RoboSub 2023
Optional Community & Outreach Submission
School/Organization Name: The Ohio State University
Team Name: Underwater Robotics Team
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Submission Date: April 12, 2023

Community & Outreach Submission

A key objective of the RoboSub program is to strengthen and enhance the community. Teams are encouraged to participate in educational outreach activities and describe those activities here. Maximum 500 words

Community & Outreach Description:

UWRT developed the STEMBot Workshop, an affordable STEM program to reach underprivileged schools in the Columbus area, tailored to a five-day after-school program. UWRT's STEMBot program was designed to serve a classroom of 25 children for $2500 worth of cost currently sponsored by UWRT. This program is offered to local schools at no cost.

STEMbot has gained traction and the team has run the curriculum at a local middle school for the past two years. UWRT team members constructed a curriculum that taught children how to maneuver and implement TinkerCAD to design and assemble geometries, as well as understand concepts related to center of mass and center of buoyancy and apply them to building abuilding a Remotely Operated Vehicle (ROV) using 3D printed components and piping. Overall, emulating the roles UWRT mechanical members have throughout the build cycle of their underwater vehicles.

Middle school students were also able to generate algorithms on how to make peanut butter and jelly sandwiches. Using this hands-on activity and a simplistic lecture about ROS, students were able to build Scratch scripts that controlled their ROVs thruster speeds and control system. The students were also able to learn how software can be applied to various applications, not only how our Software Team encodes it for our underwater vehicle development, outside the field of underwater robotics.

UWRT's Electrical Team taught the students about electricity. After gaining a fundamental understanding of how batteries store energy to drive electronics, they were introduced to circuits and components. Students learned about capacitors, motors, and LEDs and how they use energy to change the behavior of circuits. They also learned the differences between series and parallel, by demoing how each circuit functions with LED visuals.

At the end of the program, students were able to design, build, and drive their ROV with the opportunity to customize their vehicle frame design. The ROV is equipped with four thrusters and is controlled via a Raspberry Pi microcontroller. Students controlled their ROVs using a connected PS3 controller. The students then competed in an underwater obstacle course to see who could drive through the fastest.

UWRT's STEMbot Workshop garnered well-deserved recognition from Ohio State's College of Engineering for its remarkable impact on the students who participated in the program. The workshop's innovative curriculum, hands-on activities, and real-world applications of STEM concepts left a lasting impression on the enrolled students. Through the guidance of UWRT's dedicated team members, the students not only gained practical knowledge in areas such as design, assembly, and programming, but they also developed critical thinking, problem-solving, and teamwork skills. The recognition bestowed

upon UWRT by Ohio State's College of Engineering serves as a testament to the workshop's effectiveness and the organization's commitment to fostering educational opportunities in underprivileged schools. As a result of this recognition, UWRT was rewarded with $1000.