

Milestone 1: Ideas and Approaches

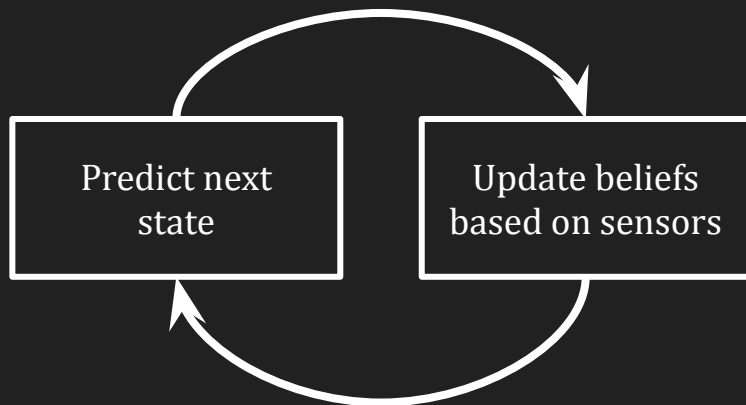
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Project Direction

- Interested in applications of probabilistic models to robotics
- Want to estimate a robot's position in the presence of uncertainty
- Want to integrate information from diverse sensors
 - GPS (low precision, slow)
 - Accelerometer (fast, drifts over time)

Approach

1. Model robot as a set of linear differential equations
2. Given probability distribution of initial states, predict next state based on dynamic model
3. Use sensors as evidence to update beliefs in Bayesian fashion
4. Repeat



Environment

- Using Python, Numpy, and possible PGMpy
- Simulating simple 2d robot environment
- Simulating noisy sensors such as GPS and accelerometers
- Comparing estimated position to true position
- Jupyter notebook for exploration and possibly reports

Next Steps

- Implement a 1D Kalman filter with one sensor
- Find more academic sources on Kalman filter design
- Develop simulation environment