



Towards CSI enabled Closed-loop WiFi based SLAM

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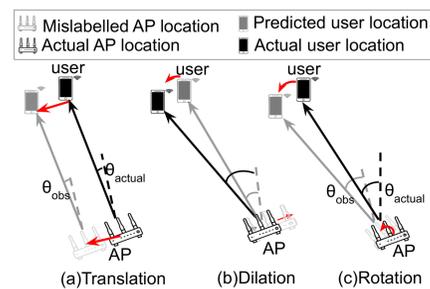
Motivation



- Locate the user in GPS-denied indoor environments
- Everyone has a Wi-Fi device on them making Wi-Fi ubiquitous
- Thus Wi-Fi localization has huge scope

Building the Bridge

Challenges



The user location is predicted wrong due to errors in access point's estimated details.

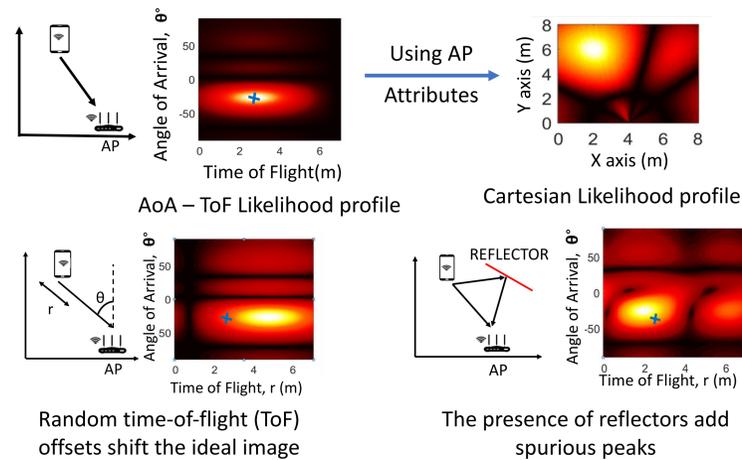
(a) **Translation:** Predicting the wrong location of the AP.

(b) **Dilation:** Predicting incorrect antenna separation

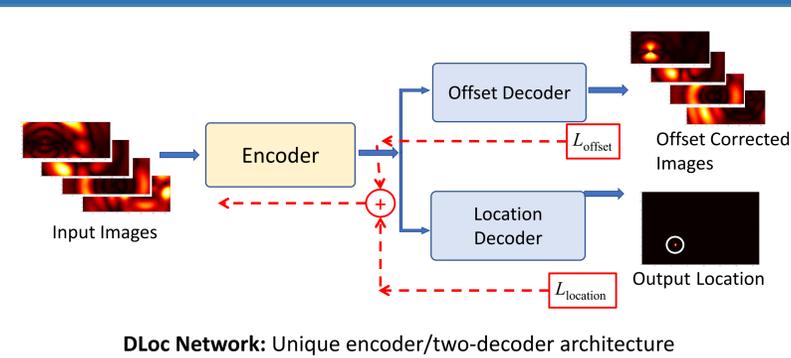
(c) **Rotation:** predicting the wrong orientation

