Integration

AR Track, Week 6

Congratulations!

- Welcome to the final week!
- Your rover should now be able to plan paths, move to given positions and estimate its own state
- Now it's time to combine everything

You will need

- AprilTags
- Some arts and crafts supplies (to hold the AprilTags up)

Building the map

- You will need relatively accurate measurements of each tag's position (±1cm) and rotation with respect to an origin point
- You will also need to generate an occupancy map based on your tag locations – discretize so that each tag is an obstacle
- You can also add obstacles around anything else you want
- Hint: AprilTag measurements are most accurate when the tag is viewed straight on

TODO: Picture of occupancy map

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x

y

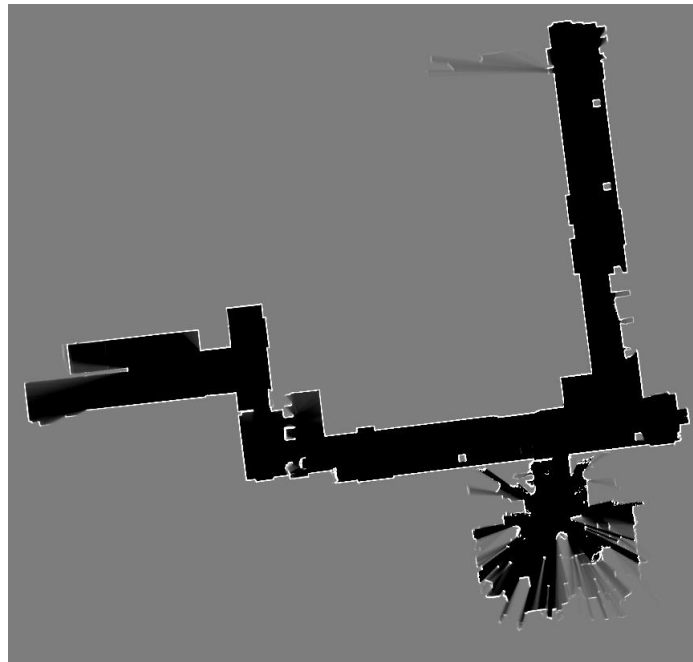| $m_{1,1}$	$m_{1,2}$	$m_{1,3}$	$\cdots$	
		$\vdots$		
				$m_{x,y}$
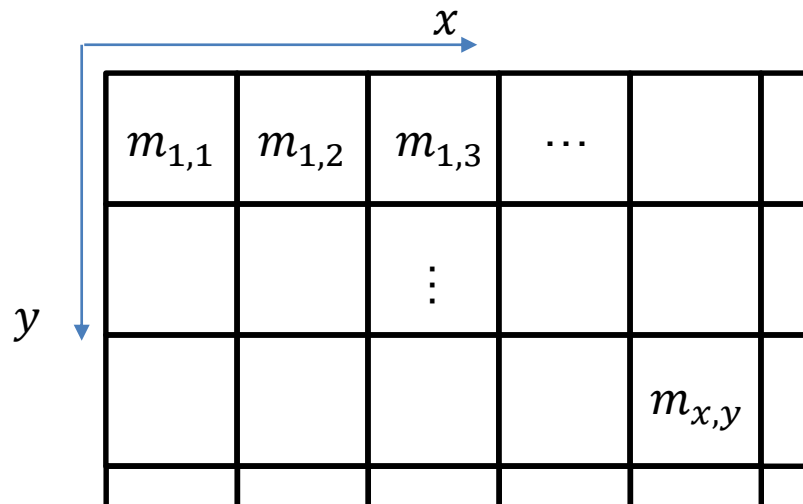
Full algorithm
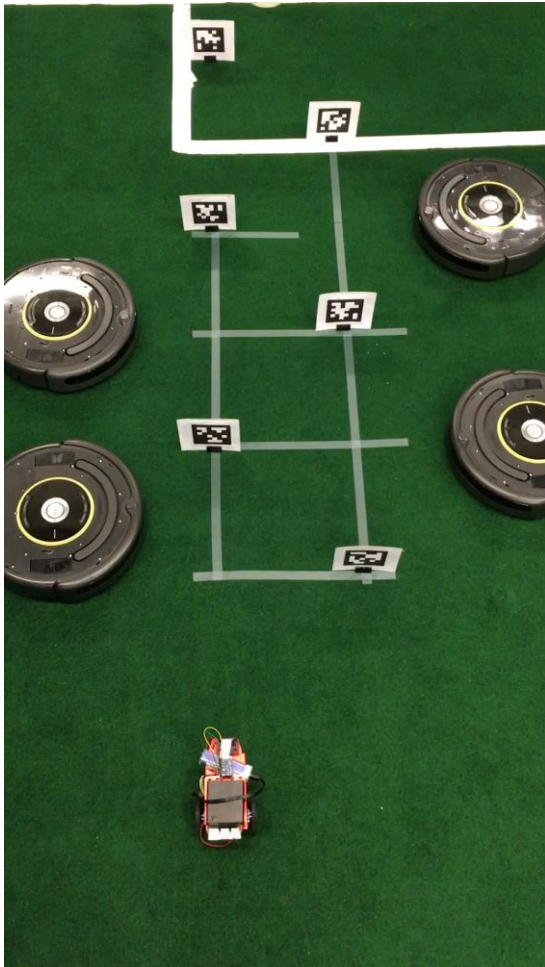
- Calculate path to goal using Dijkstra's
- Get measurements from sensors
- Update state using EKF and measurements
- Compute control inputs (v and ω) to move to the next node
- Command the robot to move

Future Extensions

- Use feature tracking for pose estimates
- Build the map online (Simultaneous Localization and Mapping)
- Add different sensors (stereo camera, lidar etc)

Map built using a laser scanner