

Efficient Design of Scalable Indoor Positioning System based on Wi-Fi Fingerprinting

Emad Ebaid and Keivan Navaie
School of Computing and Communications



What is the Indoor Positioning System (IPS)?

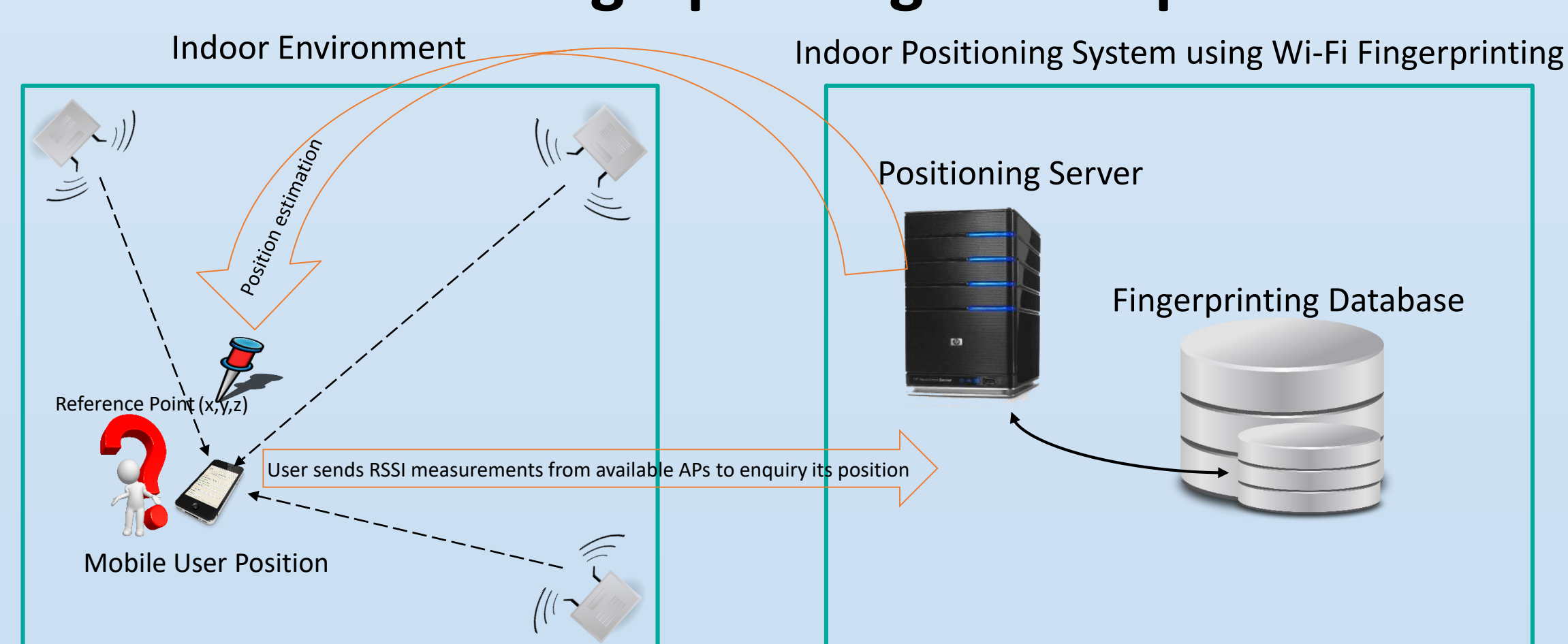
IPS is a system, which can determine an object's position inside a building or in a particular coordinate system. This can happen through different technologies such as Wi-Fi and Bluetooth. The IPS can be designed based on the environment (e.g. offices and shopping malls) and service provider's needs. Unlike GPS, the IPS has not been widely deployed due to indoor environment challenges and the cost of building such a system.