Connecting Locations with Maps

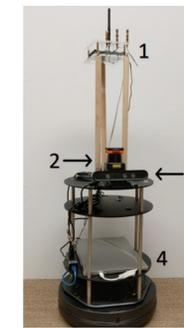
Challenges



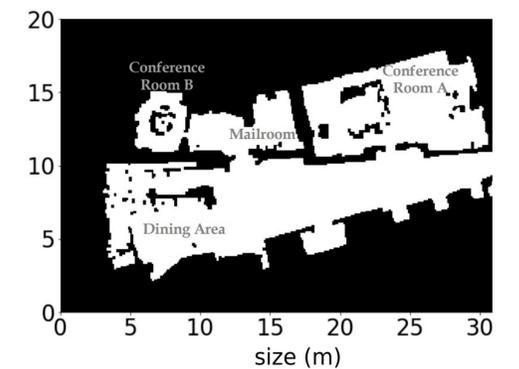
Idea



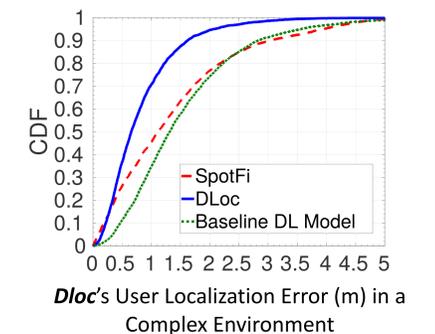
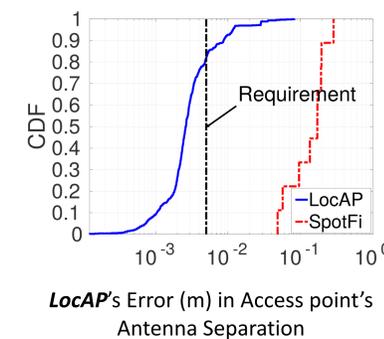
Implementation



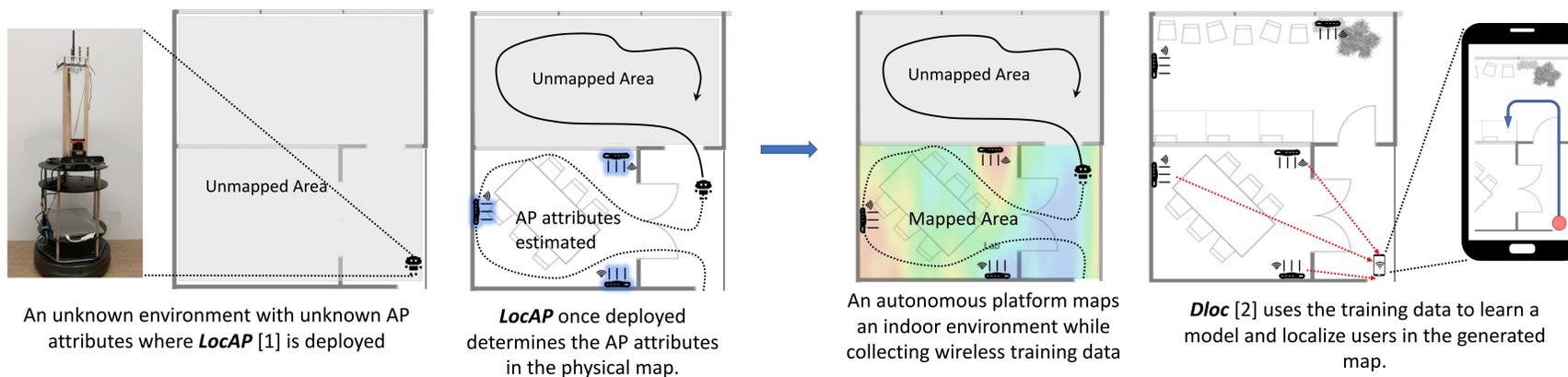
Makeup of our autonomous robot



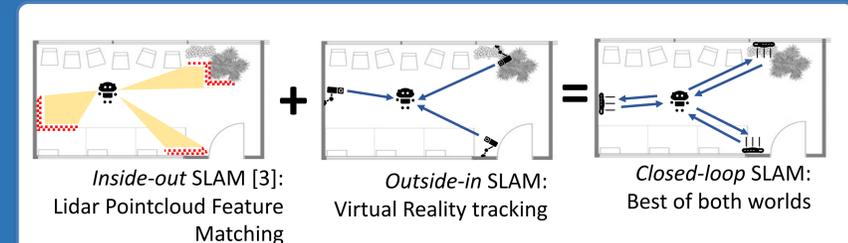
Results



Overview



Tandem Deployment



References:

- [1] Roshan Ayyalasomayajula, et al. "LocAP: Autonomous Millimeter Accurate Mapping of WiFi Infrastructure." 17th USENIX Symposium on Networked Systems Design and Implementation (NSDI 20). USENIX Association
- [2] R. Ayyalasomayajula, A. Arun, C. Wu, S. Sanatan, S. Abhishek, D. Vasishth, and D. Bharadia. Deep learning based wireless localization for indoor navigation. In The 26th Annual International Conference on Mobile Computing and Networking (MobiCom '20). ACM, 2019.
- [3] Grisetti, Giorgio, et al. "A tutorial on graph-based SLAM." IEEE Intelligent Transportation Systems Magazine 2.4 (2010): 31-43.

