ENTC
Electronic and Telecommunication Engineering
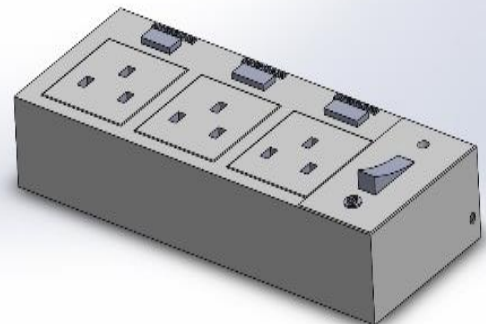
PROJECT PROPOSAL

SMART MULTI PLUG

EN 21

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PROBLEM DESCRIPTION

PROBLEM

With the advancement of technology, most people who works in office or university students have to spend a lot of time in front of their computers or engage in other activities from their seats. Not only that Disabled people with difficult to walk are in a same place most of the day. It is very difficult to constantly go near the plug point to turn on or off electrical devices in that situation without calling someone.

PROJECT IDEA VALIDATION

We conducted a survay amoung randomly selected people and based on that results it's proven that this problem has been on many people's minds. So It had better to have a clear solution to this pertucular problem.
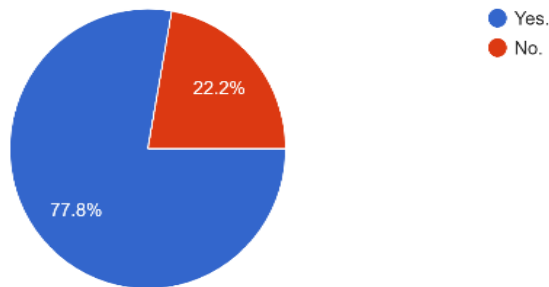
How many electric devices do you usually use at the same time?
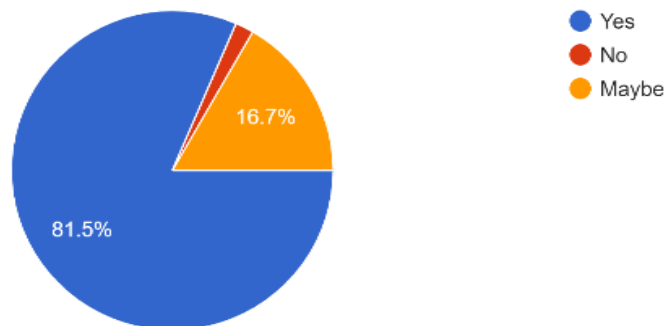
54 responses
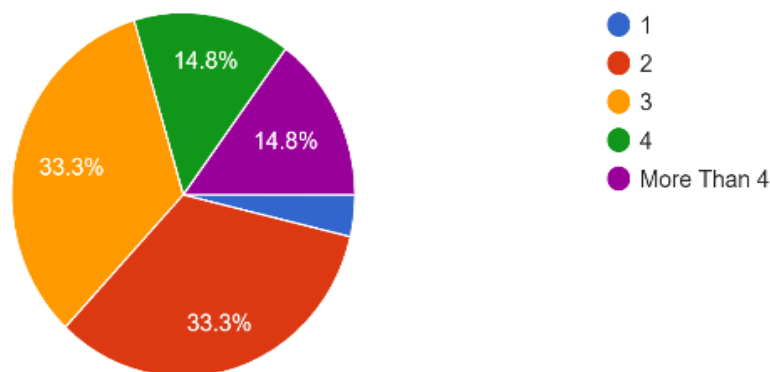
If you are a person who is working much time on the day just sitting on your chair, have you ever thought that it's better to have control over multiple electric devices just using your finger tips?

54 responses

- Yes.
- No.

22.2%

77.8%

Do you think it would be beneficial for disabled people as well?

