Furthermore, a team of TU/e industrial design students has designed and rapid prototyped an updated design with an additional button, not taking into account the ergonomy yet (September-December 2015). In below figures, the various designs are shown.

Assignment / goals
The primary goal of this project is to develop a design that incorporates all requirements and is feasible for actual implementation and realization. Technical requirements include the choice of material, integration at Preceyes’ device, sterility and draping. User-interaction requirements include a variety of buttons with different functionalities and ergonomy. The existing designs serve as a basis for further development, however, different concepts can also be thought of. E.g., a tweezer-like gripper design, as opposed to the current joystick-like design, is a concept that hasn’t been evaluated yet. Deliverables of the project include realization and user experiments of the design. Involvement of surgeons during the experiments is an important part of the project and prototyping of various ideas is desired.

Further information
[1] www.preceyes.nl
[3] D. Wilmink (2013), Redesign of the motion controller gripper for a vitreoretinal surgical robotic system, BSc assignment Industrial Design Engineering, University of Twente, August 2013

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