Development of an Affordable Submarine Robot for College Engineering Education

**Abstract**: Radical changes can happen and have been happening in the labor market. Many people might be concerned that close to half of all jobs will be taken over by robots in the next 25 years; however, robots will help create new jobs as many of the current unwanted jobs being taken over. The best way to prepare the workforce is to face the upcoming changes and adapt robotics into engineering education. However, robotics is a very broad and interdisciplinary filed, which makes it hard to select or develop an effective tool to enhance the related engineering education. This paper talks about the development of an affordable submarine robot for engineering education. First, the whole submarine robot development process is introduced, followed by the design implemented on robot Nellie. Then, the mapping of the knowledge and skills used in developing the robot to the core engineering courses is discussed. Furthermore, student learning outcomes are summarized. Finally, the impact of this project is discussed.

1. Introduction

<how robotics education is done nowadays, and why we are developing this robotics too>

1. Development of Submarine Robot – Nellie
2. Submarine robot development process
3. Design and development of Nellie

<talk about the subsystems, use material from the competition paper>

1. Knowledge and Skill Mapping

<talk about the relationship between the knowledge & skills and core engineering courses from different disciplines>

1. Student Learning Outcomes
2. Project Impact

<talk about what we did at Cal State LA, and what are the impacts (students, program, institution)>

1. Conclusion