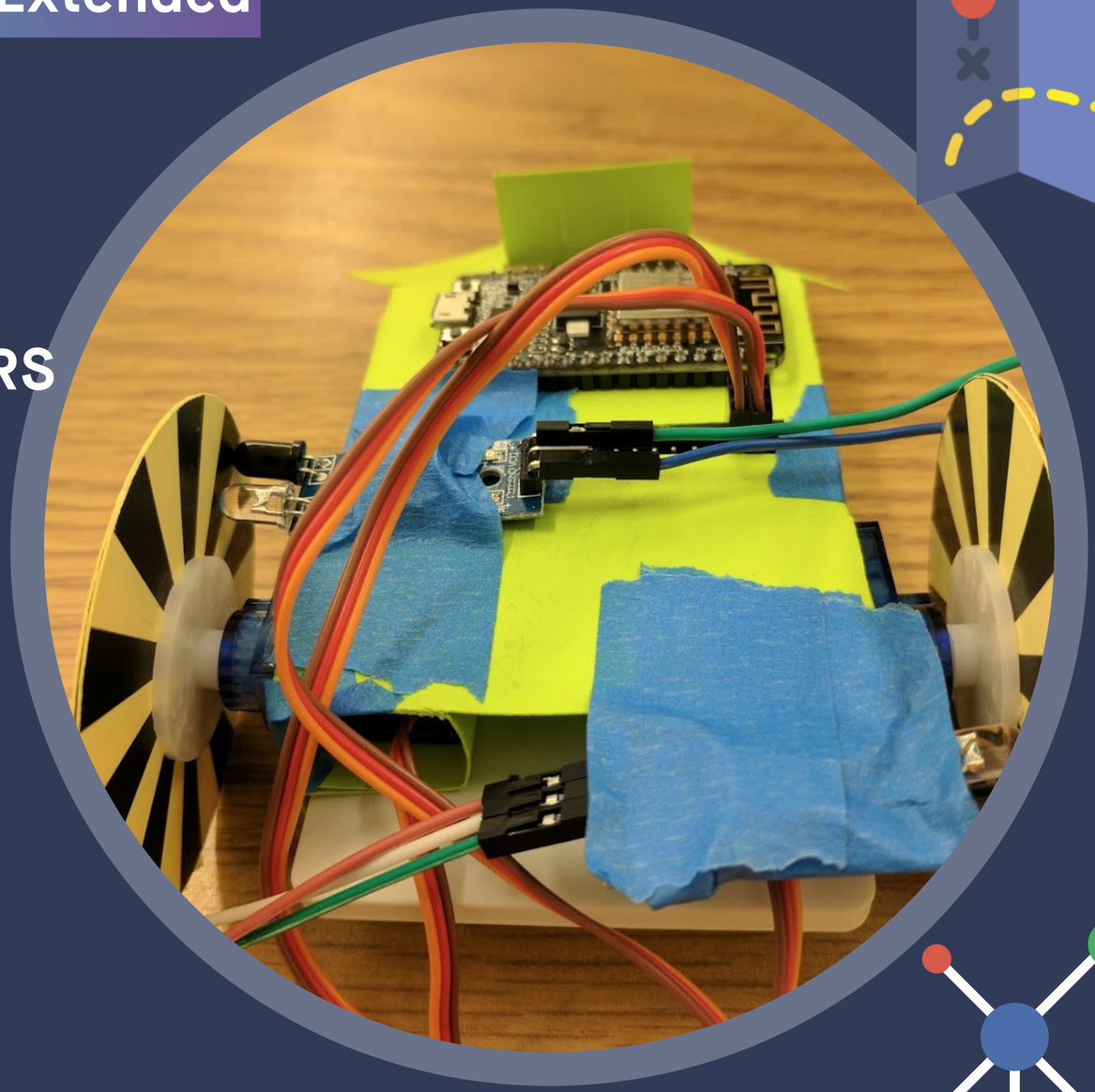
Zixuan(Kevin) Fan

State Estimator: Extended Kalman Filter



KALMAN FILTERS

For the purpose of this project, we implemented an Extended Kalman Filter to estimate the state of the Plant. The Extended Kalman Filter

The Extended Kalman Filter we implemented uses six state variables for the robot in 2-DOF space: its location x, y and angle θ relative to the reference frame and velocities x', y', and θ' representing the angular velocity of the robot.

STATE PREDICT & UPDATE

Two inputs are taken into the Plant of the system. PWM voltage of the servo on the left wheel , pwm1 and PWM voltage of the servo on the right wheel, pwm2. In order to estimate the states, we utilized three sensor measurement to implement the sensor fusion. Two FC-51 Infrared sensors used to measure the angular velocities of the two wheels and a MPU-6050 gyroscope for measuring the angle of the robot related to the absolute reference frame.

PARTNERS

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SENSOR FUSION

With more sensor measurments, we are able to estimate our state variable far more accurate. The sensor fusion of IR angular odometer and gyroscope yields an acceptable state prediction.

To view details, please visit https://github.com/lwei0402/EE183DA_Lab4