54 responses

- Yes
- No
- Maybe

16.7%

81.5%

SOLUTION

To solve this problem, we decided to transform manual controlling electrical equipment into smart controlling equipment through controlling the power supply remotely. Also, we can monitor the certain appliances whether it is switched ON or OFF through a software(app) when the user is near by 10- 15 m.
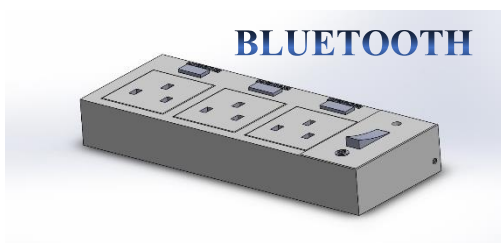
BLUETOOTH

So, our solution is introducing a smart controlling multiplug with 3 sockets. It is based on Bluetooth technology.

JUSTIFICATIONS

Bluetooth technology is very familiar and versatile technology among most of the people since every smart phone has been integrated this technology. It's easy to use. No ne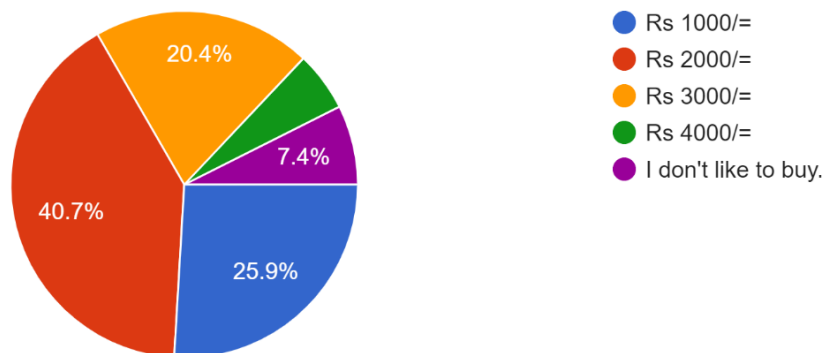ed any prerequisite knowledge or device to use this technology. Although we are able use much advanced technology having relatively higher controlling range Wi-Fi to develop our product, we identified an issue of it. Most probably user may have connected to a Wi-Fi network from his mobile phone and when he/she wants to control the power supply of the equipment, he/she will have to disconnect from that network and connect to the multiplug. So, we can suppress that issue by using Bluetooth technology.

We selected to include 3 sockets to our multiplug. According to the survey results which we had done, 3 electric devices are usually being used at the same time. And it will cause to reduce the project budget as well.

Although there are existing products as such already in the market which can be used to solve the problem those prices are not affordable. Majority expect to spend around Rs.2000 for such product.

If you are willing to buy this product, What is the maximum amount would expect to spend to purchase? [For a single socket plug]

54 responses

Legend:
- Rs 1000/=
- Rs 2000/=
- Rs 3000/=
- Rs 4000/=
- I don't like to buy.

Values shown: 20.4%, 7.4%, 40.7%, 25.9%

TECHNICAL FEASIBILITY

In our design of Bluetooth multiplug essential requirements and availability of them can be listed as below.

Item	Quantity	Available/Unavailable
AtMega328p IC	1	Available
22pf Capacitor	2	WE can't afford this due to the crisis, but we can afford it soon.
16 MHz Crystal Oscillator	1	Available
Relay Module	3	Available
Bluetooth Module	1	Available
LED Red	4	Available
AC 240V to DC 5V Convertor	1	WE can't afford this due to the crisis, but we can afford it soon.
10kOhm Resistor	1	Available

According to the above table it's obvious that almost everything is available and affordable I the local market currently.

Other than the availability of components as a well based product we have to check in order to see if this is working properly and if the required performances are reachable. In that case it can be described as below.

This product is designed to reach several main goals. Among them the main goal is to ease the handling of several electronic devices at the same time just by a fingertip on the phone. So, on the way to reach that goal we use an app that can handle Bluetooth technology. Therefore, by that app we can simply handle every device which is connected to the multiplug.

