IoT Based Anti-Crime Platform using MicroGPS Chip

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Background

- High Crime in South Africa [1].

- GPS Trackers are limited to cars.[2]

- Small Properties are difficult to be traced.[3]

Problem Statement

- Lack of tools for tracking small properties such as laptops and backpacks.
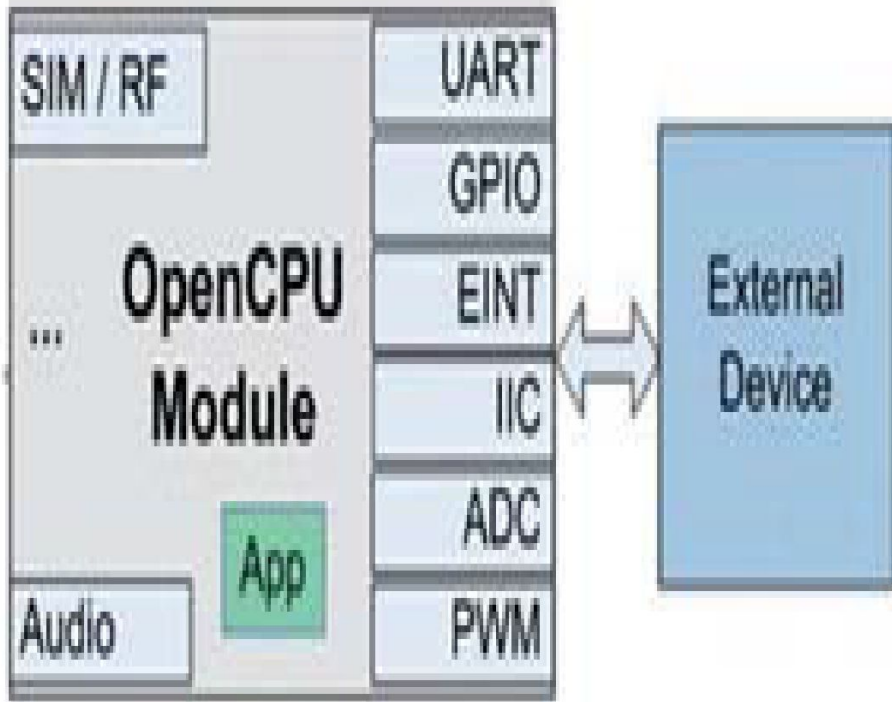- Need for low cost MicroGPS tracking system.

