Software Controlled Appliances for Energy Conservation and Differently-abled People

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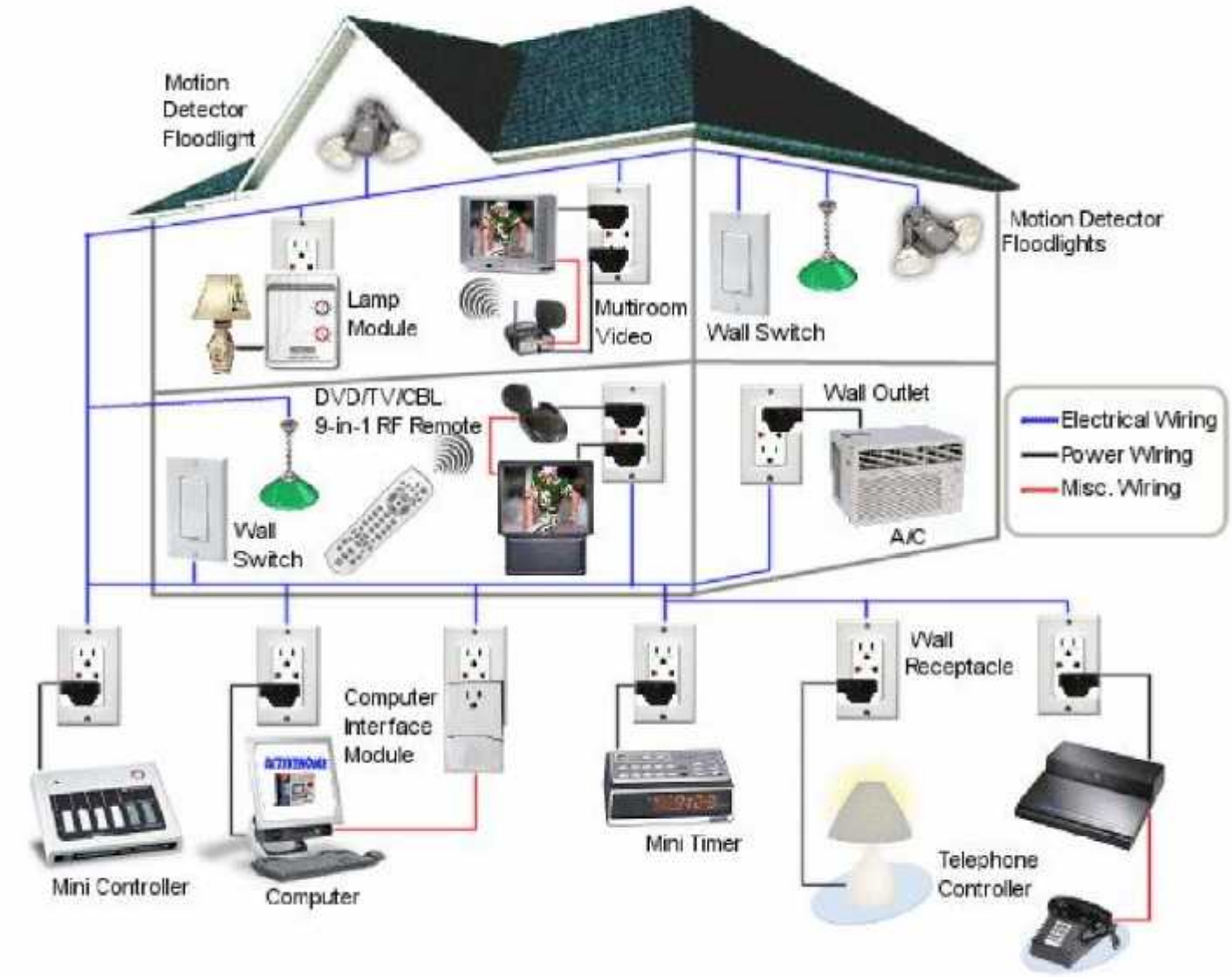
Motivation

- To conserve Energy
- To help differently-abled people access appliances
- Accident Prevention and Management
- Economic gains
- Security
- Convenience