There we reach the second main goal of our product, which is to help the disabled people to use electronic devices without moving an inch. So, these two goals are the ones we can easily accomplish. Any user who uses our product have the ability to control many electronic devices and carry out multiple tasks easily at the same time rather than pasted onto a one task for a long time. At that point we have achieved the third goal we hope to achieve by our product. This Bluetooth multiplug can be powered by plugging into the home electricity system. No worries on giving power to this application. Other than the group of disabled people we target our product can be used vastly by the daily office workers who works in a single office room. They have to work with several electronic devices simultaneously at the same time. For an example an officer has to work with the printer, computer at the same time. With a product like ours he can simply connect them both into a one multiplug and easily control both of them by his/her mobile phone. By that support of the Bluetooth technology, he/she can do another work without waiting till one work ends. Our product of Bluetooth multiplug have three main goals to accomplish as mentioned above.

1. Controlling several electronic devices at the same time simultaneously.
2. Help the disabled people to control such devices without moving an inch.
3. Provide the ease of working for a person who has to work with several devices at the same moment.

As mentioned above our product- Bluetooth multiplug has the ability to perform well in order to fulfill these goals. Also, its components are reachable in the local market.

PRODUCT LIFE CYCLE

After fully manufactured in the industrial field and when it is done with the testing stuff, it would be released to the market at an affordable price. Then after the buying and affording and the trade is done, it will be given to the user directly with a literal manual guidance, which would be helpful with using this product. From the time at which a user begins to use it, it will provide a continuous service for the user for a long enough time.

We approximate that our Bluetooth multiplug will work properly for 4/5 years without being damaged at a minimum cause of occurrence of a malfunctional error in the system. After the usage, when the multiplug exceeds its lifetime, the user can simply put it into a recycling process. Since this is made of plastic and many more materials which are not decaying naturally, it has to be recyclable, otherwise it will be considered as an e-waste pollution and will not be healthy for the environment. Therefore, we deeply emphasize that after the usage this product has to be put into a recycling process.

