1. PROJECT CODE: **SHC-314**

2. PROJECT TITLE : **Make Your Life Easy: Using Smart Switch**

3. NAME OF COLLEGE/INSTITUTION: **Shivaji College**

4. PRINCIPAL INVESTIGATORS (NAME, DEPARTMENT, EMAIL, PHONE NO.)

- Mr. Rakesh Yadav, Associate Professor, Computer Science, prof.rakesh.yadav@gmail.com, 9868237468
- Mr. Ajay Kumar, Assistant Professor, Computer Science, ajaykr.bhu@gmail.com, 9711873246
- Dr. Sumit Kumar. Rai, Assistant Professor, Physics, sumitssc@gmail.com, 9350093196

5. MENTOR: Dr. Sanjeev Singh, Associate Professor, IIC, DUSC

6. STUDENTS INVOLVED IN THE PROJECT (NAME, DEPARTMENT, EMAIL ID AND PHONE NUMBER)

S.N.	Name of Students	Department	E-mail	Contact No
1	Ankur Goel	B.Tech(CS)	Ankurgoel7373@gmail.com	8586015843
2	Himanshu Chitkara	B.Tech(CS)	himanshuchitkaranonu@gmail.com	9999251520
3	Gaurav Kumar	B.Tech(CS)	Kgaurav2212@gmail.com	9582628401
4	Jai Bhagwan Yadav	B.Tech(CS)	Jaibhagwan.yadav@shivaji.du.ac.in	8826915181
5	Bhavini Khare	B.Tech(CS)	kharebhavini@gmail.com	8527937417
6	Shivam Kr. Baberwal	B.Sc.(H) Phy	shivambaberwal@gmail.com	9873941603
7	Abhijeet Ranjan	B.Sc.(H) Phy	Abhijitranjan1996@gmail.com	7503816489
8	Roopesh Jain	B.Sc.(H) Phy	Roopeshjain31@gmail.com	8826361493
9	Vineet Rawat	B.Sc.(H) Phy	Vinitrawat1996@gmail.com	9717298950

ABSTRACT

The technology which surrounds almost everyone in the modern society, affects both work and leisure activities. Technology is one of the principal driving forces of the future, it is transforming our lives and shaping our future at rates unprecedented in history, with profound implications which we can't even begin to see or understand. Throughout history, people have looked for better ways to meet their needs and to satisfy their expectations. Through our modern day miracle of science we are able to appreciate that which is truly an incredible era of advanced erudition and self-sufficiency. Because of the advantages of modern day technology, we are allowed the unique benefit of looking back on what was and comparing it with what it is and what it could be. Technology is now a big part of our society and our foreseeable future. There is little room for people that wish to live without technology, and luckily, it is still advancing at a rate that has helped stave off stagnation.

With technology we have paved ways for an easier, smart and comfortable life. With this idea of smart living, the project **Make your life easy**: **using smart switch** intends to provide with the facility to control the functioning of Smart Household Devices like Smart TV, Smart AC etc. through smartphones.

Smart switch gives you freedom of being tech savvy, efficient person, environment buddy and much more at same time. Control your air conditioners, fridges, televisions, fans and lights etc. at the click on your smartphone. The product features sleek look and mesmerizing design to make your walls adorable. Smart switches make the use of Bluetooth technology which functions perfectly in all modern smart phones and is easiest to use. With just one touch incorporation the switch is one step ahead of the present technology and make it even better to look and operate. Smart switches will be available at cheap price so that they are affordable with more functionality by make them capable for controlling smart as well as ordinary appliances like Ceiling Fan, Bulb.

INTRODUCTION

The project Smart Switch consist of 3 broad phases:

(i)   Developing an Android app for the project.

(ii) Building a circuit for communication between the app and the electronics appliances.

(iii) Implementing One Touch Technology.

Aim:

The aim of this project is to implement a model of Smart Switch with learning more about project management and basic technical circuits. This project is done as group work.

By this, device, one will be able to:

(i)   Control electronic household devices, using app, through Bluetooth.

(ii) Control the electronic switches using One Touch Technology.

(iii) Reduce power consumption.

How this project is making 'Smart'?:

(i)   Current technology of Smart Switch used in some countries and major worldwide famous companies require initial installation of extra electronic device that cost around $400 which is not affordable for more than 70% of the world population. But our project reduces the cost by a large extent and hence make it affordable to the common people.

(ii) Save electricity.

(iii) A decreased device size.

(iv) Intention to make Smart Villages.