Proposed Solution

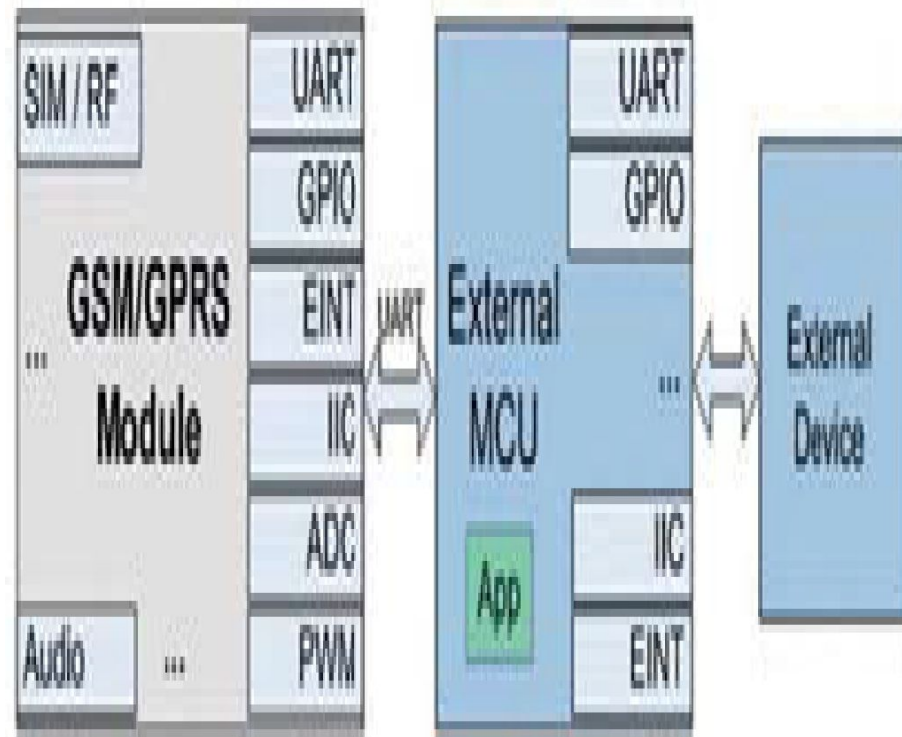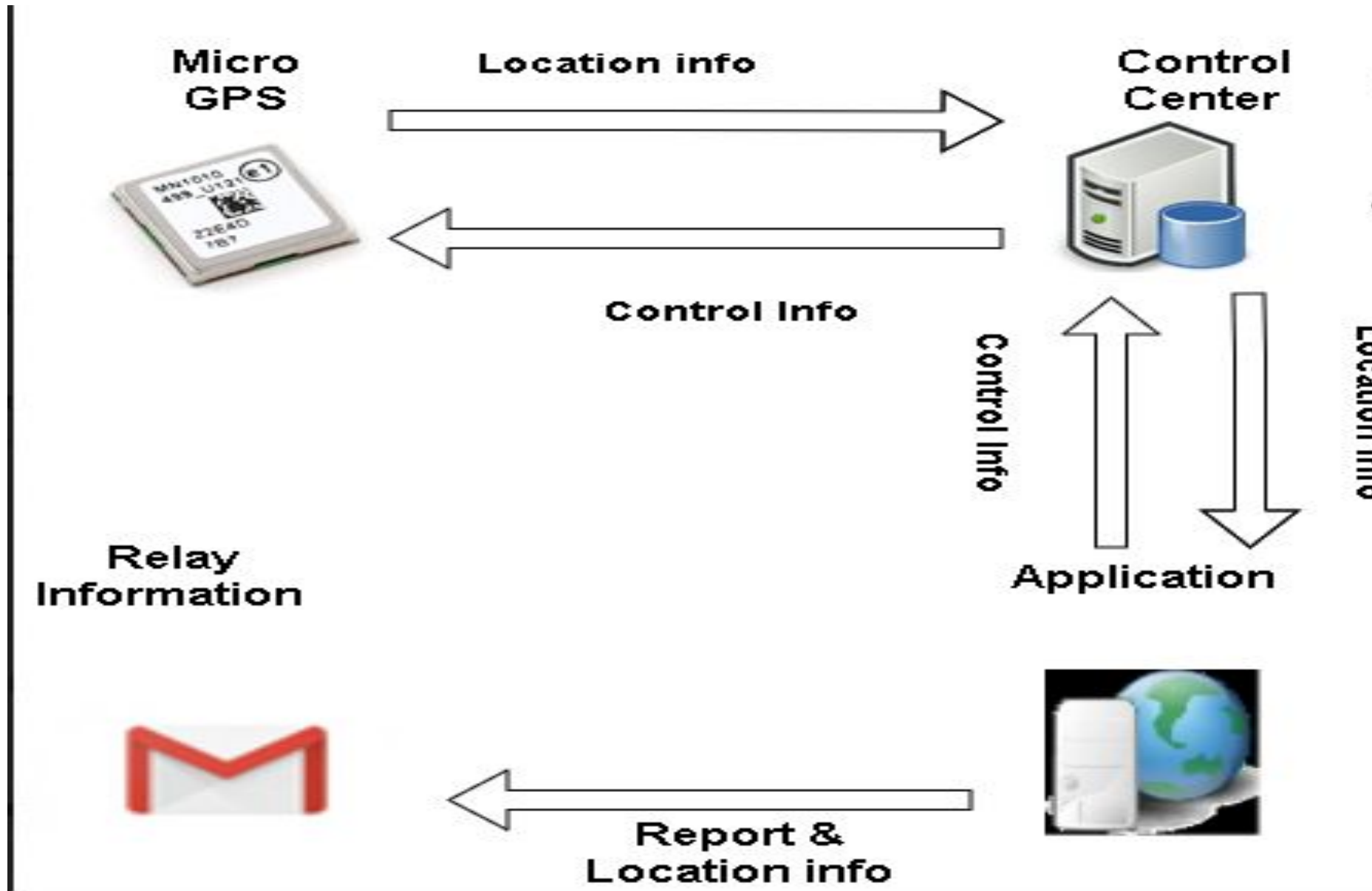Figure1: OpenCPU Frame Work[4]

