Object Localization with 2 Receive Antenna PLUTO+ SDRs

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- Guidelines to review the report for Question 1-3 below: https://dl.acm.org/journal/dgov/reviewer-guidelines
- Guidelines to review the code artifacts for Question 4-8 below: https://conferences.sigcomm.org/sigcomm/2022/cf-artifacts.html

1. Summary

The goal of this project was to do wireless localization for AoA and ToF estimation using the Pluto+ SDR. The motivating paper behind this project is the SPOTFI paper. Here, instead of using the WiFi APs (used in the paper), the author is trying to use a single Pluto+SDR which has just 2 antennas. Using a single access point (on top of that, using just 2 antennas) is not enough to get the exact location, hence the author's goal with a single 'AP' is to determine the accuracy offered by AoA and ToF estimation. First, the MATLAB simulation was done to validate the algorithms and methods used. Next, the SDR was used to provide input data for the MATLAB scripts

2. Strengths

The author has tried to implement the actual hardware for the system. Additionally, the author has investigated if the AoA and ToF estimation can be done with minimal hardware (2 antennas and 64 OFDM subcarriers). The author has also used OFDM subcarriers for transmission, which is a major learning objective of this course.

3. Weakness

The hardware experiment is not described adequately. Since this is a major point of this project, more information on this is required in the report. There should AoA and ToF estimation plots in the report as well (it was there in the presentation though). Since this project is hardware based, and such wireless localization is highly dependent on the scene, the scene description is essential but is missing in this report.

4. Documentation: Is the artifact/code sufficiently documented?

Reviwer's score: 6

Rate from 0% to 100%, where 0% means "documentation is completely insufficient" and 100% means "documentation is absolutely sufficient". If you need to assess both a dataset and tools, please take the average and comment below. In assessing tools, please consider if they are easy or difficult to install/set up and get to run. In assessing datasets, please consider if the meta data is sufficient.

Choices are:

- **1.** 0%
- **2.** 20%
- **3.** 40%
- **4.** 60%
- **5.** 80%
- **6.** 100%

Documentation: Comment on/explain your choice above:

The codes in the github repo are well documented. Each receiver and transmitter codes for MATLAB and GNURadio are separated properly. The installation guide is informative.

5. Completeness: Do the submitted artifacts/code include all of the key components described in the report?

Reviewer's score: 5

Rate from 0% to 100%, where 0% means "does not include any key components" and 100% means "includes all key components".

Choices are:

- **1.** 0%
- **2.** 20%

- **3.** 40%
- **4.** 60%
- **5.** 80%
- **6.** 100%

Completeness: Comment on/explain your choice above

Yes, the code includes all the key components described in the report. However, since this is a hardware project, there should be a folder/link to the actual experimental dataset taken from pluto sdr. This would ensure that, even if the hardware experiment can't be run, we can still run the plots.

6. Exercisability: Do the submitted artifacts/code include the scripts and data needed to run the experiments described in the paper, and can the software be successfully executed?

Reviewer's score: 5

Rate from 0% to 100%, where 0% means "the scripts/software cannot be successfully executed and/or no data is included" and 100% means "the artifact includes all necessary scripts/software and data, and scripts/software (if present) can be successfully executed".

Choices are:

- **1.** 0%
- **2.** 20%
- **3.** 40%
- **4.** 60%
- **5.** 80%
- **6.** 100%

Exercisability: Comment on/explain your choice above

We believe the codes are very well written, and instructions for installation are very well defined. For the hardware project, we were not able to run the hardware experiments (not the fault of the author, we couldn't find appropriate time for it). So, a collected hardware experiment dataset would be helpful.

7. Results attainable: Does the artifact/code make it possible, with reasonable effort, to obtain the key results from the artifact/code?

Reviewer's score: 6

Rate from 0% to 100%, where 0% means "no results can be obtained" and 100% means "all results can be obtained".

Choices are:

- **1.** 0%
- **2.** 20%
- **3.** 40%
- **4.** 60%
- **5.** 80%
- **6.** 100%

Results attainable: Comment on/explain your choice above

Yes, we believe the codes will make it possible to obtain key results from the provided code.

8. Results completeness: How many key results of the paper/report is the provided code meant to support?

Reviewer's score: 6

Rate from 0% to 100%, where 0% means "the artifact is meant to support no key results" and 100% means "the artifact is meant to support all key results".

Choices are:

- **1.** 0%
- **2.** 20%
- **3.** 40%
- **4.** 60%
- **5.** 80%
- **6.** 100%

Results completeness: Comment on/explain your choice above

We believe the code is meant to support all the key results of the report.

Reviewer Team member1 Name, Signature
Name: Matthew Fiorenza
Signature:

Reviewer Team member2 Name, Signature
Name: Raj Bakhunchhe
Signature