Components Description:

(i)   Atmega-328 chip

(ii)   Bluetooth Module-hc-06

(iii) Relay (5V, DC, Electro-magnetic)

(iv)   Diodes (IN4007)

(v)   Zener Diode (6.2V, 1 Watt)

(vi)   Resistors (470 KOhm, 1 Watt, 100 Ohm, 1 KOhm)

(vii) Capacitors (2.2 microFarad, 400 V, X-rated, 1000 microFarad, 50 V)

(viii) Shift Registers (74HC595)

(ix)   Conductive material (Copper Tape)

OBJECTIVES

Objectives of the project entitled Make your life easy: using smart switch are as follows:

To control household devices: To control lights ,TV ,AC ,fan and other household devices through mobile application ” **Smart switch**” .It turns off the devices completely unlike from the remotes which rest them in standby mode .so it makes it power saving device.

To make it affordable: Unlike preexisting devices; Use of efficient and necessary components only, makes it cheaper and compact.so it makes lives of middle class peoples more smarter. Our motive is to develop smart villages also along with the cities .As it can be also used to control working of machines for irrigation, alarms, etc.

To incorporate one touch technology: It provides an alternate way to control the household devices when mobile phones won't work. Moreover it also gives a sleek design with decorated plate to the walls instead of up –down switches, as it is one of the demands for home automation.

To remove central dependency: Atmega 328 chip is the heart of the smart switch, which removes central dependency. As most of the existing technologies uses central hub, so fault in one interface can affect the working of others. But in our "smart switch" each switch works independently.

To use Bluetooth signals: We use Bluetooth connectivity as an interface signal, as it is easily available. No extra expenditure is required for this unlike of Wi-Fi where internet is required for central hub. Bluetooth connectivity rarely loses signal when in range.

Easy installation: To install it with the main controlling section, so there is no need for extra space and it also reduces the installation cost.

To control intensity of devices: Switch will be able to control the speed of fans, intensity of lights, modes of AC and etc. by using smart phones .The app will be synchronized with the device and one touch technology i.e. it will send any data regarding about the current status of the devices.

A user friendly app: To make a simple user friendly app **"Smart Switch"** with all details .It will contain all the information about your devices and you can also add your household devices to it with simple procedure. And it will be updated periodically.

METHODOLOGY TECHNIQUES

Introduction to Arduino:

By keeping the idea of Smart Switch in mind, we started exploring the different ways, methodologies, tools and technologies that could lead our project to a charming success with all the objectives achieved at the end of the project.

We came across many different technologies like Raspberry Pi, Arduino Uno, and Arduino Mega etc. that could be used to achieve the objectives mentioned in the project. We started our project with the Arduino Uno board and started with some experimental program to test the proper functioning of the Arduino Uno Board.

To test the proper functioning of the Arduino Uno Board, with begin with the blinking led program.

A software was needed to code and upload the blinking led program from P.C to Arduino Board. We get the software from the Arduino official website arduino.cc. Using the software the blinking led program was successfully uploaded and tested on the Arduino Board.

The Arduino Uno Board, LED, breadboard and Arduino Software to code and upload the program was successfully tested by checking the whole setup for blinking LED Program.

Introduction to HC-06 Bluetooth Module:

The Arduino Board was perfectly working with a simple blinking LED program. We next aimed to control the LED with the help of a smart phone.
While working for the same, we came across many different wireless technologies that be used to achieve the same like ZigBee, Wi-Fi and Bluetooth.

We started with the Bluetooth Module due to its low cost and reasonable range. We get the HC-06 Bluetooth module and incorporated it with the existing LED circuit. The Source Code of the blinking LED was modified to adapt the changes by the introduction of HC-06 Bluetooth module in the circuit. The Arduino board is now programmed to receive a signal from any android device and turn on/off the led based on the signal received by the HC-06 Bluetooth Module.

Just like the client server architecture in networking, we are ready with one side, lets' call it a server- The Arduino Board with HC-06 Bluetooth Module ready like a server to receive a signal from the client side and process the request based on the signal received.

Android Application:

To send the signal to the Arduino Board via HC-06 Bluetooth Module, we required to design and built an android application that can establish connection with the HC-06 Bluetooth Module to transmit and receive data.

Design & Development

We require to make a simple a sleek design for the android application so that the user don't gets confused at any point of time while using the application. We aimed to provide them with such an easy and effective interface so as to control and monitor all their house hold devices remotely on a single screen.

During the design process we consider two cases when the user enter into the application or simply start the application

1) Mobile's Bluetooth is already turned on
2) Mobile's Bluetooth is turned off
3)

Based on the present state of the application, the application will proceed in a different direction. If the Mobile Bluetooth is already turned on, the application should simply initiate the connection establishment sequence with the HC-06 Bluetooth Module.

If the Mobile Bluetooth is off at the time of start of the application, the application should prompt the user with a dialog box having an option to turn on the Bluetooth. The will get closed if the user denied the Bluetooth permission else the same connection establishment sequence with the HC-06 Bluetooth Module will take place.

On the main screen we were required to provide the user with a toggle button to send an on/off command to the HC-06 Bluetooth Module. The HC-06 Bluetooth Module receives the signal and send it to the Arduino Board. Arduino process the signal received and turn on/off its particular pin based on the signal received.

