Wireless Pet Containment

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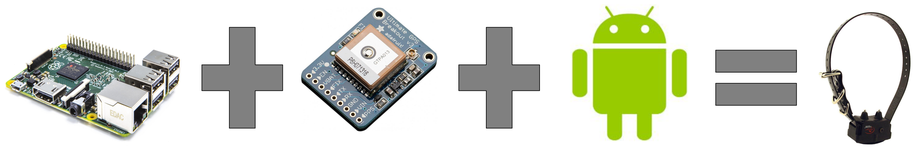
Goal

- Goals

To build a low-cost, portable pet containment system with a user-friendly Android interface..



Motivations and Objectives

- Motivations
  - The increasing amount of pets in urban areas requires proper confinement by their owners.
  - Existing pet containment products are expensive, less user-friendly, and with limited portability
- Objectives
  - To enable pet owners to supervise the activities of their pets in real-time through Android devices connected to the internet
  - To make the system economic, portable and user-friendly

Research Challenges

- Robust and consistent data exchanging among multiple devices (GPS, Rpi, Android device)
- Require efficient algorithm to perform real-time computation of pet's location on a cheap phone processor
- The GPS we are using can only updates location in about one second, but puppies can move as fast serveral meters per second, prediction of the pet's movement is needed near the boundary

Methodology

Methodology

- The GPS sensor installed in the collar is constantly sending out the latitude and longitude coordinates to the control unit, which is a Raspberry Pi
- Raspberry Pi transfers raw data from the GPS sensor to useful data structure. Meanwhile, the Rpi constructs connections with Android devices using socket programming and passes the coordinates as a usable data structure for Java

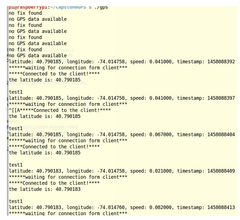
Methodology contd...

- Pet owners manually make boundary on the map interface of our application. According to the location data received from Rpi, the daemon will determine whether the lastest location is within the boundary.
- According to the computed results, the daemon responds to Rpi. If the pet is about to cross the boundary, the buzzer piece installed on Rpi will be activated to alert the pet not to cross, in the meantime, the pet owner will be informed by an alert message

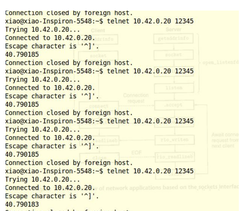
Results

Results:

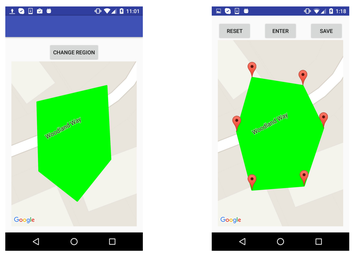
- On the Pi



- On the remote Device



- On the app



Discussion

- Due to the limit of current GPS technology, the accuracy of the commercial GPS is only 3 meters, which is significant for the purpose of project. To improve accuracy, multiple GPS sensors can be used to collect data simultaneously. However, such implementaton can incur extra cost which defeats the our object to build a low-cost, reliable product.

Acknowledgement

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References

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