APRIL TAGS
PRESENTATION

Mobile Robotics Project

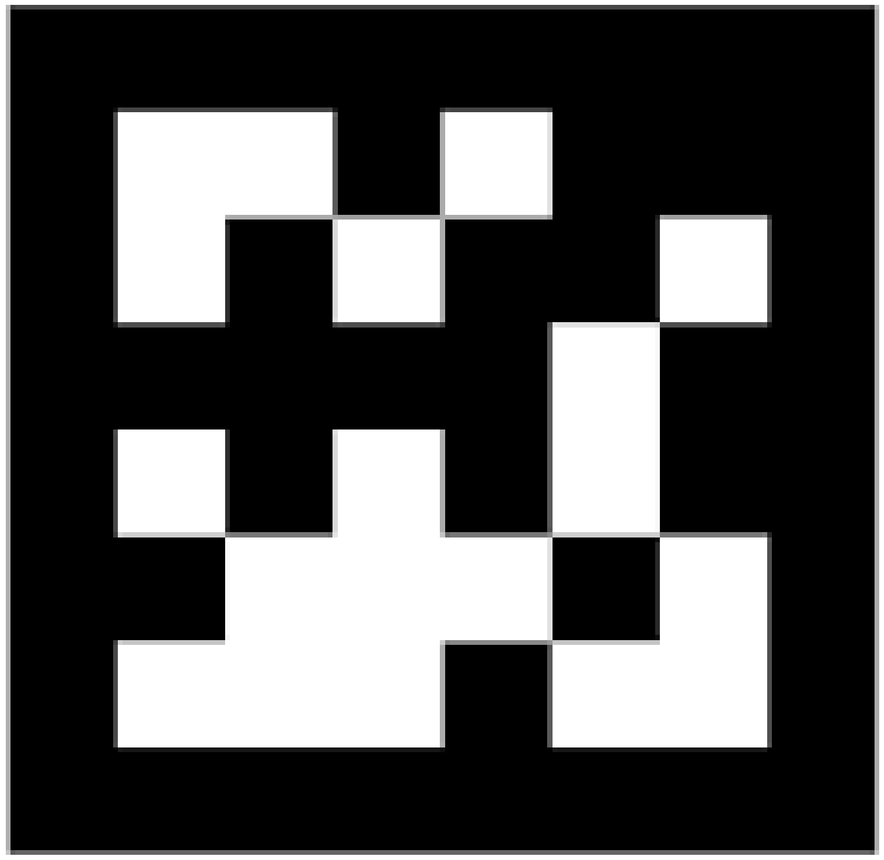
Team - OutOfMemor-

- Anushka Jain
- Himani Belsare
- Surtani Monica

UNDERSTANDING APRIL TAGS

AprilTag is a visual fiducial system, useful for a wide variety of tasks including augmented reality, robotics, and camera calibration.

Targets can be created from an ordinary printer, and the AprilTag detection software computes the precise 3D position, orientation, and identity of the tags relative to the camera.



OUR PROJECT

April Tags based Camera Pose Estimation

HIGHLIGHTS

- Estimate the pose of the camera given the location of April-Tag.
- Consider an environment with multiple April Tags, assuming known location of the robot as it moves build a map of the April Tags.
- Now relocalize in the same environment using the April Tags by observing one or more of the tags and estimate the location from where the Tag is observed

OUR PROGRESS

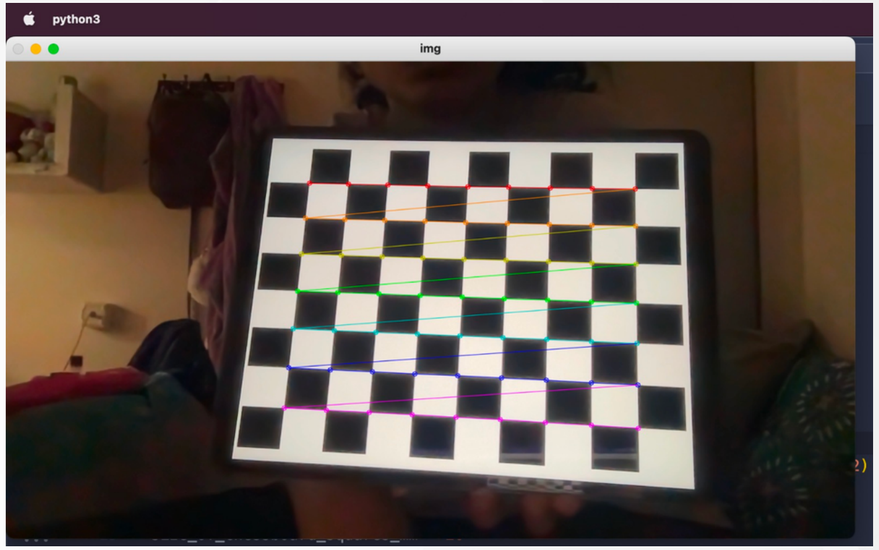
What have we implemented?

- April Tag detection
- Getting an ID for each detected April Tag
- Camera calibration
- Finding rotation matrix and translation vector
- Using these to:
  - find location of April Tag given known location of the robot
  - find location of robot given location of April Tag
- Using perspective-n-point algorithm

APRIL TAG DETECTION & ID GENERATION

- We used OpenCV and the AprilTags libraries to detect an April Tag Family and ID.
- Using this, different April Tags can be detected and identified as separate entities.

CAMERA CALIBRATION



Using camera calibration to find the following:

- camera matrix - focal length and focal center
- distortion coefficients
- rotation matrix
- translation vector

FINDING ROTATION AND TRANSLATION

Using OpenCV and the April Tags libraries, we are able to obtain the rotation and translation matrix to transform points from the object co-ordinate system to the robot co-ordinate system.

These matrices can be used to perform further calculations to get more information regarding positions of entities in the environment.

THANK YOU