DeepBLE: Navigation using Low Energy Bluetooth

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Abstract
With the new Bluetooth Low Energy APIs released by Android, we leverage the geofencing power of BLE in tracking position. We use a network on anchors that communicate with other devices.

Motivation

- No need for network signal
- Low Overhead
- Scalable and flexible
- Bluetooth Low Energy
- More robust/portable than Wifi
- Less impact by LOS -> Indoor use

System Design
Each anchor broadcasts info about the users and anchors in their field, forming a network.

Design Goals

- Portable
  - Anchors placed anywhere, No framework req.
- Enriched Context
  - Each anchor/user with contextual information
- Scalable
  - Easy to add more anchors
- Robust
  - Fault tolerant, esp. with regards to line of sight

Future Work
- More precise position tracking
- Render map of relative positions
- Graphical display of anchor network

Conclusion
Designed an Android app to track location using BLE, which can be extended to fit a wide variety of use cases.

Use Cases

- Main anchor screen
  - Set your device
  - Set context for anchor
- List of anchors and their users

Screenshots

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