It was the design of the mobile application that we were expecting to achieve.

We started building an android application by keeping the above design in mind and successfully created the one we were expecting.

Introduction to Motor Shield:

Now after creating a mobile application that could control a LED connected with one of the Arduino Board's Pin remotely. We tested the same circuit too.

Now we were very close to the completion of first phase of our project i.e. turn on/off the AC devices remotely with the help of an android application. With the current circuit we could control the DC device remotely.

We continued our journey by exploring and searching for the ways that can be used to control an AC Device's Switch.

We came up with some sort of mechanical idea using the motor shield to get the state of devices controlled remotely by rotating the motor forward and backward to turn on and off the AC Switches remotely.

Introduction to the Relay – Replacement to the Motor Shield:

We attended a workshop on Arduino organized by the DDU College, DU. There we came across the concept of Relay that can be used with any MCU to control the Larger Loads. The idea of the motor shield was completely dropped due to both high complexity and cost.
Relay was incorporated in the circuit to control the Larger Loads instead of a LED.

After incorporating the Relay, we tested the resulting circuit with an AC bulb.

At this stage, we were able to control the on/off functionality of any device using android application and completed with the first phase of the project.

Introduction to the One Touch:

After successfully completing with the first phase of the project, we all started to explore the different tools, technologies and methodologies that can be used to incorporate the one touch technology with the existing circuit that are affordable and easy to incorporate too.
After exploring a lot we come across two methods that we could use to incorporate one touch technology with the existing circuit

1) Force Sensitive Resistor(FSR)
2) Capacitive Touch

With the FSR, we need to apply some force on the button to toggle the state of devices that decrease the convenience level for the user.

FSR implementation is costly than that for Capacitive Touch.

Due to these disadvantages of FSR, we proceeded with capacitive touch that just needed a resistor for implementation.

We used the Arduino inbuilt capacitive touch library to implement the capacitive touch in our project.

The Arduino Source Code was then modified to provide a support for controlling the devices' state physically by just touching the touch panel for that device.

We can use any conductive material as a touch panel so we used the copper tape to implement the touch panel.

At this stage, we completed successfully the second phase of the project.

Circuit Minimization:

We have successfully completed with the two phases of the project. The circuit was working properly to allow the user to control the switches remotely as well as with the one touch technology but still the circuit contained some unwanted components e.g. Arduino Board.
Once the Atmega328 is programmed, there was no need for entire Arduino Board in the circuit.

We started working on removing the Arduino Board dependency for Atmega328 Chip. We minimized the circuit and cost significantly by removing the Arduino Board dependency for Atmega328 Chip.

Circuit Optimization – Introduction to Shift Register:

With the present circuit we could just control 5 switches. We started working on the optimization to increase the number of devices that could be controlled. While exploring and searching on the same concept, we came across Shift Register.

Shift Register can be used to hold the some bit of information. We used an 8 bit shift register to hold 8 bit of information. Every bit was indicating the state of 1 of the 8 devices. Now 8 devices could be controlled by just adding a shift register in the circuit.

The Atmega328 was then reprogrammed to incorporate the Shift Register with the existing circuit.

Deployed application on Google Play Store:

We get a Google developer's account and successfully published the application on the Google Play Store.

RESULT AND DISCUSSION

Survey Analysis and Results:

A survey was conducted to get into the details regarding the feasibility of the project, the awareness regarding the home automation technology among the common masses. The survey form was filled by 1500 people in total. The questionnaire was carefully designed to get the unbiased results of the survey from people of every age by including both open and close ended questions. Questionnaire's main focus was to gain insights about the people views regarding home automation technology and frequently they feel the need of such kind of System and the cost they are ready to pay to make their life easy with that technology as the project was started with the aim: convenience at affordable cost. The results from the survey were then analysed carefully and presented below:

Starting by collecting the information regarding the smart phone users as the home automation system entitled Make Your Life Easy: Using Smart Switch requires the smart phones to work as indicated by its title also, Smart Switch.

- ✓ We found that 96% of the people use the smart phones.

We continued our analysis on the next question answered by the people that gathers information about their awareness of any such technology that they can control their switches with a mobile application with Bluetooth Technology.

➢ We found that only 40% of the people are aware about similar kind of home automation technology presented by our project.

Besides 40% of the people are aware about similar kind of technology and no one have that system installed into their houses.

To analyzed the problem precisely, we continued by analyzing the responses made by the people to our next question in the questionnaire that asks them for the reason not to get the home automation system installed into their houses beside having information about them. This was an open question with no options, but after analyzing the results carefully, the responses for this question fall under the following categories:

1) Not Affordable:

Present home automation systems are very costly due to the unwanted features they provide. They are built by keeping in mind the extra features also that not even required so frequently. So, they cost a lot to get them installed. E.g. by using the currently available home automation systems available a person can control his/her house while sitting in any corner of the world that fosters global security and convenience but adds a lot to the cost.

