Smart switch

Note: This is our second abstract submission. Our first abstract submission is titled "EDF Afterburner"

Introduction: The smart switch is a switch which, like conventional switches, can be controlled manually. However , it can also be controlled via mobile devices through the internet.

Motivation: A smart switch will make it very easy to make any place "smarter" by letting it be controlled dynamically through a computer. It obviates the need for custom designed fans, lights and other electronic devices that can be controlled via a computer and therefore, offers a general solution to the problem of controlling devices via a computer or through the internet.

Goals: The smart switch should be very easy to integrate into the electrical power infrastructure of any house and the appropriate programming interface should be present to allow people to design software to control these switches.

Construction:
Designing a smart switch can be broken down into two major components

- Designing the switch and physical network for it
- Designing the system-program interface to help users control it

Switch - A prototype will be designed in Solidworks and then printed in a 3D Printer. The Physical feedback i.e. controlling the on and off position will be done using small electromagnets and a combination of springs and locks.
Each set of switches will be controlled by a separate microcontroller and the microcontroller will be programming in Assembly. All the different sets of switches will communicate a central unit which might be an Arduino or Rasberry Pi via these microcontrollers.
This central unit will either be connected directly to the WiFi or a mobile network, or connect to the internet via a computer.

System-program interface - The system-program interface will be written in C and Python.

Time line:

Week 1:

- Start working on a switch design. Complete 3D Model for it
- Simultaneously start working on the infrastructure to be used for the switch. (The network topology between the microcontrollers, how the switches are controlled and how the switches send feedback back to the control unit

Week 2:

- Print switch
- Start working on microcontroller and control unit software simultaneously

Week 3:

- Complete microcontroller and control unit software
- Start working on the System-Program interface

Week 4:

- Complete basic design
- Create demo application to demonstrate the working of the switch

Week 5

- Serves as a buffer week

Parts and cost:

- Rasberry Pi: Rs 3000
- 8051 Microcontrollers and programmer - Rs 2500
- 3D Printed parts - Rs 1000
- Misc items (Wire, tape, etc) - Rs 1000
- Total cost: Rs 7500