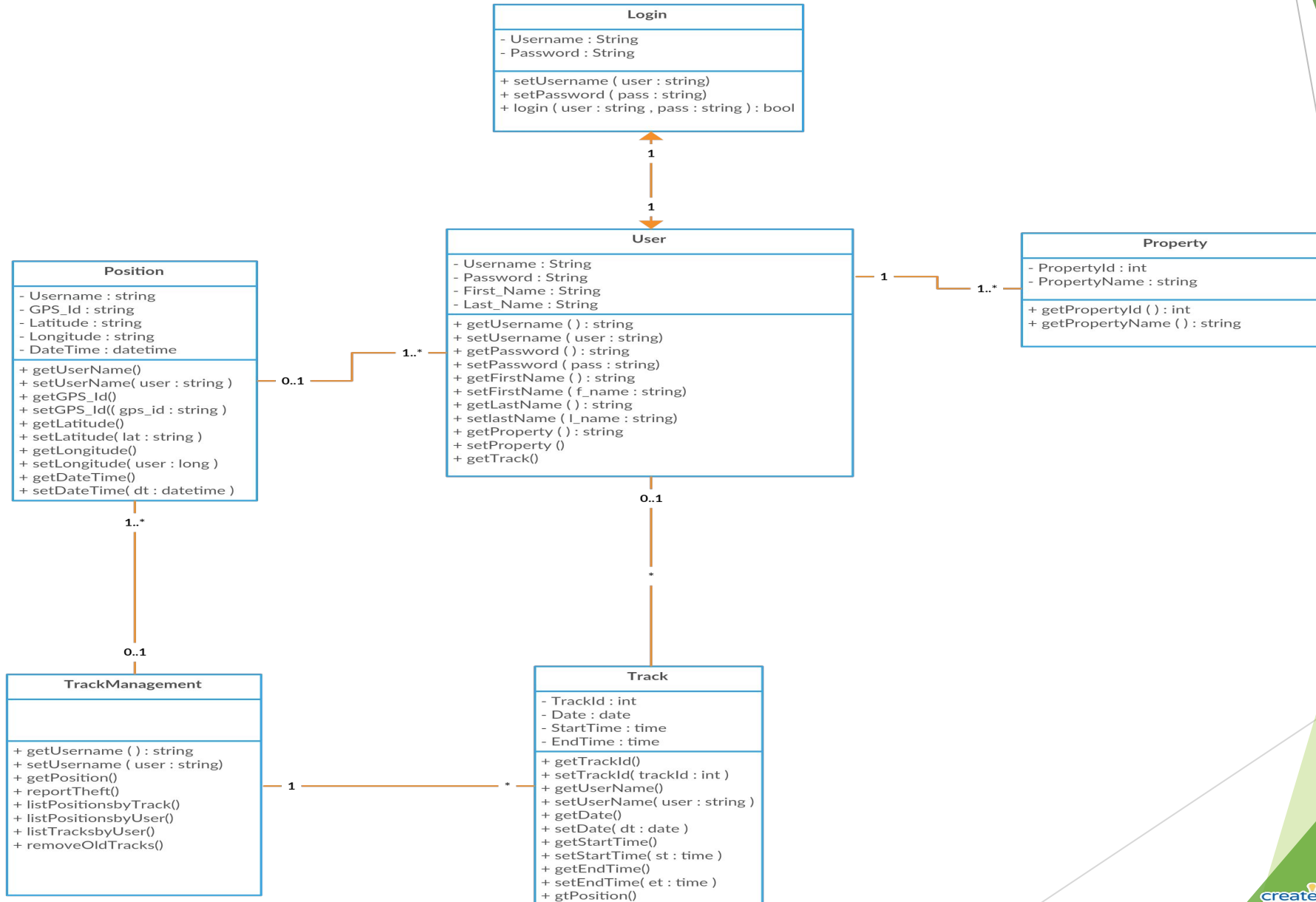Figure 2: Conventional Frame Work[4]