2) Lost Physical Access:

About 25% of the people participated in the survey raised the issue of physical accessibility of the devices after being controlled by a mobile application as many of the existing home automation system don't provide the physical control to the device if it gets controlled by the smart device. E.g. if their mobile gets discharged, then there will be no way for them to control their household devices.

3) Reachability:

The area of home automation is no doubt a widely growing field but its growing at a high rate in the developed countries. About 16% of the people found the home automation system unreachable due to shortage of vendors working on the concept of Home Automation in India.

4) Difficulty In Installation:

About 10% of the people participated in the survey who were aware of such technology claimed that the home automation system are difficult to install as most of the home automation system are not built to fit with the existing simple electric circuit present in home.

The above mentioned issues are the major one most of the people mentioned in their response. Beside these, people also questioned on the reliability of the home automation system, effect on the health of people etc.

We continued our project by figuring out the main issues faced by the people when it comes to home automation. We add the issues mentioned by the people into our goal list. Now, we have to come up with a system that resolve these issues by removing the some features that are not actually required and adding the addressed ones. We continued with the aim to get the issues resolved in the project SHC-314 Make Your Life Easy: Using Smart Switch.

We came up with the following ideas to get all the issues resolves which are mentioned above.

1) Low Cost:

Existing home automation system provides that much advanced facility that are not commonly/frequently required by the common man by compromising on the cost factor. The major cost in such an automation system is due to the presence of a central hub that cost around $400 that connects you to yours house independent of your location i.e. you can control your smart home, from wherever you want.

To have an estimate of the cost that people are willing to spend to have a home automation system, we continued our analysis with the responses to the next question in our questionnaire that asks them the amount they are willing to spend for home automation system.

By analyzing the results, we came to know that about 55% of the people make are willing to spent between Rs.1500-4000 to have a home automation system and just 10 % of the people participated in the survey consider the home automation system to worth for more than Rs. 4000.

To reduce the cost drastically, we completely removed the concept of central hub and internet. We extend the very famous concept, the locality of reference, to our project too to reduce the cost. We extend the concept as described below:

Locality of Reference (Extended to Home Automation):

As per the concept of locality of reference, we cached only the memory locations that are frequently accessed by the computer programs.

In the same way, with the home automation system we frequently access those thing that are around us, instead of those that are far from us. E.g. when you are sitting in office, you may need to control the devices in your office but there will be hardly any requirement to control yours' house devices while sitting in office.

So, we foster to achieve local convenience at low cost by simply using the Atmega328 Chip, HC-06 Bluetooth Module, and Relay Module as the main components of the circuit.

2) Physical Accessibility:

To provide the users the physical access to their home switches in smart way, we came up with the idea of One Touch. Besides providing the physical access to the switches, this new idea will bring a sleek design to yours walls and get you rid of the ordinary up and down switches.

To incorporate the one touch with our project we used the concept of capacitive touch. By keeping cost in mind, the one touch incorporation in the circuit only adds a 10K resistor in the existing circuit per switch.

With the one touch technology incorporated, now you can toggle the state of any switch by just touching it.

To know the people views and requirements about the one touch incorporation into the smart switch to get the physical accessibility to the switches we precisely analyzed the results from the next question in the questionnaire that focus their views on the requirement of one touch incorporation into the smart switch.

   ✓ 94% of the people participated in the survey feel the requirement of one touch incorporation into the home automation system.
   ✓

3) Reachability:

    By publishing the Smart Switch application on the Google Play Store, we increased the reachability to the home automation system. Users can just download the application and can write to us to for any queries. If he/she wants to get the home automation system, they can simply specify their requirements in the mail and we will get the product delivered to their address.

4) Easy Installation:

    There is no hassle in the installation of the smart switch automation system into your house. Just two steps and you are done with the installation of the smart switch automation system:

    a) Remove the Switch Board that you want to get controlled by your smart device.

b) Plug in the Smart Switch Board that you have received after placing your order with us.

The abstract circuit for the Smart Switch Board is exactly same as the circuit for the ordinary switch board. So, any electrician can simply adjust the circuit with the existing circuit present in house. The electrician need not to worry about any internal details regarding the Smart Switch Board. For all of them, it is just a Switch Board, so they are comfortable to work with it and for the users, it is Smart.

The various flaws were mentioned by the people participated in the survey and we tried our best to deal each one of them in an efficient way but do people really feel the need of an automation system?

To get an insights into people views about the need of a home automation system, we analyzed the responses to the next question in the questionnaire that asks them about the need of a home automation system.

➢ About 87% of the people participated in the survey feel the need of home automation system.

Existing Home Automation Systems:
A lot of home automation systems were already available in the market before we started with the project entitled "Make Your Life Easy: Using Smart Switch". We deeply studied some of the

existing home automation project and tried to figure out their advantages and disadvantages and tried to overcome the disadvantages in the existing ones and adding some new features that are actually required by the people.