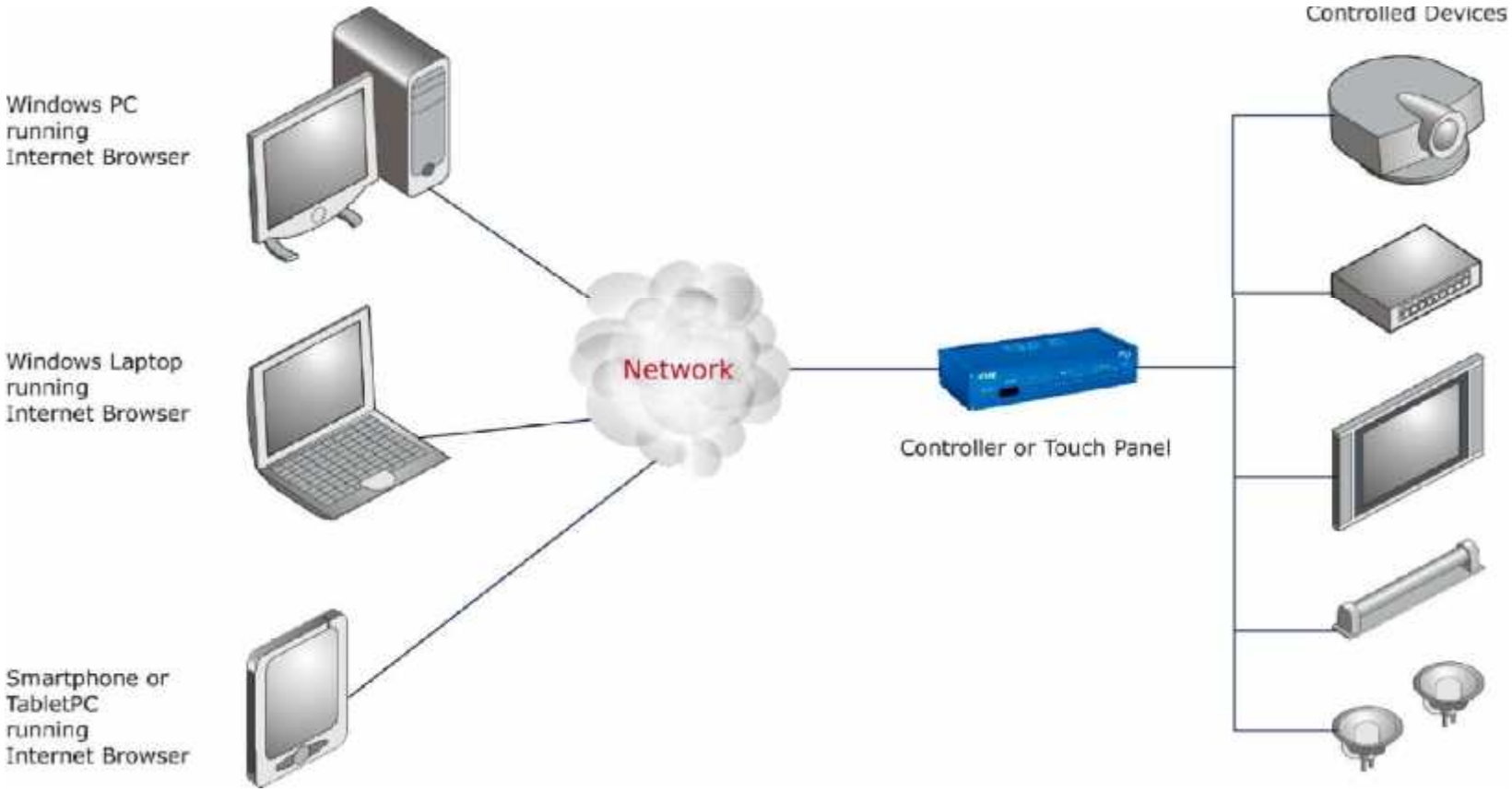
Objective

- The task is to develop a system to remotely control appliances using software applications such as mobile/web apps, for the Conservation of Energy and to aid the Differently-abled people.

