ELPER

ELderly People's HelpER

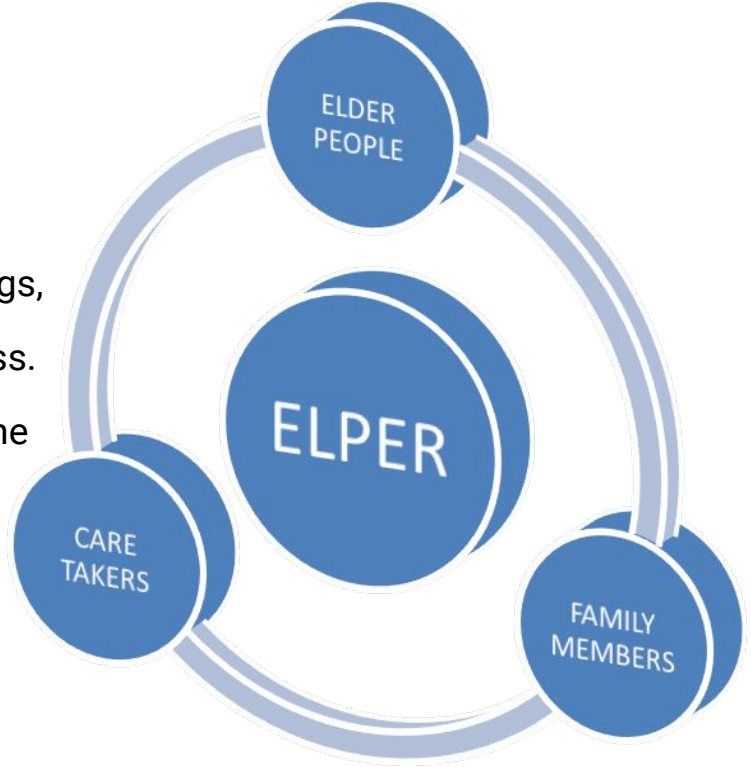
A Robust assistance for old age group and Indoor positioning system.

Background

Due to increase in urbanisation and inclusion of modern culture in daily life, people pay less attention towards the old aged ones. The main reason being their daily hectic schedule. It is equally important for people today to manage their daily schedule as well as take care of elderly ones, but they are not able to. By trusting a system which replaces human presence can simplify daily life problems. Today people face problems regarding donating time towards elders, we aim at solving this problem by putting simple electronic modules in charge of it.

Motivation

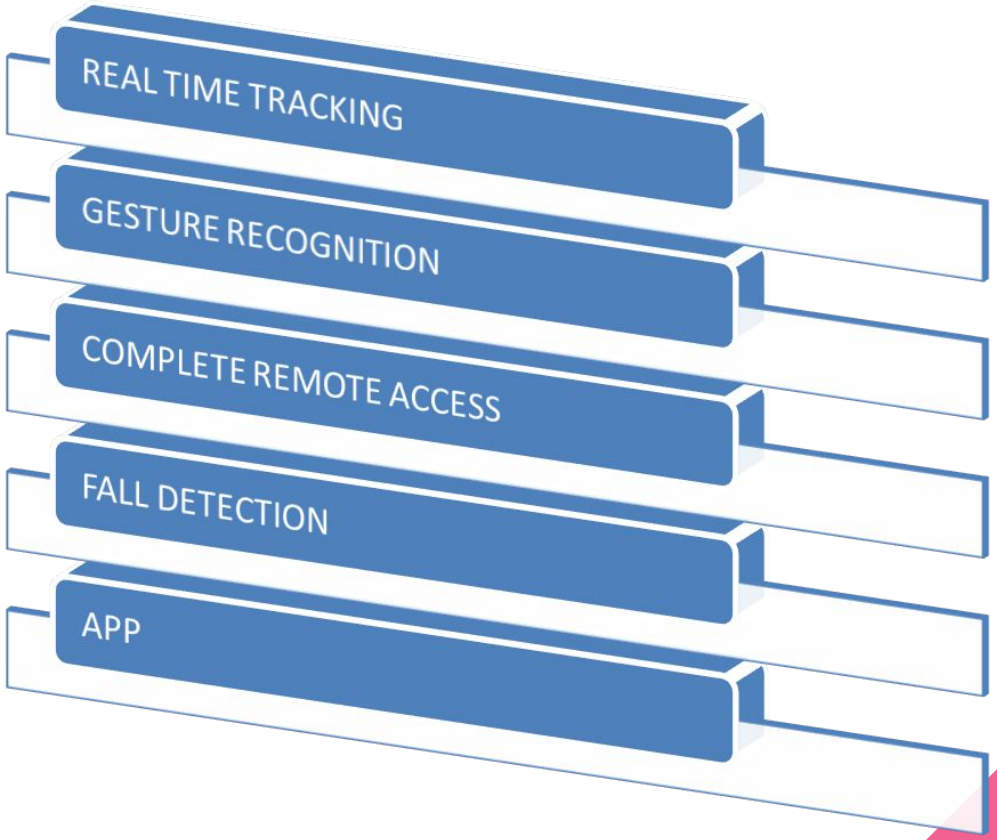
- Elder people face problems like deteriorating eyesight, pain in legs, physical stress and are also prone to strokes of unconsciousness.
- The caretaker can not monitor the activities of elder people all the time.
- Even the family members are busy in their hectic schedule.
- BUT these three broken links can be connected using simple integration of electronic modules.
- The idea to create a system capable of connecting these links drove us to produce the ELPER.