PRODUCT ARCHITECTURE
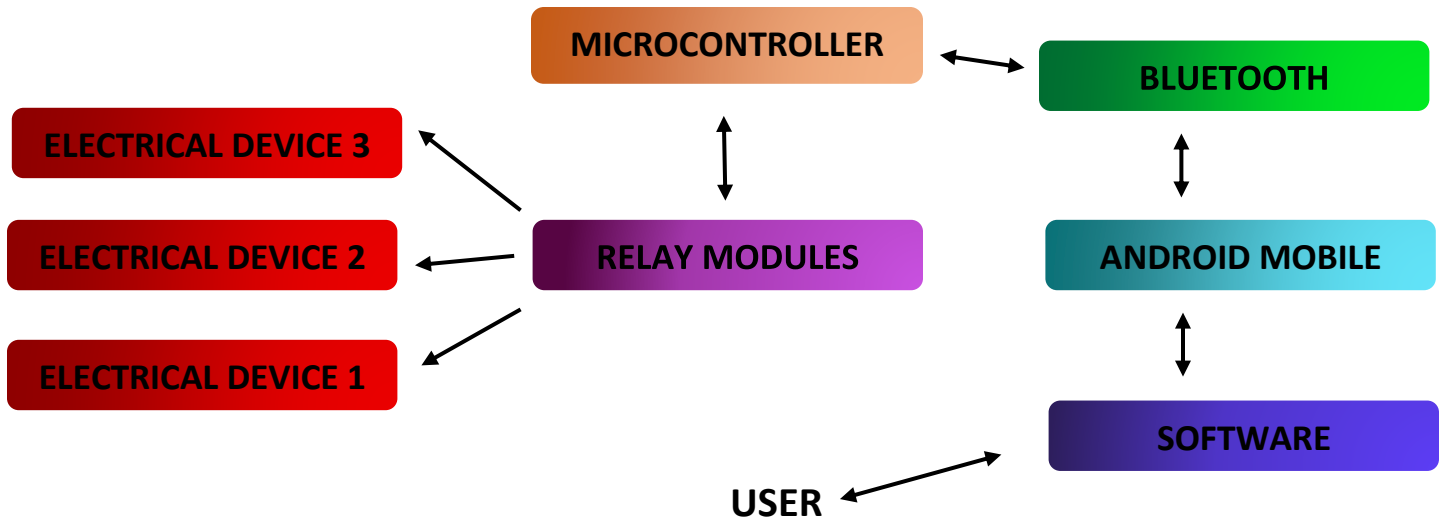
In smart multi plug the phase wire is connected through three relay modules in each socket which is controlled by the microcontroller Atmega328p IC. If user need to switch ON/OFF a particular device, user can use the software to access the control through an android mobile phone. After connecting the mobile phone and Smart multiplug though Bluetooth. Microcontroller will receive the command form user through Bluetooth signal then it will activate or deactivate relay module. Also, user can see whether the devices are turned ON of OFF in an office with multiple devices. In the software platform initially, we need to install and assign the keys. For particular multi plug. There are two keys per socket out of three sockets in the smart multiplug. Assigning simple ASCII codes '0', '1', '2', '3', '4', '5' for remote control.
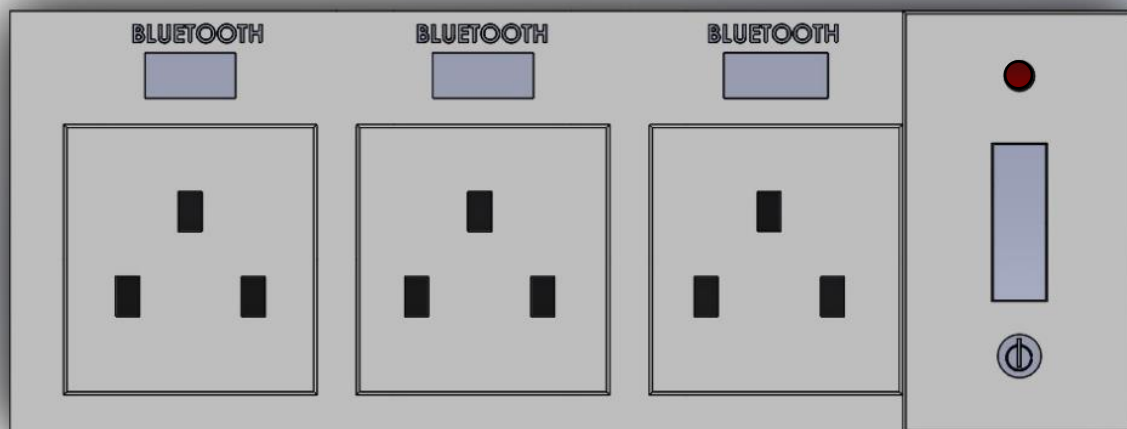
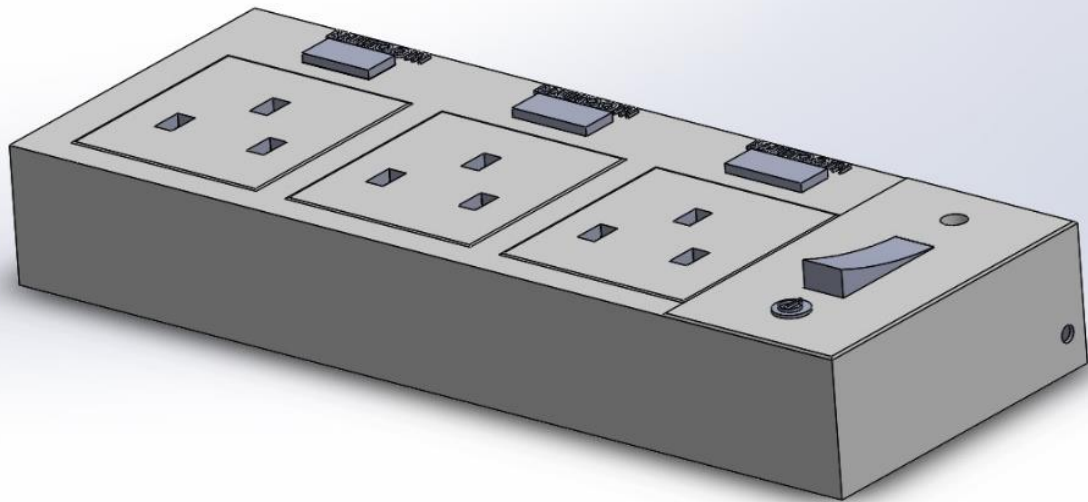0,1 - Switching ON, OFF 1st socket