Existing System



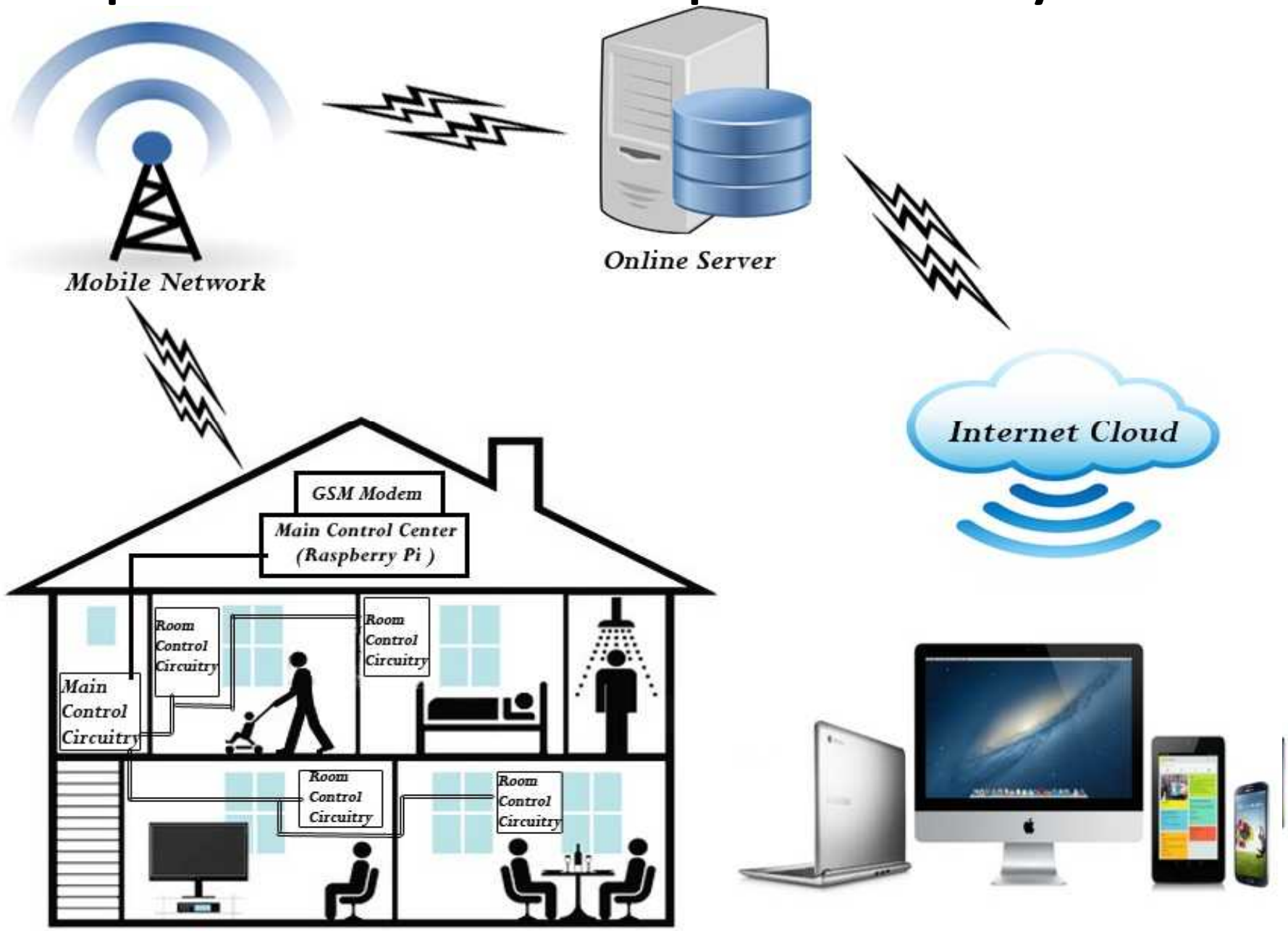
Existing System



Drawbacks of Existing System

- Proprietary systems compatible only with devices manufactured by them
- Requires Wi-Fi
- Is proximity bounded
- No programmable interface

Experimental Set Up Of the System



Proposed System

The 3 major components of the system are:

- Internet Connectivity

  GSM Modem is used to connect the raspberry pi to the Internet Cloud, the Controlling devices are also connected to this cloud.