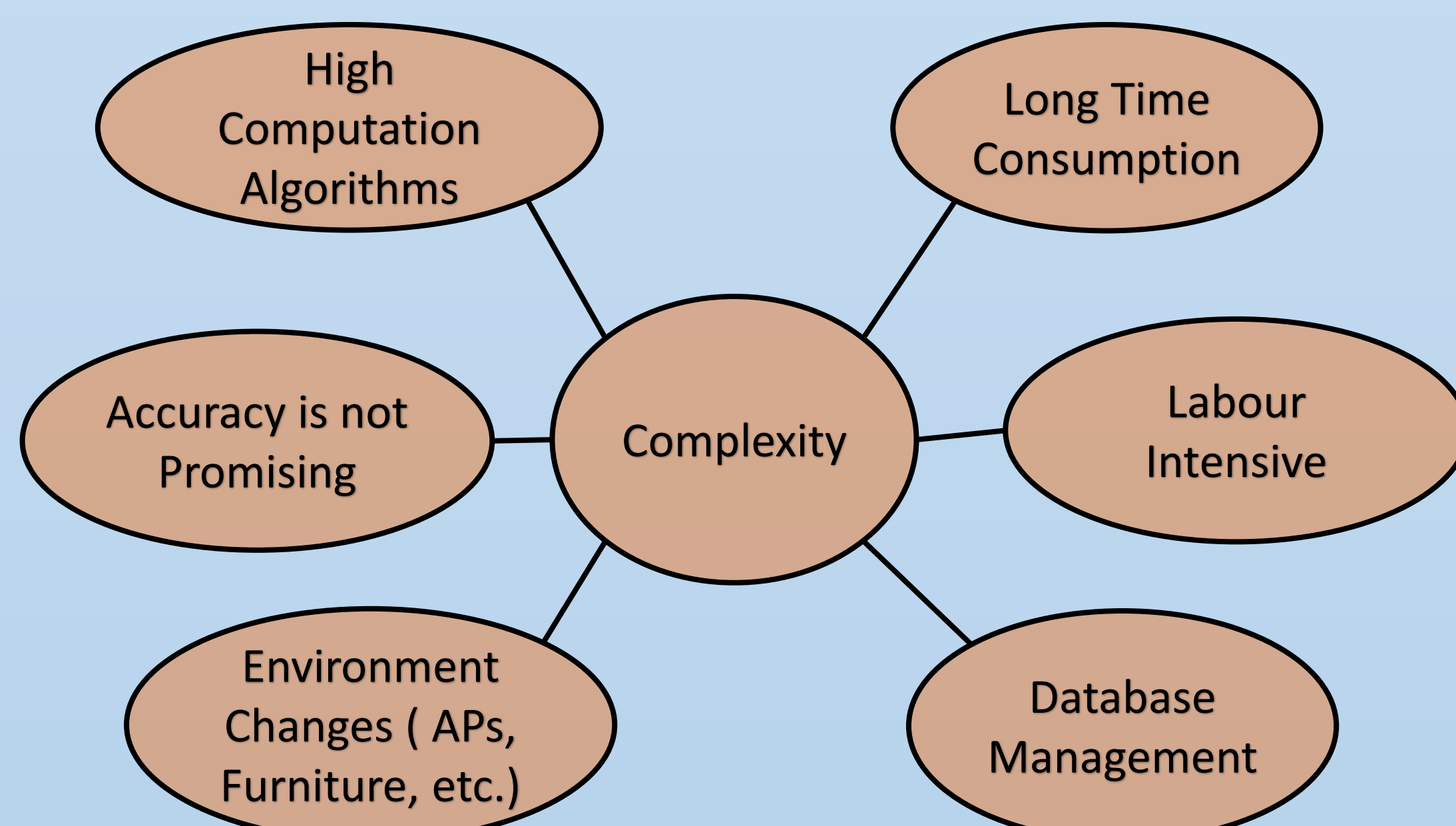
Background

- Cyber-Physical Systems (CPS) are evolving and gradually building an ecosystem of smart homes, smart cities and automated systems.
- Indoor Positioning Systems (IPSS) play an essential part in providing location-based services to many demanded applications in CPS such as robots and UAVs.
- Indoor positioning based on Wi-Fi is widely used to limit the complexity and cost of the Indoor Positioning System (IPS).

