# CALIFORNIA STATE SCIENCE FAIR
# 2014 PROJECT SUMMARY

**Name(s)**

Leela Amladi

**Project Number**

**S0903**

**Project Title**

## Pill-Buddy Platform: A Smart Pillbox and Web App to Keep Patients on their Medication Schedules and Connect Caregivers

**Abstract**

**Objectives/Goals**

The objective of my project was to create a platform consisting of an Arduino-based pillbox and a web application, to assist patients in adhering to their prescription schedules. The goal was to create a pillbox that could notify caregivers when patients forget to take their medications, and to integrate a web-application that would provide an easy way for caregivers to communicate about prescriptions, and by extension, other topics relating to the wellbeing of the patient.

**Methods/Materials**

To build the Smart pillbox, I designed and built prototypes using Arduino open source hardware and software platform, photoresistors (used to detect if pills are still in their compartment), and LED#s and Piezo buzzers for alarms. The Smart Pillbox integrates Twitter with an Ethernet Shield in order to send tweets to caregivers when patients forget to take their medications. I designed the final pillbox prototype using Autodesk Inventor 3D modeling software and printed it with a 3D printer. To code the web-application, I used Python, specifically the Flask framework, and used it in conjunction with Jinja2 templating docs for the front-end, and MongoDB for the back-end database.

**Results**

The Smart Pillbox successfully notifies the patient when it is time to take pills; it accurately detects whether prescriptions are taken within ten minutes, and notifies caregivers using Twitter and SMS. The web-application successfully provides an easy-to-use interface for each caregiver and patient to make an individual account with which to modify prescription schedules. The web-application and pillbox successfully communicate with each other wherein the web-application assumes the responsibility for 1) notifying caregivers in accordance with modifications made to the #Followers# tab of a patient#s account, and 2) providing all users with a digital representation of the pillbox and the pills that should be filled in each compartment.

**Conclusions/Discussion**

My conclusion is that the Smart Pillbox with its integrated web-application is an intuitive and convenient way to keep patients on their prescription schedules, and to connect a community of caregivers around their patient#s Smart Pillbox, enabling them to improve patient care.

**Summary Statement**

A platform consisting of a Smart pillbox, that senses when patients forget to take pills and notifies patients and caregivers; and a web-application that connects a community of caregivers around their patient and to the Smart Pillbox.

**Help Received**

For the pillbox: Matt Garten, helped me learn Arduino, TechShop gave me a space to work and access to their 3D printer. For the web-app: Kedar Amladi introduced me to Python and helped me when I was stuck with the code.