- Control circuitry

  Consists of 2-way relay switch, multiplexing and de-multiplexing circuitry, Flip-flops.

- Software application

  Consists of web apps(accessed using web browser), Android apps(accessed using mobile devices).

Internet Connectivity

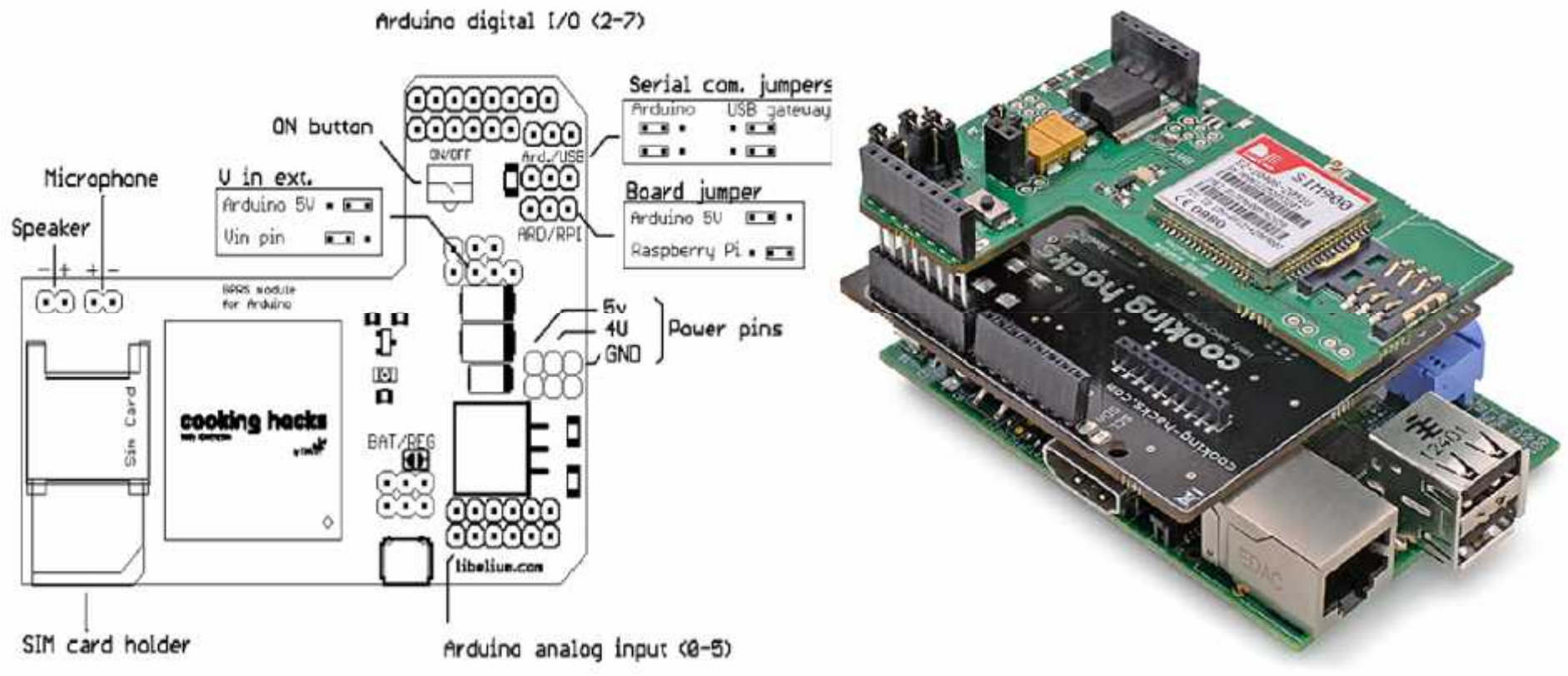
Two options:

- Wi-Fi
- GSM

Advantage of GSM:

