ROBOSUB

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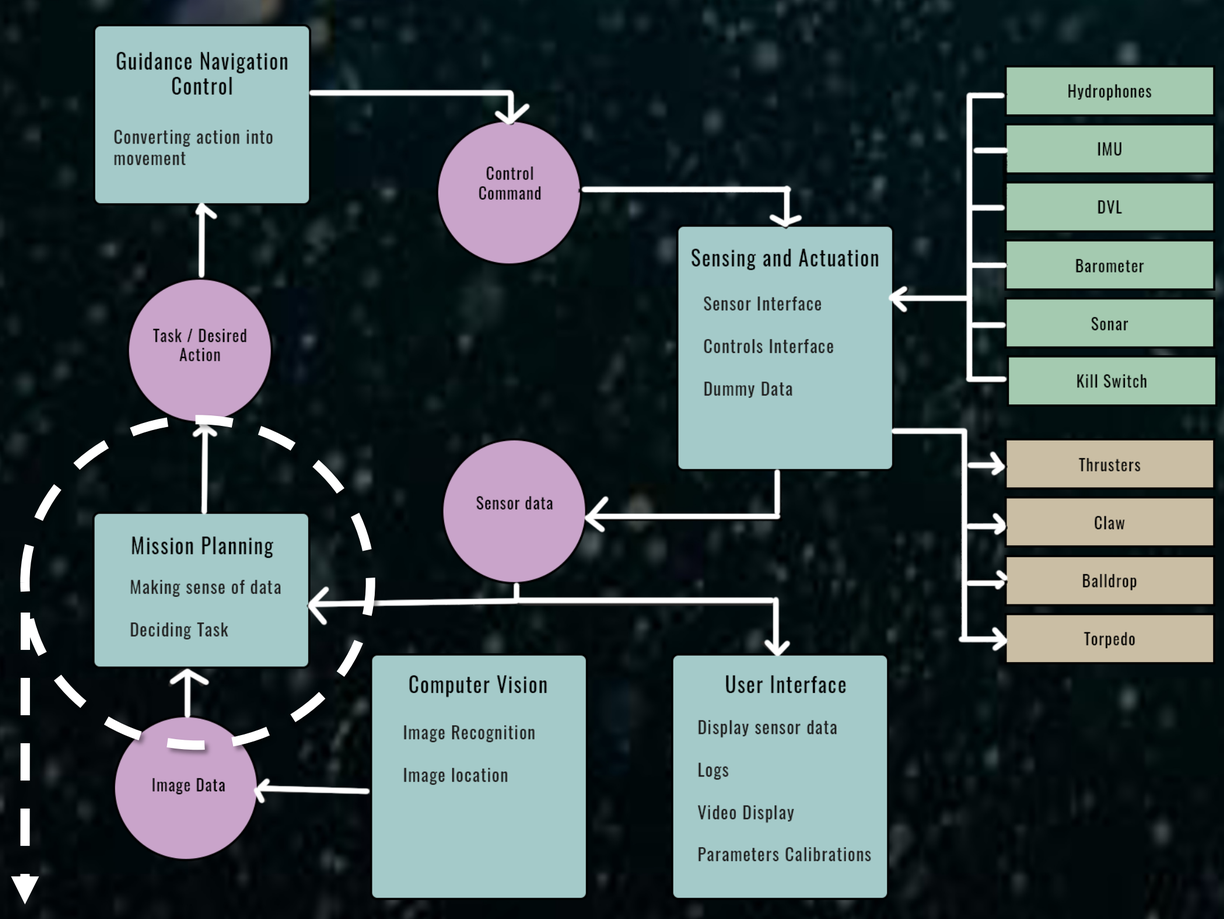
Background