Wi-Fi Fingerprinting Technique



Research Problem

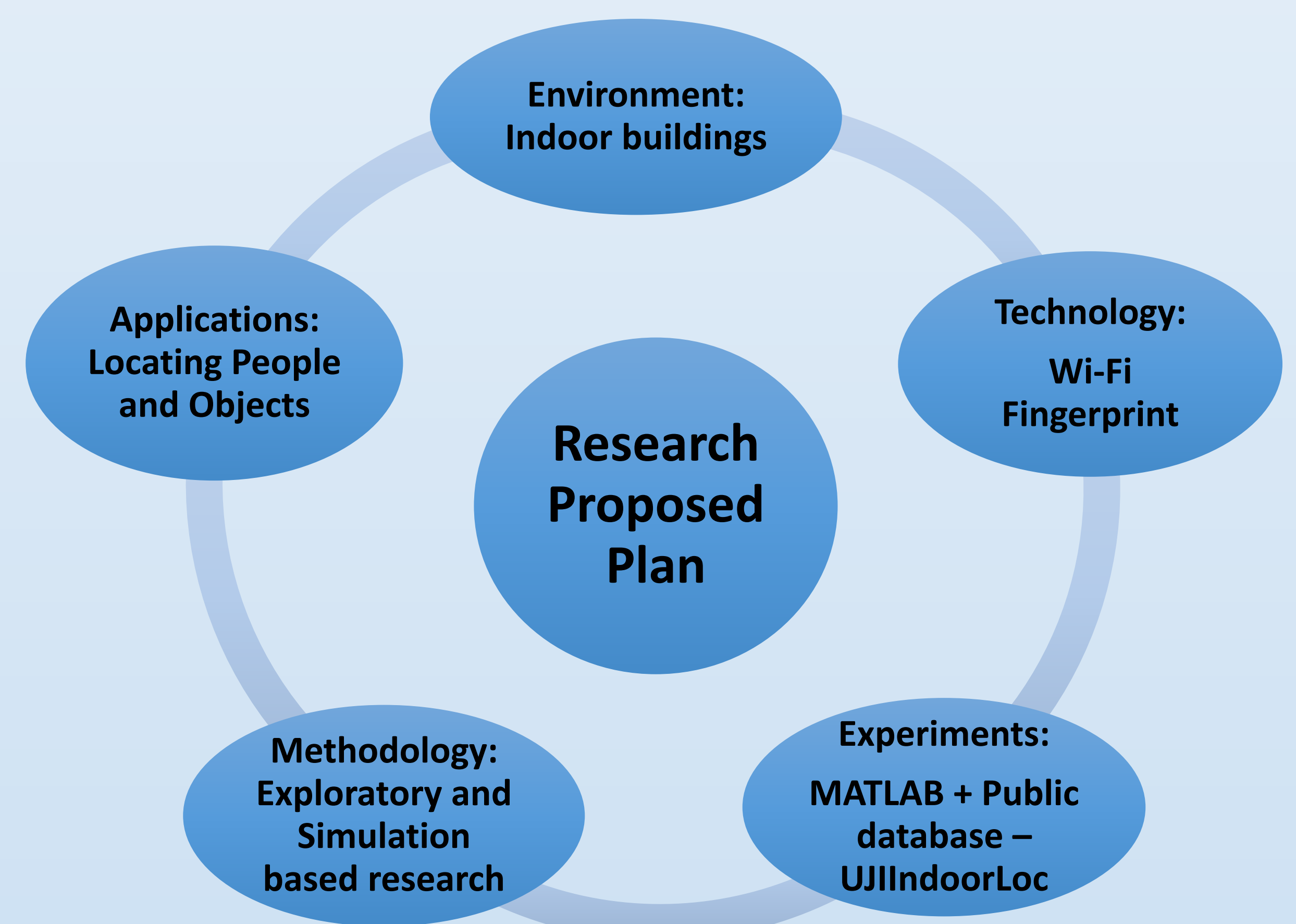


Motivation

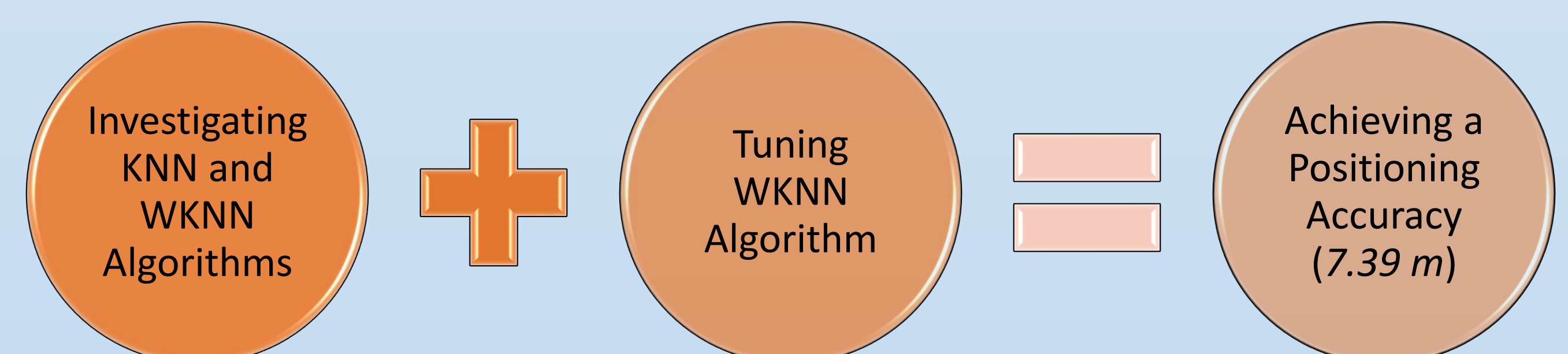
To build cost-effective IPS by reducing the complexity of the IPS while maintaining efficiency and scalability.