Objectives :

1. A lightweight device that is capable of achieving odometry,gesture recognition and wireless transmission of data.
2. Accurate method to track the individual position in real time
3. Integration with exoskeleton and artificial limbs for physically handicapped people to provide desirable feedback and output

Technical Features



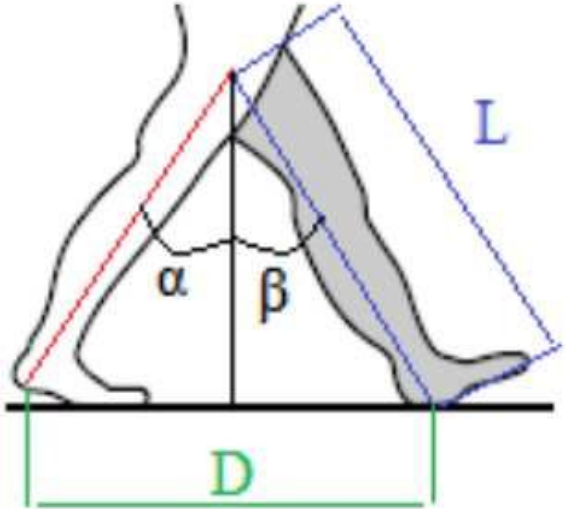
1.0 Real Time Tracking

-Unique method which is low cost and involves less processing as compared to conventional method

-Based upon observation of human way of locomotion and walking dynamics. Application in Trigonometry.

-Eliminates the use of heavy filters like kalman filter or second order complementary filter.

- -Helps in estimating the distance travelled, indoor position coordinates and body state.



2.0 Gesture recognition

-Based upon observation over proximity sensors used in smartphones.But is developed to be versatile and robust

-Easy to convey needs and problems from distance through gesture.

-Number of swipes made before proximity sensor would decide the action needed to be provided from remote helpdesk

3.0 Complete remote access.

-Data acquired by the device would be constantly uploaded to the cloud.

-Data will be made available to many individual care takers and appointed hospitals

-Various networking protocols are made available to access uninterrupted acquisition of data

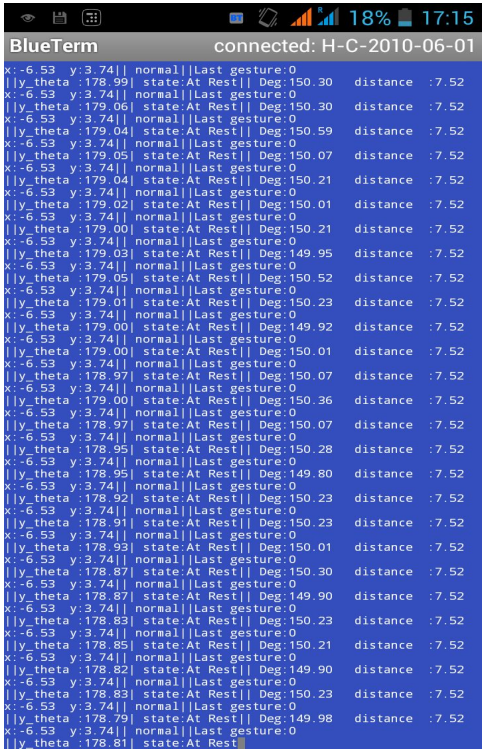
4.0 Fall Detection

- Monitoring the output of the IMU sensor, the system detects the positional status of the person.
- The Fall Detection system sends an alarm to the caretakers and hospitals since it is the case of emergency.
- The system also detects the position of the person and send the data to the caretakers as usual.

5.0 Android App

- As a remote access feature on smartphones,an android app was developed
for easy handling of acquired data and its segregation.

- The app will also locally keep the logs of data in order to compensate for conditions where the connectivity with the remote caretaker is lost. In this case the phone will act as a reachout device for caretakers.



Methodology

To accomplish the objectives the following methodology has been used -

- Real Time Tracking, Fall Detection has been done by monitoring and processing the data received from IMU and Magnetometer.
- Gesture recognition has been done using the Ultrasonic distance sensor.
- Data dumping, which the key feature of the device, uses the Wireless modules such as WiFi Module and Bluetooth Module.
- The system runs on a 16MHz processor sufficient to run the features.

Fabrication cost

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ITEM	COST
Arduino UNO	450 ₹
Magnetometer	250 ₹
IMU	250 ₹
WiFi Module	200 ₹
Bluetooth Module	250 ₹
Sonar	180 ₹
Total	1580 ₹

Future Implementations

-Integration with GPS, for outdoor tracking and much more precise location.

-Improved Gesture recognition i.e. Hand Pose recognizer.

-Integration with GSM,GPRS and voice recognition module for ease in communication and touch free control.

-Development of intelligent personal assistant and knowledge navigator like Siri or Cortana.

THANK YOU!