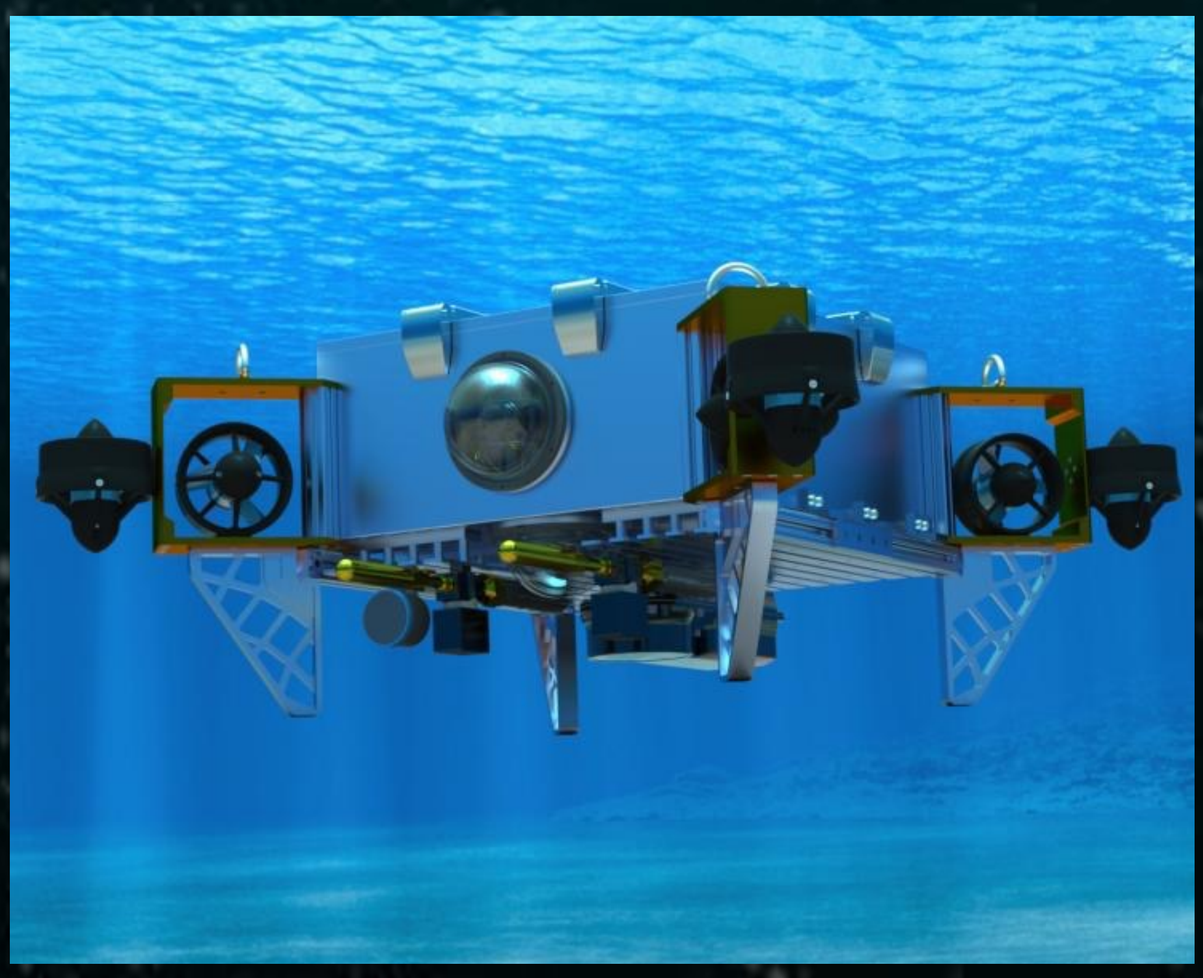
Lanturn is an autonomous underwater vehicle (AUV), that will be used in the international Robosub competition. It is a joint project that requires collaboration between Electrical, Mechanical and Computer Science students. The AUV must complete a series of tasks without user interference. The AUV must see, understand, and localize objects in its surroundings so it can respond and interact with them.

Objective

Design and implement a software solution that can be used on our Robosub. The software should allow the Robosub to complete all the required tasks for the Robosub competition including maneuvering, recognizing objects, detecting sound, picking up objects, and firing torpedoes at targets. The software should be clearly written with adequate documentation, allowing future teams to continue where we left off.

System Design

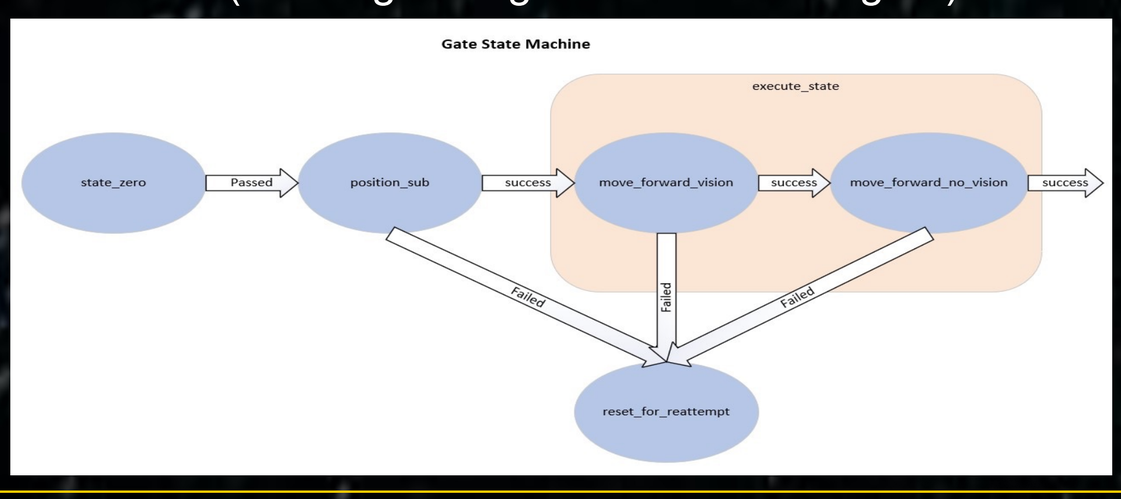




Mission Planning

Mission Planning is the brain of the Robosub, which processes all the information and decides on which action to take next. It does this with help of a state machine. You can see an example diagram of one state below and how the state machine has been designed to complete the task.

Gate State (Passing through an underwater gate):



Result

Our software connects to and reads data from the different sensors. We use ROS for publishing and subscribing to data. The data is consumed by the Mission Planning node where we have completed some of the states as of now. We have created a User Interface for all the sensor data. We've created a program to publish data mimicking the different sensors to allow for testing the different states in Mission Planning without connecting to the actual sensors. The team have also trained Computer Vision software to recognize images for the competition. Extensive documentation and explanations can be found in our Github repository.

Tools & Technologies

YOLO · ubuntu · ARDUINO · Qt · OpenCV · python · H-ROS