2,3 - Switching ON, OFF 2nd socket

3,4 - Switching ON, OFF 3rd socket
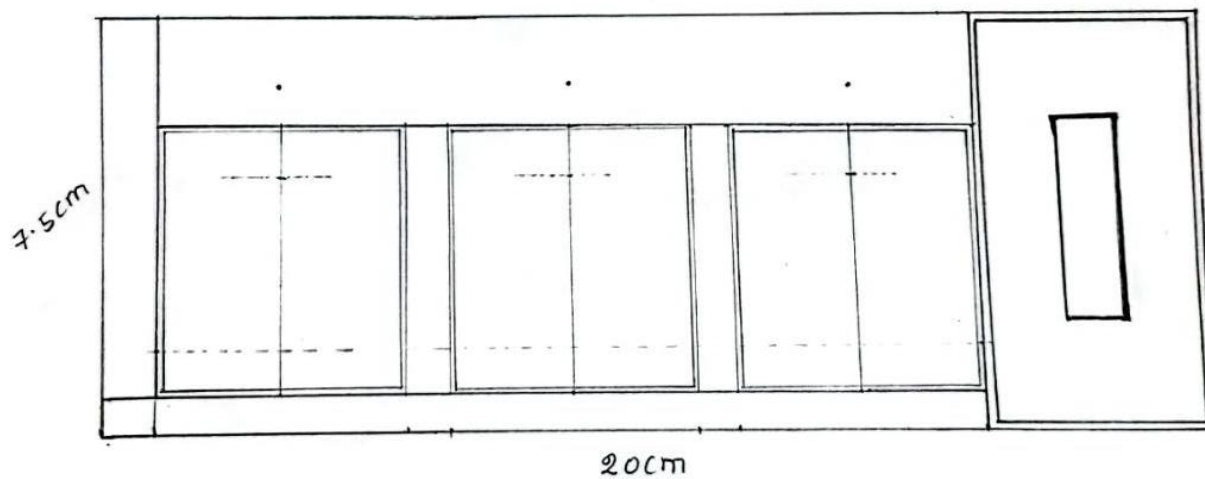
INITIAL SKETCH