Besides relying on the results gathered from the survey about the existing home automation technologies we ourselves explored in details the existing home automation systems.
Some of the existing home automation systems are briefed below:

1) IFITech Home Automation System :
   The IFITech Home Automation system allows you to control all household devices remotely.
   Disadvantages:
   a) No Physical Access Control
   b) Cost 18,500 (Very High)
2) Wink Connected Smart Home Automation Hub:

   Wink HUB allows your diverse collection of smart products to speak the same wireless language so you can easily control them from the Wink app
   Disadvantages:
   a) No Physical Access Control
   b) Cost 6,890 (High)
   c) Only Compatible with the smart products.
3) Universal Remote:
   Universal Remote is an android application that let you control the functioning of any devices that can be controlled using IR remote for that device. More precisely, it simply emulate an IR Remote for any device that already supports one and also available in its database.
   Disadvantages:
   a) Standby Mode:
      Whenever we turn off the device with the IR Remote, they are still consuming electricity in standby mode.
   b) Not Compatible with every device:

      We can't control every device with the IR Remote. Only those device can be controlled that already supports one e.g. TV, AC etc. can be controlled but Light, Fan etc. can't be controlled using any IR Remote.

   c) No Physical Access Control.

The results from our exploration about the existing home automation system highlights the same issues/disadvantages mentioned by the people participated in the survey.

We kept these disadvantages in mind and started developing a simple, affordable home automation system that foster convenience to the user and can rectify the disadvantages in the existing home automation system.

Smart Switch and Smart Board:

We finally came up with a simple electric circuit named as Smart Switch Board and Smart Switch Android Application.

Smart Switch Board can be easily incorporated with the existing electric circuit in the house and user can simply download the Smart Switch Android Application from the Google Play Store to control the Smart Switch Board remotely.

Turn on your Bluetooth and pair with the HC-06 Bluetooth Module.

Start the Smart Switch application and just wait for the application to complete/establish the connection with the Smart Switch Board.

If the application does not initiate a connection implicitly, just click on the menu icon in the title bar and click on Connect.

By clicking on Connect, the connection establishment sequence will begin and subtitle of the application will be: Connecting to HC-06.

Once the connection is established, the subtitle will get change to Connected and after that, you can successfully control all your switches remotely with the help of Smart Switch application.

Accessibility:

Smart Switch application is available on the Google Play Store. Users can download and install the application from the Google Play Store.

With effect from 3 Oct 2016, we have more than 1000+ downloads for the Smart Switch application all around the world and still growing.

INNOVATION SHOWN BY OUR PROJECT

EXISTING TECHNOLOGY

Description:
At home, we generally operate (switch on/off) all the electrical and electronics appliances such as fan, light, cooler, air conditioner, and so on through switches of the regular switch board. This manual switching of any home appliance is an inconvenient method for physically disabled or elders or even for normal young guys when frequent switching operation is required. Thus, this conventional manual switching method has to be overcome by an easier method of switching. This can be done using an advanced switching method like a remote control for electronic home appliances.

In this we can use the unconventional remote control technology for controlling the home appliances easily without using the fixed wall switch boards. There are different types of remote control technologies such as infrared or IR remote technology, radio frequency or RF remote

control technology, GSM based remote control, DTMF (Dual tone multi frequency) based remote control, and so on using different wireless communication systems. We discuss about a few real time embedded systems based projects with which we can design and implement remote control circuit for home appliances.

IR Remote Control system
IR remote control for home appliances project works based on technology similar to the TV remote operation. The IR remote is generally used in home theatres and is based on the principle of using infrared light as the medium of communication. A TV remote basically consists of a set of buttons and a circuit board. Each button is embedded with a black conductive disk which acts as a contact between the buttons and the printed circuit board. The circuit board or the chip consists of a circuitry to sense the connections or detect the button being pressed and produces the signal in Morse code form which is amplified by the transistors and then given to IR LED. The IR LED is connected to end of the circuit board and emits infrared light which is sensed by the sensor placed at the receiver of the TV.

Radio remote control system

Radio remote control (RF remote control) is used to control distant objects using a variety of radio signals transmitted by the remote control device. As a complementary method to infrared remote controls, the radio remote control is used with electric garage door or gate openers, automatic barrier systems, burglar alarms and industrial automation systems.

Standards used for RF remotes are: Bluetooth AVRCP, ZigBee (RF4CE).

Also, transmitters or receivers can be *universal*, meaning they are able to work with many different coding. In this case, the transmitter is normally called *Universal remote control duplicator* because it's able to copy existing remote controls, while the receiver is called *Universal receiver* because it works with almost any remote control in the market.

