**Input Sets and Sources**

The home automation over the internet takes in various input sources. For the convenience of user a web portal as well as an Android app has been developed. Please note that there is no requirement of analogous data in our project therefore quantisation and thresholding have been kept at bay. The app takes in your coordinates to sense you position relative to your home and thus notifies you if you have left any appliances left on. For simplification let's break up the input sets :

- **Android App**:

  The app provides an interface that helps you control your appliances from far away land over the internet. It takes in the instructions in form of touch and write them to a file in form of '0' or '1'. (ON/OFF)

- **Web Portal:**

  We also have a web portal which does pretty much the same thing as app but is usable on any device supporting internet. It takes in the instruction via click and writes them to a file.

- **GPS coordinates:**

  The app uses GPS to get user's current coordinates in order to calculate the distance between user and his home. Coordinates of user's residence  are already coded into the application at the time of installation.

- **State of Home Appliances:**

  In order to notify the user that he has left appliance switched on while being away from home the ap needs to read the state of home appliances at a given point of time.

- **Arduino:**

  Arduino ATMega8 (the microcontroller used) has been also use to provide input to the app. The pins of the board are read in order to identify the state of various home appliances

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**Output Sets and Sources**

The project's outputs information processed from your GPS location and also the instructions given using app or web portal. The app and portal are both input as well as output sources and are thus mediums of information exchange with the user. The outputs generated further push the user to input more input and thus maintain the flow of the data. Following are the details of all the output sources :

- **Android App:**

    The app gets input from the distance calculation algorithm using GPS running in the background and state of appliance as an input from the Arduino and on the basis of the information outputs the option of switching the appliances on or off.

- **Arduino:**

    The microprocessor acts as an output source as it pushes a certain pin high or low (on or off ) as per the instructions given by the user. For the demonstration purpose we have a LED (Light Emitting Diode) connected to pin 13 of the board, which switches its state as per the instruction of the user.

- **Electrical Appliance / Switching Circuit:**

    Any electrical appliance can be used here in place of LED is a potential output source. A relay switch can be used to interface any appliance/device with any input voltage/current requirement with the board and thus controlled.

## INPUT INTERFACE

With all the technical jargons involved in the product, due care has been taken to keep it simple and user friendly, A layer of abstraction has been well applied over the products which keeps all the background algorithms and processes a step away from user, and what he/she gets is an efficient and easy User Experience. We have two different modes to interact with user and have a slightly different interface for both of them enlisted below:

- **Android App:**

    The Android App is more or less our USP as it packs in the most features including the GPS enabled push notifications and background processing. To begin with we have a simple start page in the app which the user gets as soon as he opens the app.
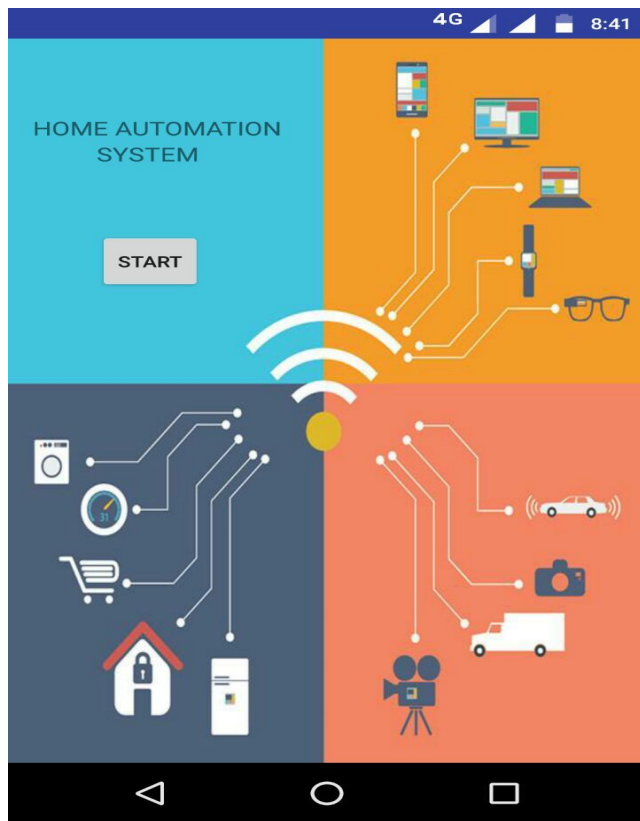
The real control interface is shown afer the user clicks start buttom in this interface. A seperate interface for start has been given in the app to allow the user a cross checking methid if he has opened the app unknowingly.

From the technical point of view, simple xml has been used in assistance with Android studio to get to this interface.

Once the user clicks the start button he is redirected to a separate interface which gives him the option of toggling between on/off states of separate appliances. For the demonstration point of view we have just shown one toggle switch , but it can be increased linearly with the number of appliances/switches connected. The toggle switch interface is :

As shown, the toggle button provides the facility to switch the appliances onoff.  The app also gives alert if you are too near your home and the appliances are off or if you are too far from the home and appliances are on.
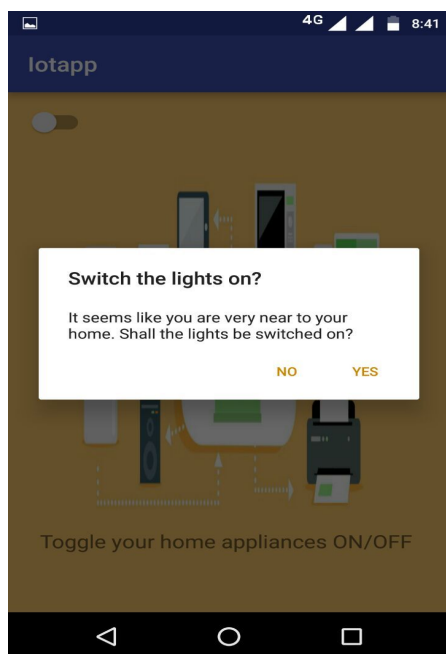


A mere click at the alert box facilitates you to control your appliances from very remote places.

- **Web Portal:**

A simple HTML?CSS form enables the user to visualise two buttons which shall be used to switch the appliances on/of during operation. Again an elegant and simple interface without any complexity allows even the most naive users to switch between the modes of their appliances.
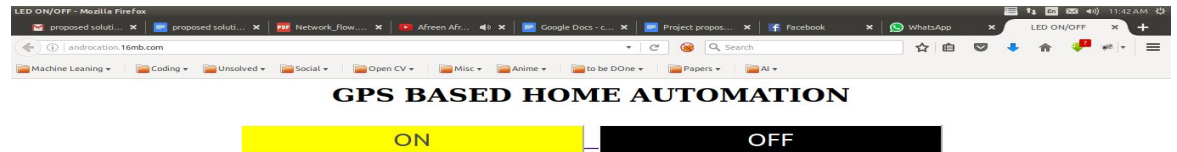


## OUTPUT INTERFACE

The project doesn't needs any designed output interface as all the actions directly have physical

Interpretation and thus the results are shown to the outer world. For the demonstration purpose we have a LED connected to Arduino ATMega8 board which lightens up or switches off as per the instruction given by the user.

In real world scenario this could have been replaced by any electrical appliance interfaced with a relay circuit and used as a remote switch button.