Weekly reports are to be emailed to atbecker@uh.edu by 5:00pm on Tuesdays. The purpose of a weekly report is to: (1) give you text and images for your papers, thesis, and dissertation, (2) document progress, (3) identify if you are stuck or need resources.

Weekly report

1. **My *Goals* from last week**
   * Read, Understand, Record and Simulate the control logic from “Persistent Robotic Tasks: Monitoring and Sweeping in Changing Environments” by Mac Schwager and Daniela Rus.
   * Create a tilt table in a large scale for understanding and discovering logical sequences of flip-flops and adders.
2. **My *Accomplishments* this week**
   1. Project 1: Persistent Robotics Tasks

The paper presents a novel approach of designing a controller that can be used for persistent tasks. The environment is modelled as a field that is defined over a finite set of locations, the field grows linearly and decreases linearly at locations that are in the footprint of the robot. For recharging and collecting data from sensor nodes we have assigned an UAV. The UAV has a data and a recharge footprint and the charge/data-accumulation happens linearly at these sensor nodes and the recharging/data-collection also is linear. Hence the UAV can fly past these sensor nodes and can reduce the amount of charge lost/data-accumulation similar to the given setup. The focus is on speed control of the robot, the authors suggest to take a path which is feasible and apply the control algorithm, and the focus is on performing the task consistently and not path-optimization. Another distinction is the algorithm works for tasks that can’t be completed, which perfectly describes the sensor recharging and data-accumulation problem. Even if a sensor is completely recharged and all the data from its memory has been transferred to the UAV, the sensor node starts discharging to collect sensor readings that are stored in the memory. Hence the task is continuous and we have to assign the right number of robots for a particular task, our goal is to avoid a catastrophe that can happen because a sensor node did not have enough charge to take a sensor reading and transmit it to the sink. In other words the goal is to keep all the sensor nodes alive. The production and consumption functions are linear some may feel this is a disadvantage since modelling of a non-linear function is necessary for precisely depicting the environment in our situation but the consumption rate takes into consideration this approximation. The system is robust and it can adapt to changes that occur in the environment and the speed can be varied online to accommodate such changes. I feel the algorithm designed by them is perfectly suited for our research since they have considered a problem statement with all the assumptions that are presented are reasonable and the description is well suited. Certain changes like while recharging we need to stop at a particular position hence speed will be zero for a period of time, we should do recharging and data accumulation hence the same algorithm gets more complex and cannot be directly applied since we use the same robot to perform both tasks. Hence certain regions might be influenced by certain tasks/ both tasks considering the size of footprint for both tasks are different, time taken the rate of accumulation is different but both tasks have to be done by the same robot.

1. **My *Goals* for next week**

* Read “Particle Computation: Device Fan-out and Binary Memory” and test the concepts projected in the new tilt table.
* Work on the simulation and improve it to an acceptable level using the control algorithm provided in the paper.
  1. Meeting with Dr. Becker on Tuesday 11:00 A.M.

1. **What I need Dr. Becker to do:**
   1. Assist me with simulation.
   2. Discuss on LTL and other possible algorithms that can be used for the project.