GSM based remote control system
The GSM-AUTO is a GSM remote control switch, it connects to the cell phone network and like a cell phone has its own cell phone number. The GSM-AUTO is activated by Sending SMS to its cell phone number, it will recognize an authorized telephone number It has 6 independent relay switches with normally open and normally closed switch contacts, these can be programmed to switch on and Off By Sending SMS R1 R2 R3 .... The relay switches can also be switched on or off by sending the GSM-AUTO a SMS text message command. It can report the relay status by sending back a text message.

DTMF (Dual tone multi frequency) remote control system
Dual-tone multi-frequency signaling (DTMF) is an in-band telecommunication signaling system using the voice-frequency band over telephone lines between telephone equipment and other communications devices and switching centers. DTMF is a multi-frequency tone dialing system used by the push button keypads in telephone and mobile sets to convey the number or key dialed by the caller. DTMF has enabled the long distance signaling of dialed numbers in voice frequency range over telephone lines. This has eliminated the need of telecom operator between the caller and the callee and evolved automated dialing in the telephone switching centers.

NEW OR INNOVATIVE TECHNOLOGY

Description:

This project is a fine combination of Android mobile technology and embedded system in Arduino. User can control Home appliances using Android mobile. An application should be installed on his/her Android mobile handset to control various home appliances. User can send commands using that application. Wireless controlling technique used in this project is Bluetooth technology. This project consists of a Bluetooth receiver. This Bluetooth device is connected to the circuit which has a decoder. This decoder sends code for respective command sent by user. Then the respective device connected to the circuit will be turned on or off depending on the command given.

Many companies in today's world are making smart devices but we are going in different and innovative direction that is making smart switches as this Switch will be providing with more functionality that is not available in the Current Technology. Through this Switch we will be able to control not only the smart devices but the simple Devices also like: Switch ON/OFF the lights of the room; Control the speed of the ordinary ceiling fan, and switching it On/OFF; Control the overall functioning of all Smart devices also like TV, AC etc.; Switch ON/OFF all other household devices also like Cooler, Fridge, Lights etc. Simply controlling all the household devices which may or may not be handled by existing technology.

At present we are available with the facility that we can control the functioning of Smart Household Devices like Smart TV, Smart AC etc. through our mobile. We can increase or decrease the volume of TV, Increase or Decrease the fan speed of our AC, But have you ever noticed the fact that these functioning with your Mobile App only works when the devices is powered on, that is, the electricity have already been supplied to that device, Like to control your TV through the Mobile application, already available in the market, we have switch it On, and then only you can control it through that App. And after watching the TV, we have to again switch it OFF. What usually people do, they turn the TV OFF by the Remote, as they don't want to get up even after knowing the fact that the TV is still consuming electricity. The smart Switch will solve the problem as we will be able to switch it off.

We have also incorporated another add on feature i.e. **One Touch Technology: One Touch OFF/ One Touch On:** In this we will be able to Switch ON/OFF all the switches by just touching the surface of the switch as it removes the ordinary design of the Switches which works like pressing the switch up and down to make it OFF/ON respectively. Besides giving our house wall elegant and sleek design, the One Touch Technology will also work as an alternative in the case when our mobile is switched off or not working due to any reason. So we will be able to control the switch through: Mobile Application as well as One Touch Technology.

Some of the Companies have already come up with the ideas/product of Smart Switch in Market but our idea is completely different from them and we are also coming up with slighter cheaper and better switches which are better in functionality as compared to existing.

CONCLUSIONS

• Our project "SMART SWITCH" has completed three phases. We have been able to control all the devices successfully with the help of our mobile app "SMART SWITCH".

• We are able to control them manually, so that user can control devices even in the case his/her phone is lost or is switched off suddenly due to some reason. Also the people who are not aware of the technology like elder people at home can use the switches with the same ease as they were already using.

• We have also incorporated one touch technology for using switches manually so that we could give sleek designs to our walls. This will make our walls look sleek, attractive and will save space.

•we have also launched our SMART SWITCH application on the Google play store.

• We have been able to control all the devices within the radius of 15-20 meters and our further effort is to increase this range so that we can incorporate our switches in industries and towers also. For this we are learning how the range of Bluetooth can be increased. We are also thinking of using some other technology with higher range and is not dependent on internet.

• We are also trying to make our devices password protected so that only user has control over his devices. For this we are trying to modify our current SMART SWITCH application.

• We are also working on multi connectivity of our application. For this we are trying to use master slave connection.

• We are trying to incorporate a meter that can show the power consumption by each device. We are trying to add this feature in our next updated application.

• We are also working on how to control or regulate fan speed with the help of application.

FUTURE DIRECTION

- Smart Switch automation can provide integrated remote access to everything from security and lighting to temperature control and appliances. Some systems provide a unified remote control as well as a central touchpad. Commanding the devices in your home can rely on networked control of electric outlets or, if the devices you plug in include remote technology, you can tap in to individual appliances through a cell phone. For example, track the age of perishable foods in a smart refrigerator.