Objectives

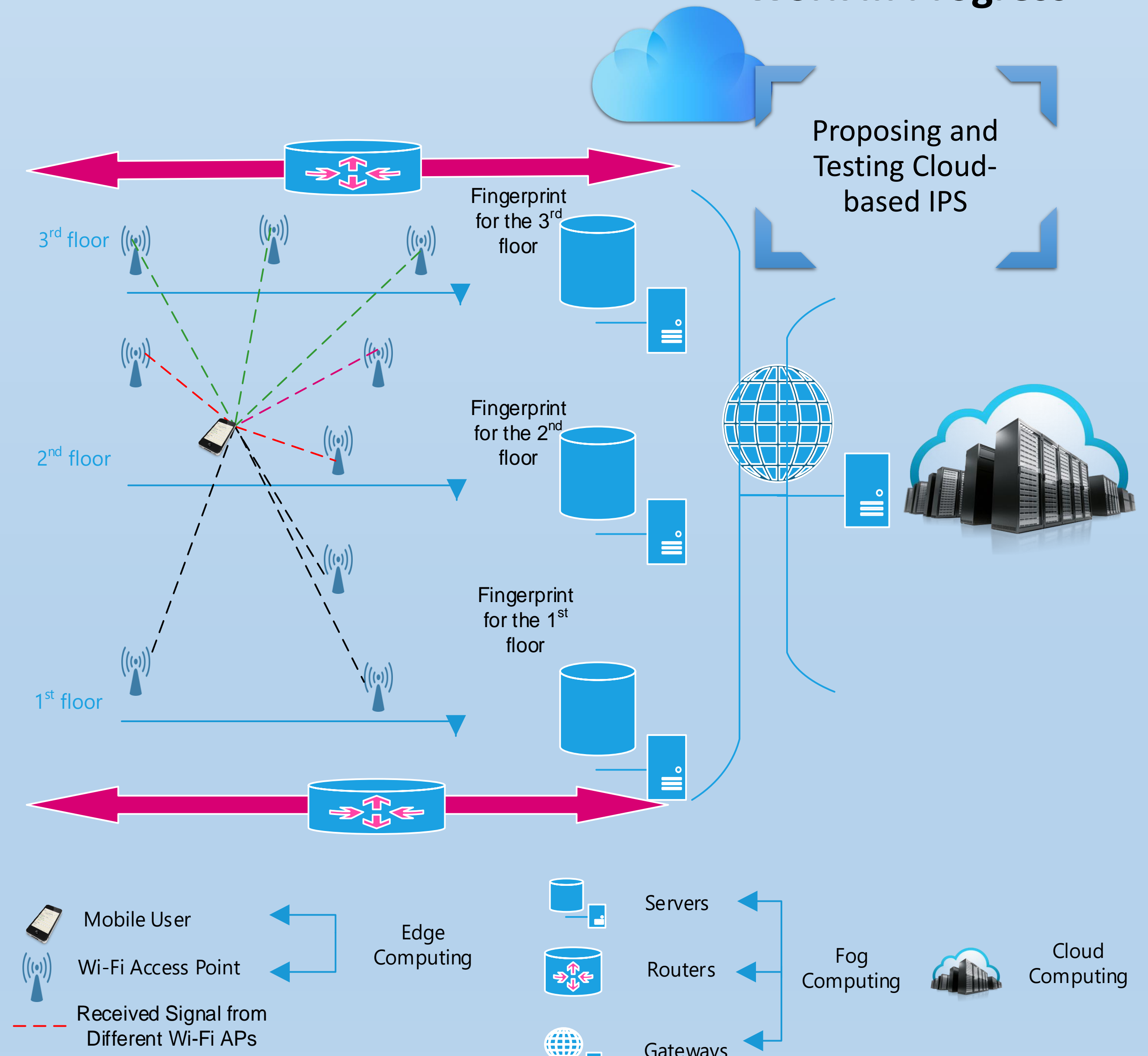
- Improve positioning accuracy and reduce Algorithm calculation complexity.
- Improve system scalability and reduce database-fingerprinting complexity.



Achieved Results



Work In Progress



Envisioned cloud-based-IPS Architecture in multi-floor scenario

Emad Ebaid
e.ebaid@lancaster.ac.uk
PhD student in Communication Systems

School of Computing and Communications (SCC)