- Does not depend on external power supply
- Offers more reliability

GSM Integration in a Raspberry Pi

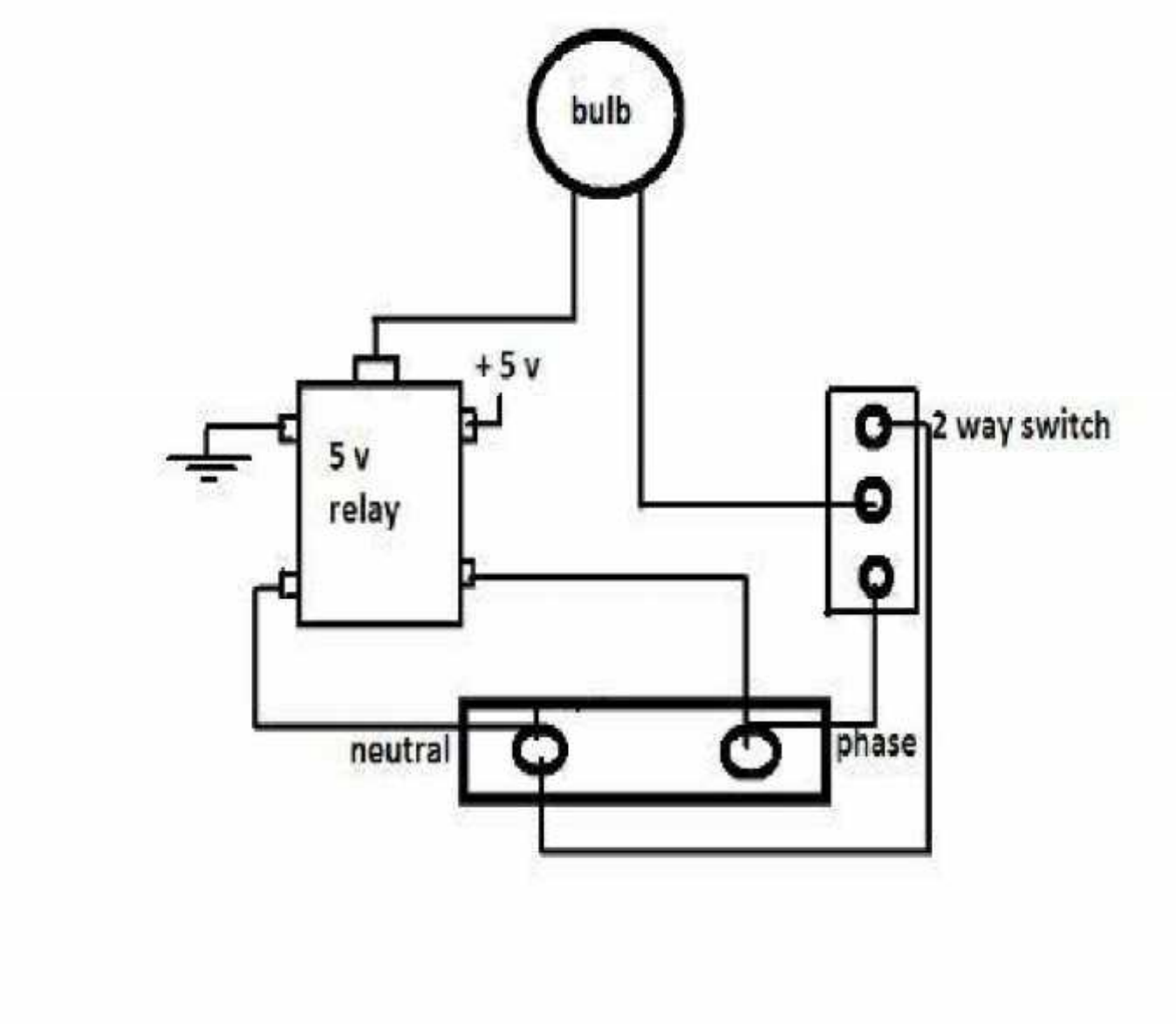


GPRS SIM900 Shield for Raspberry Pi/Arduino - used to interface the board to the GSM network through a SIM card

Programmable Interface

- Automated intimation system through call/message/software application
- Timed toggling of appliance’s state
- Personalized user profile creation
- Accessibility options to aid the Elderly and Differently-abled.