- Smart Switch technology can extend home security to include features that track children, pets and household employees. From cameras that watch over entrances and driveways to motion sensors that activate lighting, these security features can make life easier for your family, lighting the path to the bathroom or kitchen at night. At the same time, they can thwart attempts to gain unauthorized access.

- By automatically turning down your thermostat, your A/C unit, or your portable heater when you're away, you can not only help our planet by living green. You can set a smart thermostat or portable heating/cooling unit to adjust to a certain level whenever different

events take place–such as when you leave home. And to make sure that you always step back in to a comfortable crib, you can also adjust your home's temperature from your phone whenever you want–like, when you're leaving work to come home each day.

- Just as you can lock and unlock doors and turn on lights, electronics, and appliances from anywhere with Smart Switch, you can also open and close your garage door with a simple tap of a button.

CONFERENCE PRESENTATION

- The review of paper for Project Make your life Easy: using **Smart Switch** has been successfully uploaded (Paper ID-1172) for **INDIACom-2017** which is an amalgamation of four different tracks organized parallel to each other, in addition to the 3rd International Workshop of Information Engineering and Management (IWIEM 2017).

- *INDIACom-2017* is approved by **IEEE's Conference Publication Program (IEEE CPP)**. This means that the Conference proceedings of accepted papers (for oral presentations), which will be presented in the conference, will be submitted to IEEE Xplore, which is indexed with world's leading **Abstracting & Indexing (A&I)** databases, including ISI, SCOPUS, DBLP, EI-Compendex

REFERENCES

- https://www.arduino.cc
- https://en.wikipedia.org/wiki/Arduino
- http://electronics.howstuffworks.com/relay.htm
- http://www.engineersgarage.com/electronic-components/relays
- http://www.electroniccomponentshop.com/
- www.electroschematics.com
- http://www.electronic-circuits-diagrams.com/
- http://forefront.io/a/beginners-guide-to-arduino/
- http://www.robotshop.com/blog/en/arduino-5-minute-tutorials-lesson-2-basic-code-blink-led-2-3639

- http://home.howstuffworks.com/smart-home.htm
- https://www.bluetooth.com/what-is-bluetooth-technology/bluetooth
- https://www.bluetooth.com/
- http://bluetoothreport.com/bluetooth-versions-comparison-whats-the-difference-between-the-versions/
- http://compareindia.news18.com/products/bluetooth-headsets/332