SMART MULTI PLUG TOP VIEW

SMART MULTI PLUG SIDE VIEW
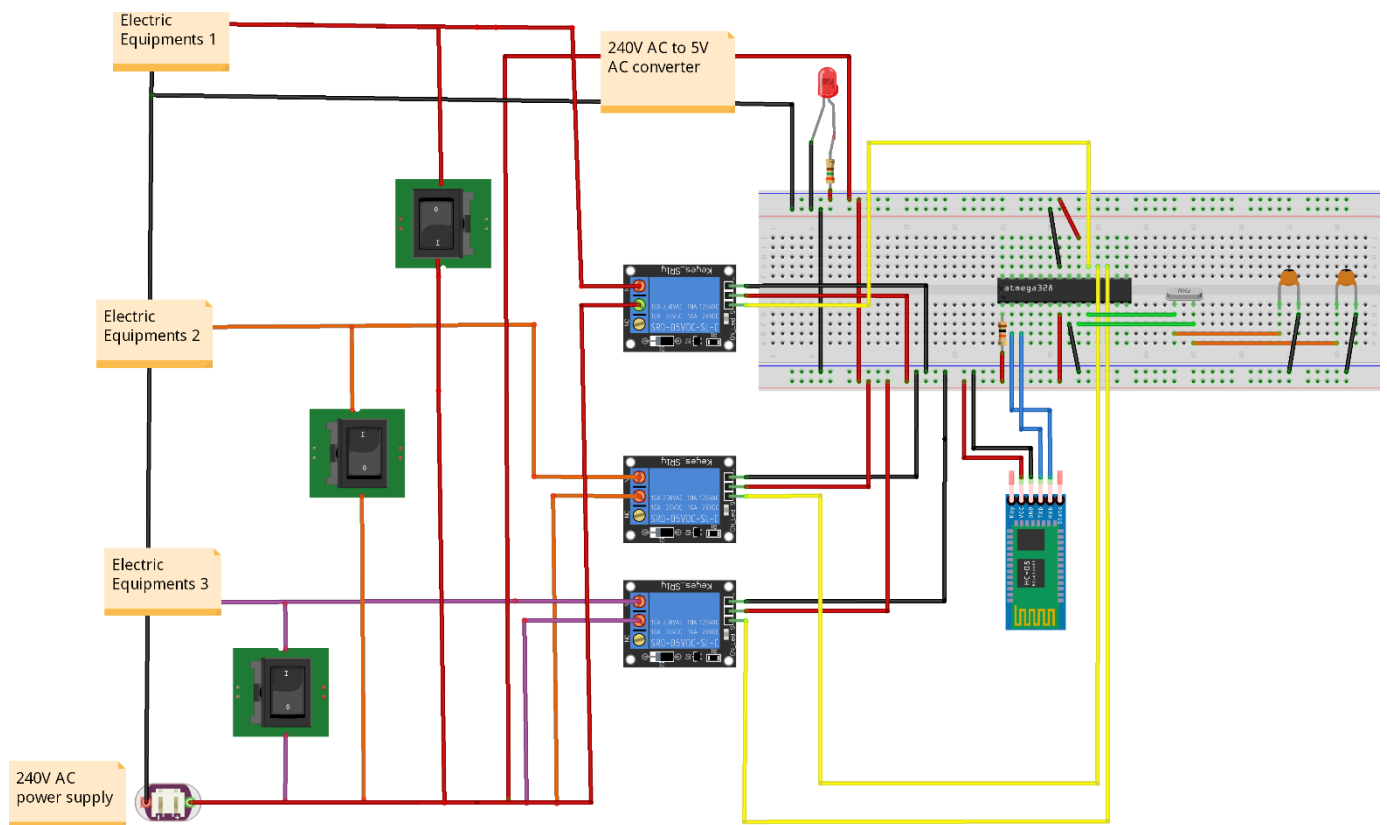
GRAPHICAL CIRCUIT BLOCK DIAGRAM

SPECIFICATIONS

✓ Rated Voltage   :   100V- 250V AC (50Hz)

✓ Rated Current   :   5A

✓ Colour   :   Grey

✓ Size   :   length 20cm , width 7.6cm

✓ Weight   :   Up to 250g

✓ Wire Length   :   3.5m

✓ Material   :   Plastic

✓ Triple Socket with Bluetooth Switch (For dual purpose)

