INTRODUCTION

The popularity of home automation has been increasing greatly in recent years due to much higher affordability and simplicity through smartphone and tablet connectivity. The concept of the "Internet of Things" has tied in closely with the popularization of home automation.Through the integration of information technologies with the home environment, systems and appliances can communicate in an integrated manner which results in convenience, energy efficiency, and safety benefits.

MOTIVATION

- IRON MAN
- LAZINESS

MAIN CONCEPTS BEHIND THE PROJECT

1. Building a prototype of the circuit of a room.
2. Automating door by simple wheel-motor mechanism.
3. Automating latch using servo motor.
4. Using arduino microcontroller for controlling everything.
5. The Android app will have a two-way control with the Arduino via Bluetooth or Internet.
    - For the Bluetooth transmission, we will be using the Bluetooth module (HC-05), which will be connected to the Arduino
    - For internet transmission, we will be using direct ethernet connection.
6. For control via voice commands we are planning to import the android app libraries from the internet thus including the voice processing in our app.

PLAN OF ACTION

Completed till June 3 (Review Meet 1):

- Components purchased
- Android app UI

Targets till June 10 (Review Meet 2) :

- Light control prototype circuit
- Bluetooth integration in the app
- UI optimizations
- Door locking mechanism and implementation

Targets till June 20 (Review Meet 3) :

- Use of Wifi as an alternative to Bluetooth to be able to control from anywhere
- Voice Recognition
- Door opening and closing mechanism
- Optimizations, Final testing, Debugging, etc.

Possible features to be added post Project Completion :

- Real life implementation
- Android wear support
- Tasker plugin for Google Now integration

OUR TEAM

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THEORY INVOLVED

- ## *Basic circuit and arduino:-*

Our home automation project involves a prototype circuit of a room which includes two leds, resistors, breadboard and arduino. One led is for the light and we are controlling the brightness of another led as the regulation of fan speed. We are controlling led brightness by simple analog output.

Here: Analog output

- ## *Latch design:-*

We are using servo motor for opening and closing the latch. We are rotating servo motor in one direction to open it and in another direction to close it.

Here: Basic servo tutorial

- ## *Door automation:-*

Also we are automating door by using two wheels connected to motors. We are opening the door by rotating it in one direction and closing it by rotating it in another direction. For rotating motor in both direction we are using relays because dc batteries have fixed polarities.

Here: Using relays for controlling DC motor

- ## *Android App Development:-*

The basic app UI consists of switches to turn on/off lights, fans, unlock/lock/open/close the door. The app connects to the arduino using WiFi/Bluetooth depending upon the user's choice.

For Bluetooth connections, we used simple connection via the APIs in the android.bluetooth package.

Here: Using Bluetooth APIs

For Wifi connections, we used OkHttp to send GET requests to the server running on the Arduino.

Here: Using OkHttp for sending GET requests

- ## *Communication via Bluetooth:-*

A bluetooth module HC-05 is connected to arduino for serial communication. Bluetooth communication is very good for short range communication. We are using SoftwareSerial library for this purpose. The device sends serial data which is received by the module and reacts accordingly.

Here:Using SoftwareSerial Library

- *Communication via internet:-*

Also ethernet shield is connected to arduino for controlling arduino through internet. Advantage for communicating via internet is you can control it from anywhere as long as you have internet and device and the ethernet shield have same IP initials(Like 10. ....,192. …). The device sends HTTP request which is received by ethernet shield through internet and reacts correspondingly.

Here: Using ethernet shield

WORK DISTRIBUTION

- Android App - Sajal
- Arduino and circuit - Ankan
- Mechanical designs - Mayank and Irfan

PROJECT PICS

//To be added

COMPONENTS

• Arduino	500
• Bread board	90
• Jumper Cables	300
• Relay x2	150
• Servo motors x1	200
• Wires, Resistors, etc.	150
• Bluetooth module	300
• Ethernet Shield	550
• Things I don't remember (mentioned in bills)	760
TOTAL :	**3000**

REFERENCE

Here is the video of the working project:

//To be added

Here is the link to the source code:

Android : https://github.com/sajalnarang/Jarvis.git

Arduino : https://github.com/sajalnarang/ITSP.git

Here is the link of the doc of important links we used:

Important links

We are also very thankful to the STAB team.