CyberTiger

CPSC 481 - CyberTiger Systems Creative Inquiry
Summary

• Project investigating the properties and performance of wireless computer networks

• Develop a custom and extensible testing tool
  – Device agnostic
  – Network agnostic

• Use various metrics to evaluate the coverage of an internet service provider for an area
  – Phone data networks
  – 802.11 wireless networks
Objectives

• Gain experience developing mobile apps
• Audit the claims of broadband providers
• Use user-collected or “Crowdsourced” data to generate a publicly available universal wireless coverage map
• Investigate the behavior of mobile networks
Crowdsourced data

• **GasBuddy**
  – Users report local gas station prices

• **OpenStreetMap**
  – Open source street map, freely editable

• Google Maps live traffic data
  – Monitors speed of Google Navigation users

• **fold.it**
  – Users play “game” folding proteins
Similar Efforts

- Wardriving
  - Plotting existing Wifi hot spots
- **Ekahau HeatMapper**
  - Creates heat map of Wifi coverage in an area
- **OpenSignalMaps**
  - Crowdsourced data via Android app
  - Heat map, signal strength only
Similar Efforts (cont.)

• **Root Metrics**
  – Phone app to perform tests and plot data
  – Limited in metrics and no Wifi network support
  – Does not provide user with a personal map

• **MobiPerf**
  – University of Michigan researchers
  – Many metrics consolidated into a single test
  – Mobile networks, plotted as a heat map
  – Does not provide user with a personal map
Test Framework Overview

- Clients: C++, Android
- Server: C++ & MySQL
- Visualizer: Python & Javascript
Visualizing the Data

• Get GeoJSON tiled test data from TileStache
• Currently using Polymaps Javascript library
• Currently plotting individual test points
• Need an improved visualization of coverage
  – Generate a heat map image to serve (server side)
  – Use a grid overlay and shade each cell according to the average values inside of it (client side)
  – Other ideas? Need to convert test points in to something more meaningful to the layman
Visualization Map

Results

Latitude: 34.6767
Longitude: -82.839
Signal: -84 dBm
Latency: 7.33333 ms
Downstream: 3614.78 Kbps
Upstream: 1948.73 Kbps
This Semester

• Availability monitoring app
  – Provide users with a map of their coverage
  – Mobility patterns
• Improve visualization map
• Gather lots of test data
• Investigate new metrics
  – Evaluate VoIP performance
• Investigate incentives for users to run tests