Significance of the Project

- Help crime fighting authorities in locating stolen properties.
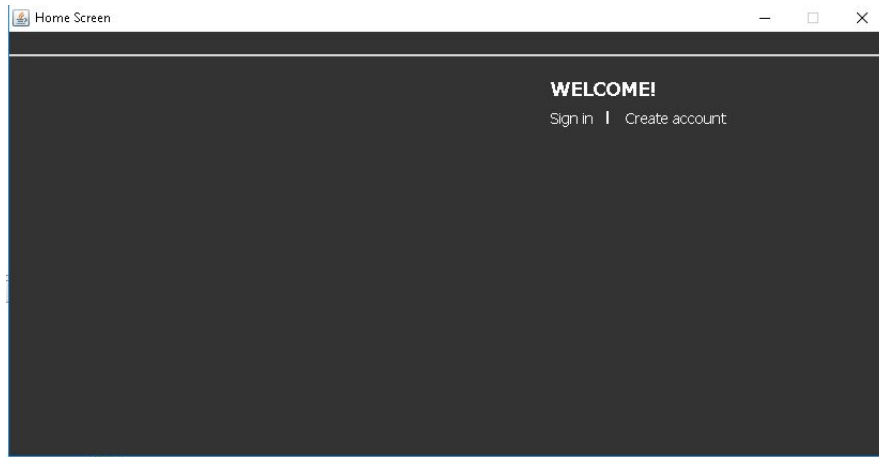- Having a personal tracker to track misplaced properties.
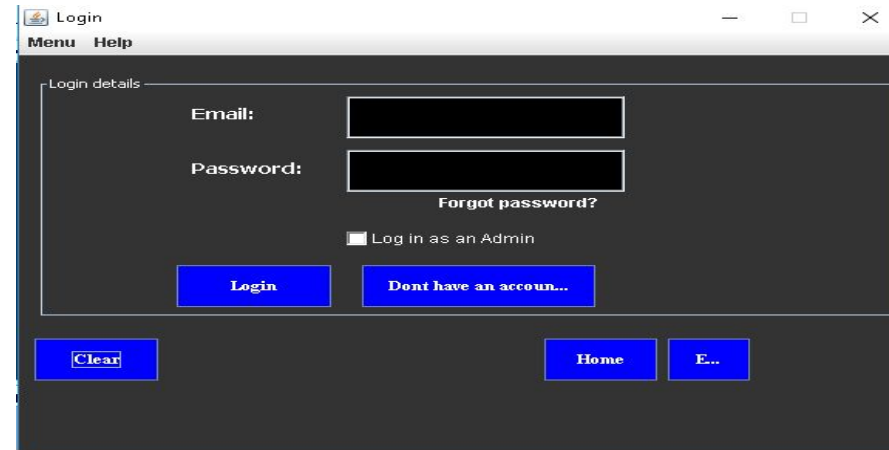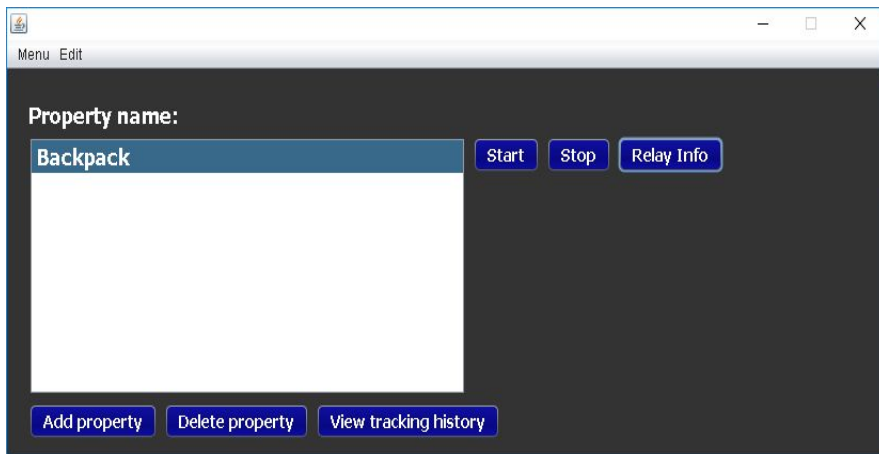
Architectural design