✓ 1 Year Warranty

✓ Indoor use

MARKETING

A. The marketing environment

Competitive forces - The competition in the specialty advertising industry is very strong on a global basis but somewhat weak nationally. Sales figures for the industry as a whole are difficult to obtain since very little business is conducted. Competitive forces can be identified in online global markets such as Ali express, Amazon etc.
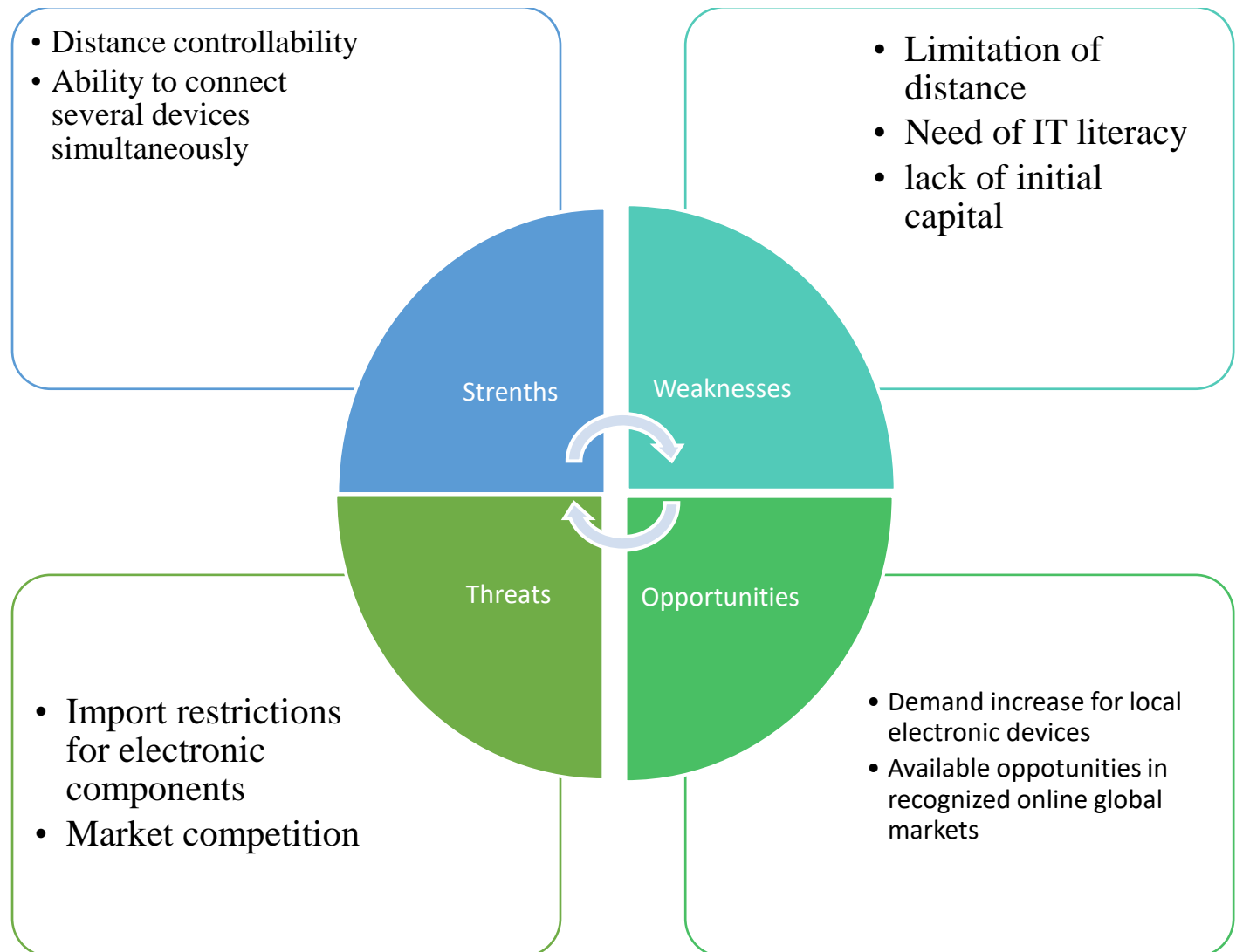
Economic forces - Since the major components of this device (micro-controllers and other electronic components) must be imported and with the current situation in the country it could make in impact

Sociocultural forces - Today, consumers have less time for work or leisure. The hallmarks of today's successful products are convenience and ease of use. In short, if the product does not save time and is not easy to use, consumers will simply ignore it. Software-based product like this fits this consumer need quite well.

B. Target markets

- ✓ Differently able community
    - Since they are incapable of handling things easily, it becomes very easy to switch devices through mobile
- ✓ Children and youth
    - Since they are fond of new technologies
- ✓ Content creators
    - Easy to concentrate on their workstations
- ✓ Officers

C. SWOT analysis

- Distance controllability
- Ability to connect several devices simultaneously

- Limitation of distance
- Need of IT literacy
- lack of initial capital

Strenths

Weaknesses

Threats

Opportunities

- Import restrictions for electronic components
- Market competition

- Demand increase for local electronic devices
- Available oppotunities in recognized online global markets

PRODUCT BUDGET

Components	Quantity	Price (Rs.)
AtMega328p IC	1	1650.00
22pF Capacitor	2	15.00
16 MHz Crystal Oscillator	1	40.00
Relay Module	3	630.00
Bluetooth Module	1	990.00
LED - Red	4	30.00
AC 240V to DC 5V Convertor	1	350.00
10kOhm Resistor	1	5.00
Enclosure and PCB		1000
Circuits wires and other		150.00
TOTAL		**4850.00**

Total production cost   -   Rs 4000 (For multiple Product manufacturing)

Market Price   -   Rs 4400

Manufacturing Quantities -   100

Profit = Rs . 40000