



CALIFORNIA STATE SCIENCE FAIR 2013 PROJECT SUMMARY

Name(s) Utkarsh Tandon	Project Number J0918
Project Title Building a Wearable Autonomous Device Providing Personal Assistance to Alzheimer Patients Using the Raspberry Pi and GPS	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The purpose of this project is to build a device for the personal use of Alzheimer patients, that would act as a virtual assistant for the patient in their daily activities. While it runs on Raspberry Pi mini-computer, the device will take information, process it, and autonomously assist the patient. Alzheimer patients would hopefully be able to use this product to live more independently. Goals: 1.Weight should be less than 1 pound. 2.Battery should run for at least 1 hour. 3.Should get a 56-60 score in the Testing Criteria. 4.Cost must be less than \$70. 5.Should be able to track the patient with GPS capabilities. 6.Device should interact with the patient, such as having a button to make sure the activity is completed. 7. A user interface should be connected with the device to allow information storage for playing reminders.</p> <p>Methods/Materials I had two designs, #1 could only sound alarms at a previously set time, and #2 had added GPS tracking and User Input capabilities. These are the general equipment: Raspberry Pi Model B, case, Mobile Juice Pack, GPS Data Logger, Speaker, Wi-Fi Adapter, 16 GB memory card, Velcro, breadboard, resistors, Push Button, and wires. Procedures: For design #1, first alarms would be set at a time 5 minutes later. Then wait for the alarm and notice each aspect for testing. For design #2, again alarms would be set along with distance boundaries. Walk the distance and notice the alarms that would sound when crossing the boundary.</p> <p>Results The qualitative testing part of my data was based on six testing criteria and it could be seen that after adding scores for each criterion, design #1 and design #2 achieved total scores of 45 and 58 respectively out of a maximum score of 60. The quantitative portion was on the percentage of error for the tracking accuracy. After finding the error in meters from the set distance and the distance really moved, the difference was divided by the set number and multiplied by 100 to get the error percentage. The average from each trial was 4.6%.</p> <p>Conclusions/Discussion By looking at the engineering goals satisfied it can be seen that design #2 satisfied more. Out of 7 goals, design #1 satisfied 3 while design #2 satisfied 6. Though the cost goal couldn't be satisfied, the product could alarm set reminders, track the patient, and take inputs to make sure tasks are understood by the patient.</p>	
Summary Statement My project aimed to create a wearable personal assistant for Alzheimer Patients that would assist through reminders of daily activities, tracking the patients, and taking inputs.	
Help Received Dad helped me set up the Raspberry Pi; Brother taught me how to use Adobe Photoshop; Codecademy website provided free tutorials on Python's basics.	