# GPS & WiFi Choke Point Analysis

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## Abstract

Devices like smartphones, tablets, and laptops are widely available, always on, and linked to individuals. Using opt-in techniques for data collection, we can effectively track individuals indoors where traditional techniques like the Global Positioning System (GPS) do not work. **By tracking position over time, we can identify choke points where travel is stopped because of bad or blocked paths**, and take action to increase the rate of travel or to perhaps promote choke points, e.g. in an effort to promote spontaneous interactions.

## Introduction

For this project, we **developed an Android application** that actively scans and stores the human-readable, machine-readable, time, and signal strength of all WiFi access points (APs). As a control, we also store the data alongside GPS data latitude and longitude. For **three unique traffic situations on the University of Miami campus over the course of a day** (during class, between class, and evening) common outdoor pedestrian and car routes were traversed on bicycle.

## Materials & Methods

AP data[1] collected on a 2013 Moto X over 3 sample times in the same day


## Result

1. Plot WiFi coverage
2. Plot traffic data
3. Classify choke points based on speed

WiFi signal radius
Choke points

## Conclusion

These findings conform to qualitative experiences of crowded areas

We used GPS data for speed and location because we could not spatially place APs automatically. Information about the exact location of APs would remove the need for GPS

In my current research at FIU[2], we investigate passively tracking anonymized users with in an inverted scenario where access points scan for the devices around them. Since all student devices are registered, information like year in school could be used in more analyses

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[1] data and code availabe at github.com/oychang/WiFiGatherer
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