PICTURES RELATED TO HARDWARE

Bluetooth Module

Relay
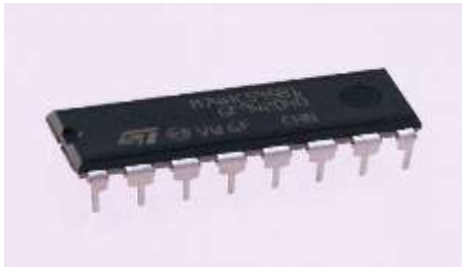
Shift Register

Resistance

AtMega328 Chip

Copper Tape

PICTURE RELATED TO APPLICATION

AVERAGE RATING ⓘ
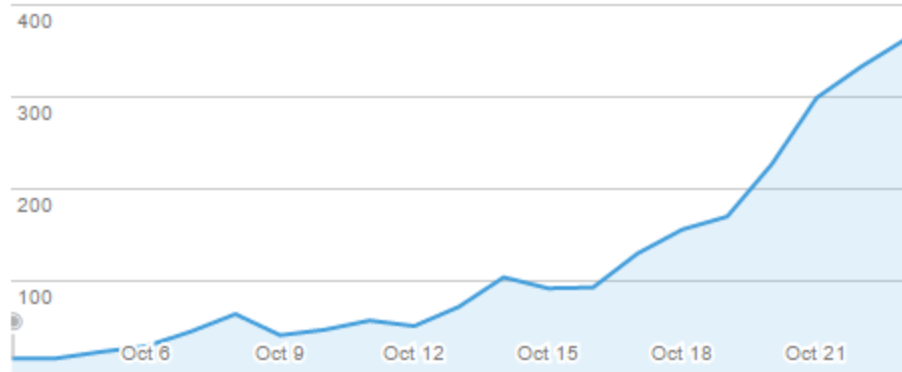
View details

4.889
Last 30 days
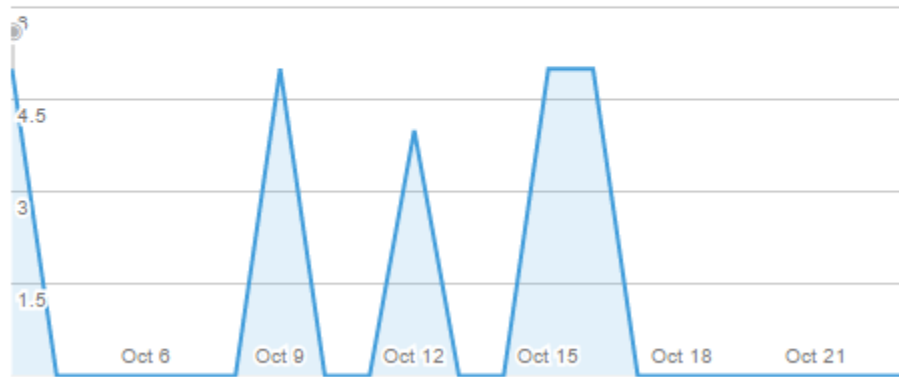
DASHBOARD

INSTALLS BY USER ⓘ

View details

2,428
Last 30 days
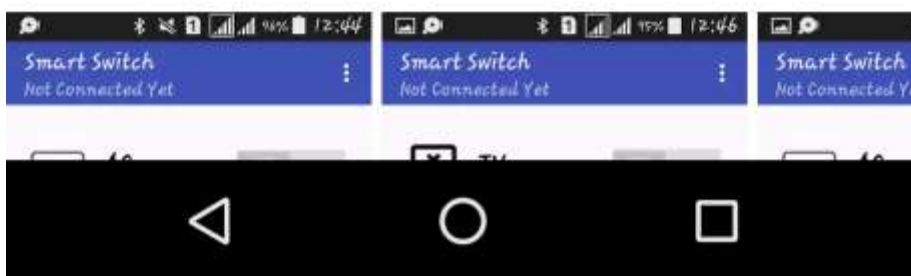
Utilization Certificate

Innovation Project 2015-16

Project Title: Make Your Life Easy: Using Smart Switch (SHC-314)

Audited Financial Statement under Innovation Project scheme

College: Shivaji College

Project Investigators:(1)Mr. Rakesh yadav (2) Mr. Ajay Kumar (3)Dr. Sumit k. Rai

Grant Sanctioned	Rs. 450,000/- (Four Lakh Fifty Thousand Rupees)		
S.No.	**Budget Head**	Amount Sanctioned	Amount Utilized
1.	Equipment/Consumables	1,25,000	36,278
2.	Travel	80,000	1,650
3.	Stipend	1,20,000	1,16,000
4.	Honorarium	25,000	12,000
5.	Stationery	20,000	5,250
6.	Contingency	55,000	4,475
Total amount utilized Rs. (In figures and words)	Rs. 1,75,653 (One lakh seventy five thousand six hundred and fifty three)		
Amount remaining Rs. (In figures and words)	Rs. 2,74,347 (Two lakh seventy four thousand three hundred and forty seven)		

Certified that out of Rs.**4,50,000** (Four lakh fifty thousand) sanctioned to Innovation Project Code SHC-314, Rs.**1,75,653** (One lakh seventy five thousand six hundred and fifty three)has been utilized during the period of the project. The remaining amount Rs.**2,74,347** (Two lakh seventy four thousand three hundred and forty seven) is being returned back to the University.
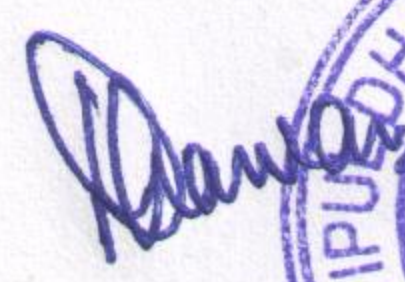
Signature of Project Investigators

(1) Mr. Rakesh Yadav
(2) Mr. Ajay Kumar
(3) Dr. Sumit K. Rai

Financial Audit Clearance and
Stamp of Charted Accountant

Signature of Principal

University of Delhi

RC/2015/9435   31 August, 2015

The Principal,
Shivaji College
Ring Road, Raja Garden,
New Delhi-27

Subject: - **Innovation Projects 2015-16**

Dear Principal,

The University of Delhi is pleased to announce the third round of the undergraduate research initiative in colleges, Innovation Projects 2015-16. You will be glad to know that the following project submitted by your college has been selected for award

Project Code: SHC 314
Project Title: Make Your Life Easy : Using Smart Switch

The distribution of grant under different budget heads as below:

Sr. No.	Budget Head	Amount
1.	Equipment/Consumables	Rs 1,25,000/-
2.	Stipends	Rs. 1,20,000/- (1000x10x12)
3.	Travel	Rs 80,000/-
4.	Honorarium	Rs 25,000/-
5.	Stationery/Printing	Rs 20,000/
6.	Contingency	Rs 55,000/-
	Total	Rs 450,000/-
Rs 4.5 lakhs (Rupees four lakhs fifty thousand only)		
Amount to be released in first phase by Finance Branch- Rs 3,00,000/		

Budget head No. 1 and half of the remaining grant will be released as the first instalment. The second and final instalment will be released after submission of half-yearly report (by 15 February 2016), satisfactory review and recommendation of release of the second instalment.
Please refer to the detailed guidelines for implementation of the project. Any queries may be addressed to- innovationprojects1516@gmail.com.

With best wishes,

Yours sincerely,

Prof. Malashri Lal