Class Diagram

Login

- Username : String
- Password : String

+ setUsername (user : string)
+ setPassword (pass : string)
+ login (user : string , pass : string) : bool

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1

User

- Username : String
- Password : String
- First_Name : String
- Last_Name : String

+ getUsername ( ) : string
+ setUsername (user : string)
+ getPassword ( ) : string
+ setPassword (pass : string)
+ getFirstName ( ) : string
+ setFirstName (f_name : string)
+ getLastName ( ) : string
+ setlastName (l_name : string)
+ getProperty ( ) : string
+ setProperty ()
+ getTrack()

1   1..*

Property

- PropertyId : int
- PropertyName : string

+ getPropertyId ( ) : int
+ getPropertyName ( ) : string

Position

- Username : string
- GPS_Id : string
- Latitude : string
- Longitude : string
- DateTime : datetime

+ getUserName()
+ setUserName(user : string)
+ getGPS_Id()
+ setGPS_Id((gps_id : string)
+ getLatitude()
+ setLatitude(lat : string)
+ getLongitude()
+ setLongitude(user : long)
+ getDateTime()
+ setDateTime(dt : datetime)

0..1   1..*

1..*

0..1

0..1

*

TrackManagement

+ getUsername ( ) : string
+ setUsername (user : string)
+ getPosition()
+ reportTheft()
+ listPositionsbyTrack()
+ listPositionsbyUser()
+ listTracksbyUser()
+ removeOldTracks()

1   *

Track

- TrackId : int
- Date : date
- StartTime : time
- EndTime : time

+ getTrackId()
+ setTrackId(trackId : int)
+ getUserName()
+ setUserName(user : string)
+ getDate()
+ setDate(dt : date)
+ getStartTime()
+ setStartTime(st : time)
+ getEndTime()
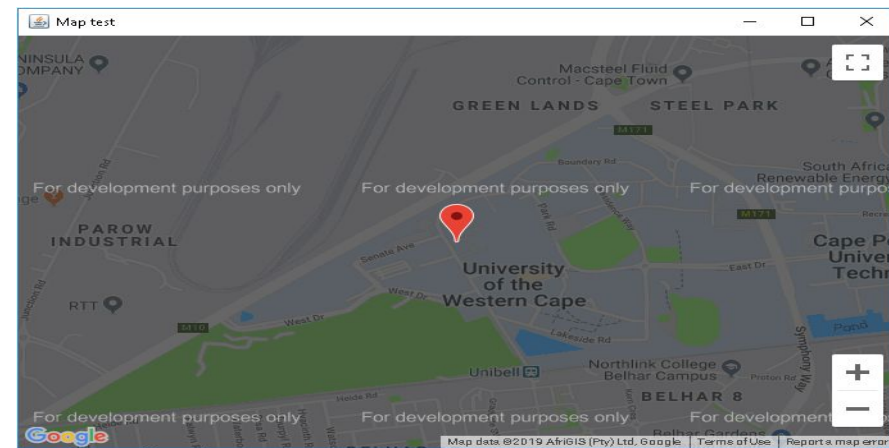+ setEndTime(et : time)
+ gtPosition()

Prototype Design

Home Screen

Registration Screen

Track Management Screen

Location Screen

Project Plan for Term 2

- Research on communication network between the server and MicroGPS
- Develop a database

References

[1]Gabriel Demombynes, BerkOzler, "Crime and Local Inequality in South Africa," The World Bank Development Research Group, November 2002.

[2] ShitalMohol, Pavanikar, Ganesh Dhage, "GPS Vehicle Tracking System," International Journal of Emerging Engineering Research and Technology, vol. 2, no. 7, pp. 71-75, October 2014.

[3] Laura A. McMahon, Janet L. Rachlow, Lisa A. Shipley, Jennifer S. Forbey, Timothy R. Johnson, Peter J. Olsoy, "Evaluation of micro-GPS receivers for tracking small-bodied mammals," McMahon et al, vol. 12, no. 3, pp. 1-19, 16 March 2017.

[4] ManjunathP.K, Sri JananiR., AnjuS. Pillai , "OpenCPU Platform for IoT Applications -A Study," in IEEE International Conference on Technological Advancements in Power and Energy (TAP Energy), 2017.