

RB.2: Stationary and Aerial Based RF/Radar Detection of Concealed Threats and Anomalous Communications

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SENTRY Challenge: RF Situational Awareness

Generate real-time RF radio maps capable of tracking cellphones and detecting anomalous communications in and around STCPs using inexpensive spectrum power sensors. These radio maps provide the Virtual Sentry real-time RF situational awareness and insight into human and machine behavior and occupancy.

- RF Situational Awareness
- Real-Time
- Noninvasive

Accomplishments

Accomplishments

- Neural Network architecture capable of generating RF radio maps
- Useable in urban and rural environments
- *RadioHound* RF Situational Awareness Platform

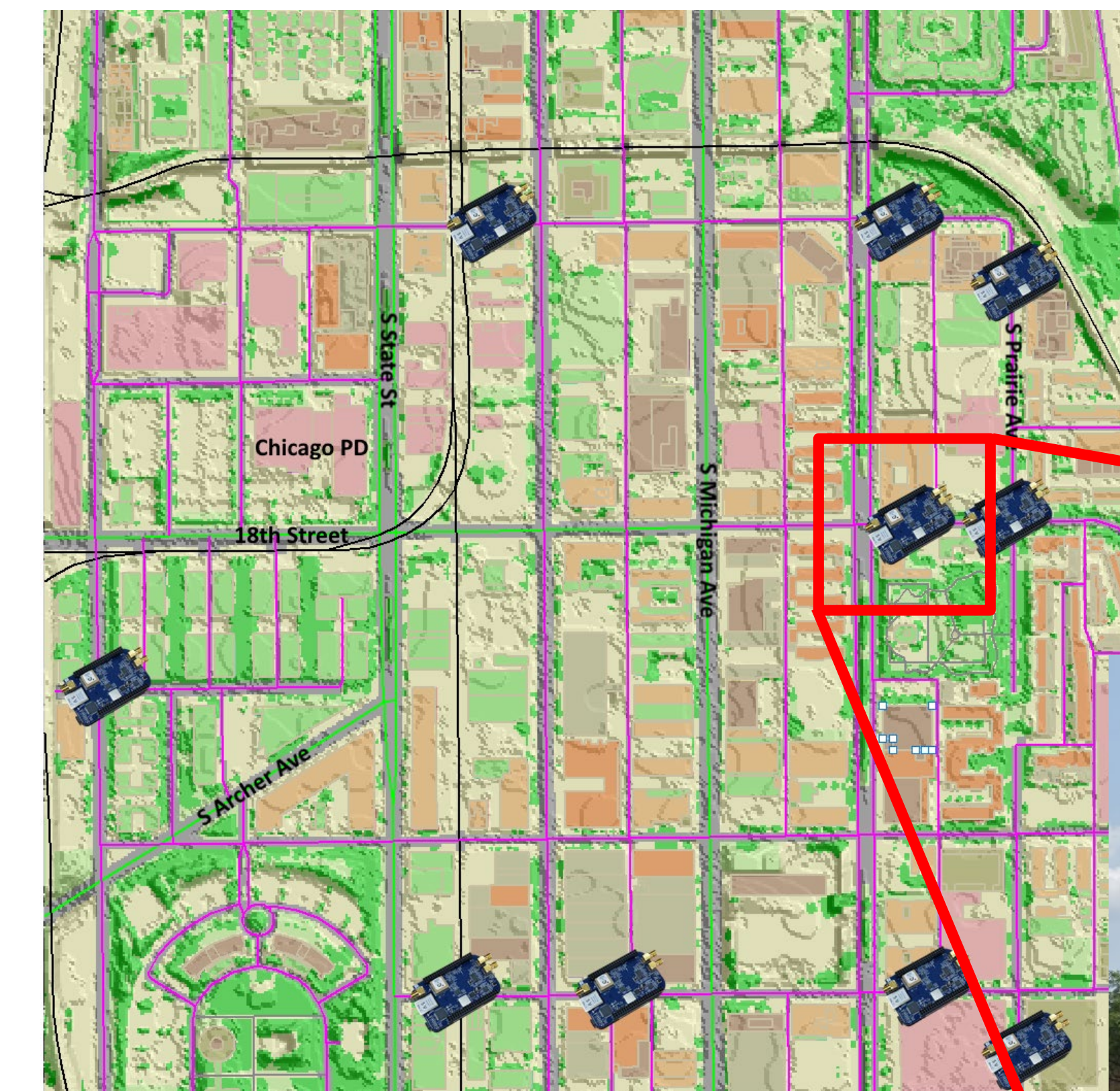
Future Work

- Implement the RF radio map system for indoor environments
- Generate RF radio maps from passive tomographic power measurements

Addressing the Challenge: Building the Real-Time RF Situational Awareness System

Real-Time RF Situational Awareness System monitors the RF environment around STCPs and generates RF radio maps for detecting and tracking cellphones and other wireless devices

- Deploy inexpensive networked wireless spectrum sensors near STCPs to monitor the RF environment
- Detect wireless signals coming from cellphones and other wireless devices with the sensors
- Aggregate the networked sensor measurements using RF Situational Awareness Platform, *RadioHound*
- Generate RF radio maps from the collected sensor measurements
- Report the RF radio maps to Virtual Sentry for real-time RF situational awareness
- Locate and track potential threats around the STCPs using the RF Radio Maps
- Provides insight into both human and machine occupancy and behavior by the amount and kind of wireless usage



Deployed RF spectrum sensor used to monitor the RF environment. Sensors are scattered around an environment and used to estimate radio maps in real-time.

Next Steps

Supporting the Virtual Sentry Framework:

- Expected Outcome: Wireless spectrum power measurements and RF radio maps information pipeline that is fed into the Virtual Sentry framework providing real-time RF situational awareness
- Track potential threats near STCPs using their cellphones and other wireless devices

Partnerships and Stakeholders:

- ARL – Developers of sensor networks
- Houston Texans – NFL team that draws in crowds for their event

