Towards an Intel® Galileo-Based Culturally Responsive Robotics Curriculum

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Abstract

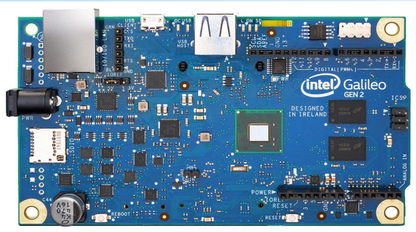
The purpose of this project is to expose middle school STEM students to basic concepts of mobile robotics. During a week-long STEM workshop, students will learn the basics of building circuits, programming languages, and the Intel® Galileo, which will allow them to build and program their own mobile robot toward the end of the workshop. The feedback from this workshop will be extremely helpful in improving the curriculum so it be implemented middle school STEM programs throughout the country.

Introduction

With the help of the Intel® Galileo microcontroller, this project introduces a mobile robotics curriculum in culturally responsive middle school STEM setting. Marquette University HEIR Lab and Arizona State University are creating a K-12 program to teach mobile robotics design, programming, and STEM concepts within the context of social justice and positive social activism.

Objectives

1. Build basic circuits with the Galileo and LEDs
2. Write a simple program for the Galileo
3. Build a simple circuit for the Mobile Robot
4. Program the Mobile Robot using the Galileo



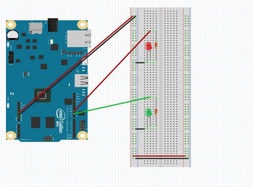
Intel® Galileo Gen 2

Approach

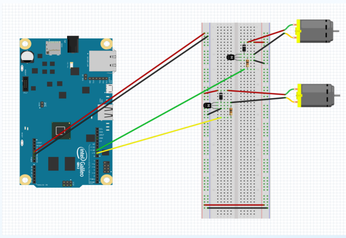
A one-week STEM workshop will be held at Arizona State University that will introduce the students to concepts of mobile robotics.

Itinerary

- **Day 1:** Learn the basics of circuits and physics concepts such as Ohm's Law
- **Day 2:** Learn basic programming code for microcontrollers such as the Intel® Galileo
- **Day 3:** Begin building circuit for a mobile robot
- **Day 4:** Finish building the mobile robot, Begin programming the mobile robot
- **Day 5:** Finish programming the mobile robot, test the mobile robot



Basic LED Circuit



Robot Motor Circuit

Evaluation

Feedback from the initial STEM program will help in strengthening the curriculum so that it can become apart of the STEM curriculum in middle schools.

Conclusion and Future Implications

The Intel® Galileo can be used as powerful teaching tool for mobile robotics in STEM programs. Hopefully the curriculum will become a part of STEM programs in Arizona middle schools, eventually expanding to the rest of country. This early exposure to mobile robotics could allow these children to develop new robots and achieve new technological advancements.

References

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