

ECE 498: Project Details

Final Exam: May 9, 2019. 8am sharp. Demo your projects on new data and show a 5 slide description of your algorithm. For 4 credit students, also submit a 5 page project report in conf paper format.

Suggested: Capture a short video (max 2 minutes) that shows your algorithm running well for the test files.

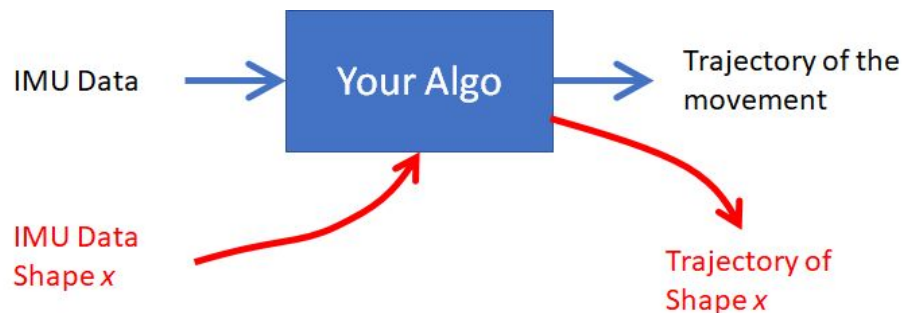
Project Topics:

1. BYOP: Bring your own project. Check with the instructor before starting the project. We expect the project to be of similar or higher complexity as the given three topics below. Bottom Line: Talk to the professor before starting.
2. IMU Dead Reckoning
3. AoA Triangulation
4. RADAR for sound

IMU Dead Reckoning

Aim:

Create an algorithm that takes IMU data as input, and produces the trajectory of the movements described by that IMU data. You will be provided Accelerometer and Gyroscope data, and a few ground truth shapes.



What to submit:

1. Your code.
2. The output for each provided data files. (2D/3D graph)
3. 5 slide presentation describing your algorithm

On the exam day:

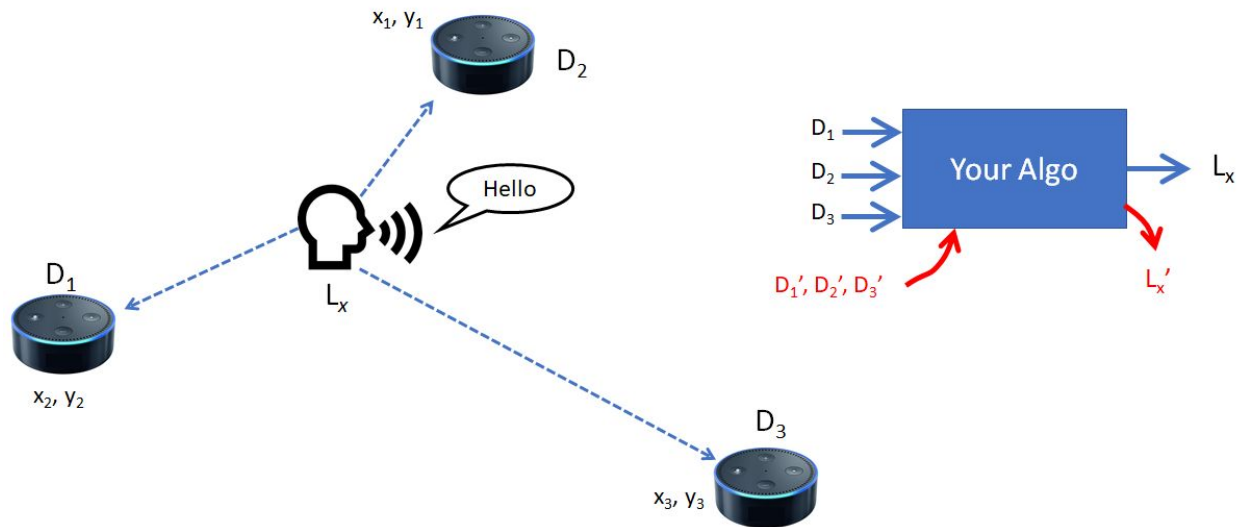
1. You will be provided a new shape X. Show the trajectory of that shape.

