Team Name: <u>Switch Easy</u>

	Name	Branch and Semester	Contact Number	Email- ID
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Note:

1. One can participate either as a part of a team or an individual basis. Switching teams is not allowed.
2. The uploaded ideas will be screened to go to the second round.
3. Judging: competition entries shall be judged, or winners selected based on the following criteria
    *   Is the problem worth solving
    *   How innovative or novel is the idea
    *   Scientific accuracy
    *   Social impact
    *   Scalability
4. Decisions of IIC JSSSTU in respect of all matters to do with the competition will be final and no correspondence will be entertained.
5. In second round, the selected teams will have to present their idea in front of the jury panel.
6. Idea should be submitted in **.pdf** format.

Abstract: (not more than 150 words)

The project aims to solve the problem of lack of availability of a cheaper alternatives to air conditioners and the inconvenience caused by existing fan solutions to users of middle-class society. Fans though helpful, leave a lot to be desired as they require manual operation and are a hassle to change the speed repeatedly. Further it can lead to power wastage if left switched on accidentally.

A solution to this problem is needed to give every common man a chance at a life of comfort and to narrow the gap in living standards of upper and middle classes of society all while conserving power at a fraction of the price of   traditional air conditioner.

Our project proposes an affordable and modular plug and play device that attaches to any fan regulator and instantaneously turns it into a "smart" fan which automatically changes the speed to the user's comfort based on the temperature and provides an app to remotely control the fan with and/or without internet. It is eco-friendly as turns off automatically when not needed.

Introduction (not more than 200 words)

The Smart Easy device is an affordable and modular plug and play device that can be attached to any smart existing wall mounted fan regulator that can convert it a normal fan into a smart fan with extensive features at the user's disposal. The core technical innovation of our idea is the adaption of most of the features of an expensive air conditioner to a far cheaper device while simultaneously incorporating new features that converts a normal house-hold fan into an affordable and smart fan which consumes less power in the long run. The uniqueness of the device lies in the fact that it incorporates a modular and plug and play approach to solve an issue that otherwise requires an entirely new system to overcome all while being far cheaper and convenient. This also enables the user to use a single device to control different fans as and when required.

The objective is to make a cheap and affordable plug and play device that can connect to any fan regulator and provide many smart facilities all while consuming power by converting any normal fan into a smart fan.

Motivation (not more than 100 words)

The majority of households in India mainly use ceiling fans to keep cool throughout the year. However, they come with their own set of caveats. For one, they are not the power efficient solutions. Hence, accidentally leaving them on over a span of a few days can incur high costs. They are also very inconvenient to use as they require the user to manually adjust the regulator. This can be very irritating if the user wakes up from sleep due to discomfort and has to turn on or off the fan manually which can ruin the sleep cycle. Overall, they leave much to be desired

Methodology (block diagram, related figures etc)

We propose a modular and smart device that rightfully named "**EZ fan regulator**" which can be easily mounted onto any existing fan regulator on walls which eliminates the need of human intervention to change the speed or turn on/off the fan.
The device is attached onto the regulator and fixed with the help of an adhesive and/or magnets.
Once attached, the actuator in the device automatically rotates the regulator pot to control the fan speed as required by the user.
With the app that the user needs to install on their smartphone, they can control the device remotely. The app communicates with the device with the help of WiFi through a cloud database. The users can also set the fan speed manually according to their wish in the manual mode.
Most importantly, the device comes with an automatic mode where the user only has to set the desired temperature on the phone app. Once set, the device automatically adjusts the fan speed periodically with the aim of achieving the comfort of the desired temperature by measuring the ambient temperature of the room with the sensor present in the device.
As it is impossible for the temperature to be controlled by the use of a fan, our device takes a rather unorthodox and clever approach to resolve this issue. When the user sets the desired temperature, the device compares it with the ambient temperature. If the ambient temperature is higher than the desired temperature, the device sets the fan to the speed proportional to the difference in the two temperatures, to maximize the comfort possible to the user through a fan. If the desired temperature is higher than the ambient temperature, the fan is turned off as it is the best solution for the scenario.

Further, the user can remotely check if the fan is off and can turn it off, in case forgotten. This can help save a lot of energy proving the eco friendliness of our solution.

Further, as the ambient temperature goes down during the night, the fan is automatically turned off when not needed thus facilitating the user's uninterrupted sleep. The user can also set the time periods throughout the day when the fan is to be turned on/off.

