Zoro the Autonomous Rescue Dog: An Inexpensive Simultaneous Localization and Mapping System Running on a Mobile Quadruped for Rough Terrain Operation in Dangerous Scenarios

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Zoro is a robotic quadruped meant to explore and map unknown or dangerous environments using many sensors such as an Xbox Kinect for IR depth sensing and mapping and encoders, touch sensors, and an IMU to keep itself stable on uneven terrain. For the actuation of its limbs, we decided to use high torque servos, an inexpensive alternative to the standard brushless motors usually used for robot dogs. The servos paired with a 12-bit analog encoder give us the same information and actuation power in a smaller configuration as normal brushless motors could give us. To keep itself balanced we used the proprioceptive abilities that the IMU, touch sensors, and encoder give us; knowing the rotation of the robot in space and all the position of its limbs and their contact with the ground. For the mapping procedure, we take advantage of the IR projector and depth-sensing camera of the Kinect and the standard Robot Operating System protocols to sync the map data to the other sensors.

Awards Won:
Third Award of $1,000