

Project Proposal

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Abstract:

The idea behind this proposal is to aid city governments in determining the amount of pedestrian traffic on city managed biking/walking and other recreation trails. The city could then allocate resources to more trafficked paths or build new paths to cut congestion or provide a shortcut. Implementation of the proposal will utilize multiple sensors arrayed along a footpath that simply record when the sensor is interrupted by a passerby and intermittently communicate results via LPWAN to the cloud. The algorithm will need to differentiate between false positives and a real person or one person vs. groups. At the hardware level, the system will need to interpret when the sensor has been interrupted. We will track the amount of traffic across certain hours of the day. We will try to differentiate between singular pedestrians and groups. We expect that patterns during the week will follow the traditional 9-5 workday, where pattern usage is increased on the exterior bounds of those times and decreased otherwise. We will quantify our findings by showing how path usage changes across the day, and how different paths compare. We will also measure power consumption, as this has a direct relationship with longevity of the sensor, and thus, cost to the city.

References to investigate:

- 1) Radio-Based Trail Usage Monitoring with Low-End Motes
- 2) Real-Time Fine Grained Occupancy Estimation using Depth Sensors on ARM Embedded Platforms

Milestone	Milestone Description	Date
Project research on low power systems for pedestrian counting and trail usage	View related work on our topic. See what sensors are used in low power systems and which problems to expect	10/15
Choose components	Choose which sensor types and specific models	10/22
Set up board.	Power/memory and I/O devices. Write and validate simple code	11/5
Set up LoRa	Setup LoRa gateway and send data to it. Can use RPi w/ hat	11/10

Set up sensors over a footpath. Testing data collection and false positive rejections.	An array of sensors over a path to measure traffic, time of day, one person vs groups. Try to reject passing animals, falling leaves, any other false positives.	11/15
Optimizations	Lower power consumption, reduce the number of bits transmitted to Cloud	11/25