Overall, our solution is power efficient, eliminates unnecessary labour by the user and improves the sleep cycle of the user all with the help of a seamless and cost effective upgrade.
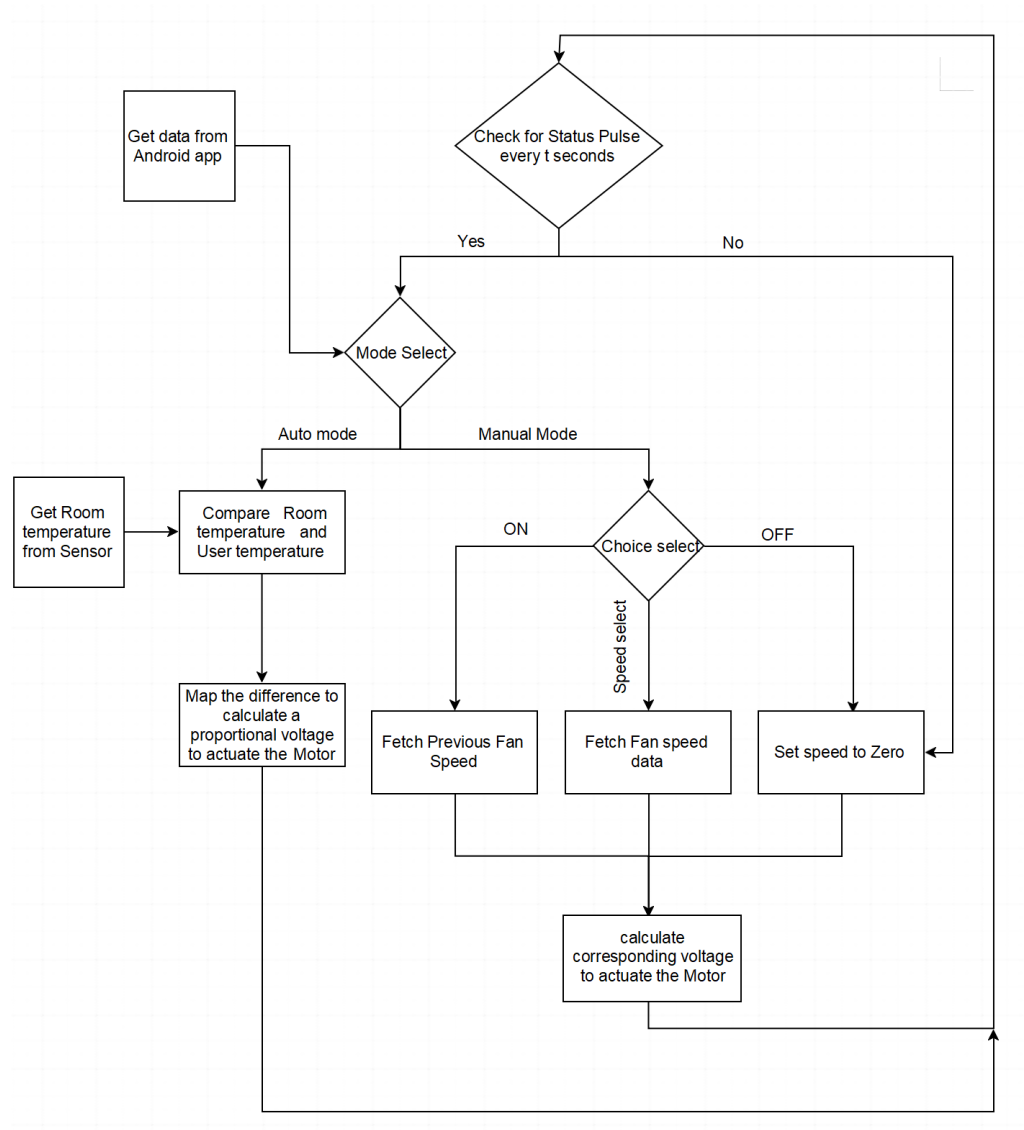
Social Impact

The proposed solution can immensely impact the life of the common man across the world. In most households, air conditioning systems are a luxury that most cannot afford as they are very expensive to install and pay upfront. It also comes with heavy maintenance expenses. Therefore, air conditioners are usually present only in homes of the rich minority.