- Your algorithm should work on the provided data file and produce an output within a maximum of one minute.

AoA Triangulation

Aim:

You have you create an algorithm that takes as input sounds recorded by three different microphone arrays and estimates the location of the sound source. The sound is spoken by a person somewhere around these three microphone arrays. You will be provided the exact distance between the microphone arrays and their configuration. You will not have the exact source sound signal. You will also be given the ground truth location for a few test files to check your algorithm.



What to submit:

- Your code
- The estimated location of the human speaker for all the provided sound files.
- 5 slide presentation describing your algorithm

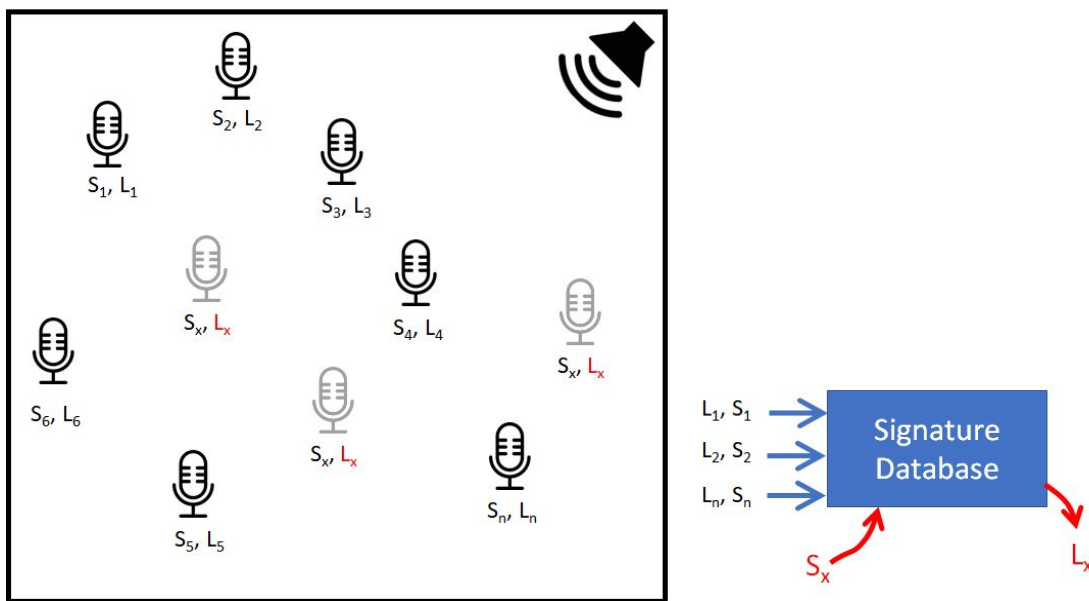
On the exam day:

- You will be provided a new set D'_1, D'_2, D'_3 and your algorithm must estimate the location L'_x
- Your algorithm should work on the provided data file and produce an output within a maximum of one minute.

RADAR for sound

Aim:

There is a single sound source inside a room. It is sending periodic audible beeps and you have a microphone that can record these beeps. Design an algorithm that can take as input a set of sounds (S_1, S_2, \dots, S_n) collected from various known locations (L_1, L_2, \dots, L_n) and produces a database of signatures. Then, when given the sound heard (S_x) at an unknown location, your algorithm should output the corresponding location (L_x) by consulting the previously created database.



What to submit:

4. Your code
5. The estimated location of the mic for all the provided sound files.
6. 5 slide presentation describing your algorithm

On the exam day:

3. You will be provided a new sound file and your algorithm must estimate the location L_x
4. Your algorithm should work on the provided data file and produce an output within a maximum of one minute.