The common man usually uses electronic fans to keep cool as they are far cheaper alternatives to air conditioners. Therefore, to this day, fans remain the most widely used household appliance to keep cool in hot climates as is the case in most of India. They can be found in every room of the house and are predominantly operated with the help of wall mounted regulators as other alternatives such as remote controllers and off the shelf smart fans with apps are often overpriced.

But they come with their set of caveats. For one, they are not the most power efficient. If accidentally left turn on while away, sometimes for days together, they can result in major power wastage and increase of electricity bills. They are also not the most convenient to use as there is a lot of trial and error required to set the fan speed at the right amount, often taking the user anywhere between 30 seconds to a minute to set initially. Furthermore, they also require constant adjustment from time to time as the user feels cold or warm over time as a result of the ambient room temperature changes. This can be a major inconvenience say in the middle of the night, when the user is asleep, and the ambient room temperature drops to uncomfortably low levels forcing the user to wake up and manually turn off the fan or slow down the fan speed. In contrast, if the user sleeps with the fan off they might feel hot in the middle of the night and must wake up to manually turn the fan on. This is clearly a major inconvenience that hasn't been addressed till date.

The proposed solution aims to tackle these very issues in the most cost effective and easy to install manner possible. The proposed solution can help narrow the gap in the standard of living of the upper and middle classes of the society. It takes a stride forward in providing comfort to the common man and improving the quality of sleep over night. With the help of the android app, the user can easily adjust the fan settings with the tip of his finger. Furthermore, this also brings down the house electricity bill significantly as the fan automatically turns off when not needed or when the user accidentally leaves the fan on. This not only saves the user money but is also eco-friendly as the fan consumes less power overall and thus is far more efficient.

As the device does not require any active internet connection and can operate on any smart phone which is readily available these days, is very easy to install and portable, it converts any common fan into a smart fan and therefore has all potential to be a very common sight in every household and a basic house requirement in the very near future all the while bringing affordable technology and internet of things closer to the common man.

Market Survey

Every innovation that man has made from the invention of the wheel to this day has been with the primary goal of comfort and to overcome any day-to-day inconvenience. After the industrial revolution the scope for improvement of physical comfort increased exponentially. One of the inconveniences that man faced constantly was the lack of an suitable measure to control the external environmental factors primarily the temperature during uncomfortable weather conditions.

This motivated him to come up with an effective solution to regulate the ambient conditions around him. One such solution to keep cool during hot weather conditions such as in the case of majority of India was the invention of fan which controls generates air current to cool the user. Though there have been other inventions to keep cool and regulate the temperature such as air conditioners and air coolers, fans have remained the most popular choice amongst the majority.

However, fans leave a lot to be desired and are not the most convenient means of keeping cool in hot conditions. According to a survey we conducted predominantly among students of our University, friends and family which comprises of a wide range of economic back ground, the following were noted.

Out of the 127 responses collected it was seen that 85% used only fans at home, 7.9% used A/C and 7.1% used both.

Interestingly, the survey revealed that 88.4% of the users end up waking up in the middle of the night to turn the fan on or off after feeling uncomfortably hot or cold.

Those surveyed were noted to want a way to automatically control the fan to their liking as 64.6% voted yes while 27.6% voted 'Maybe' meaning they would consider it.

From these findings it is clear that fans currently in market leave a lot to be desired. They are a hassle to use as they require manual operation, most of the time making the user walk across the room to control it using wall mounted regulators. Further they require constant adjusting as the ambient room temperatures vary from time to time. Clearly the users, are not happy with the current offering.

Hence, as this scenario is pretty much uniform across India as majority of middle-class homes use fans for cooling, it is clear that the primary consumer for our product is the common man that is the average lower- and middle-class people of India. As the consumers come from a middle-class background, they require an economic solution that is very easy to install and can improve the needs of the users drastically. As this does not require upgrading the entire fan system, users are more compelled to invest in the product. Our product can be sold to these users directly as they are easy to install and reduces intermediate expenses reducing profit. The secondary target for consumers for our product are major electrical equipment manufacturing companies across India such as Usha Electricals, Bajaj Electricals and so on. Fans usually have very large life spans and are not frequently upgraded. Hence these companies are looking for new and compelling solutions to make their products stand out from their competitors and persuade users to upgrade their existing solutions. Our solution fits these criteria perfectly and can peak the interests of these companies as they can sell our product along with their fans to help increase sale.