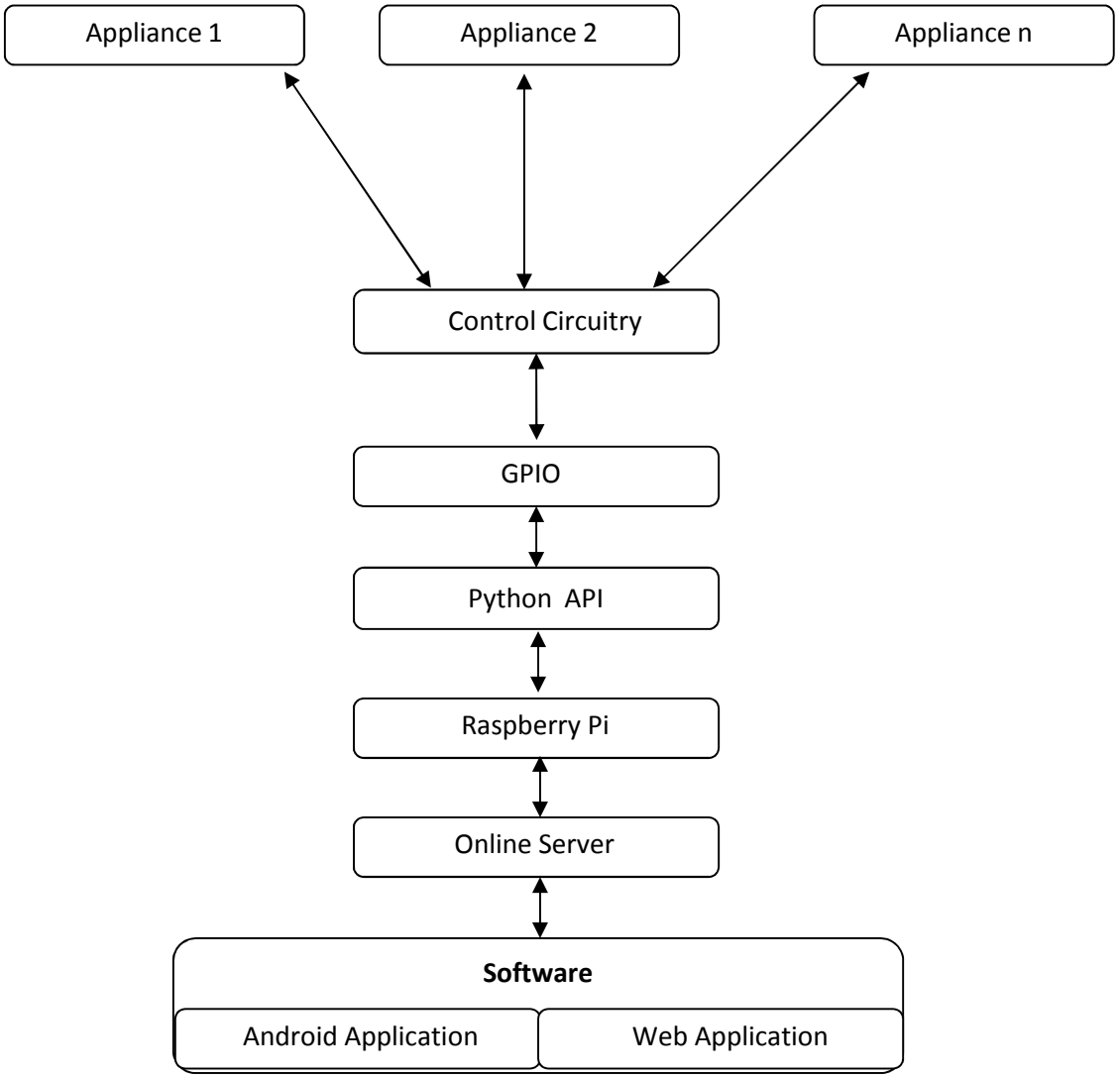
Two Way Relay Circuitry



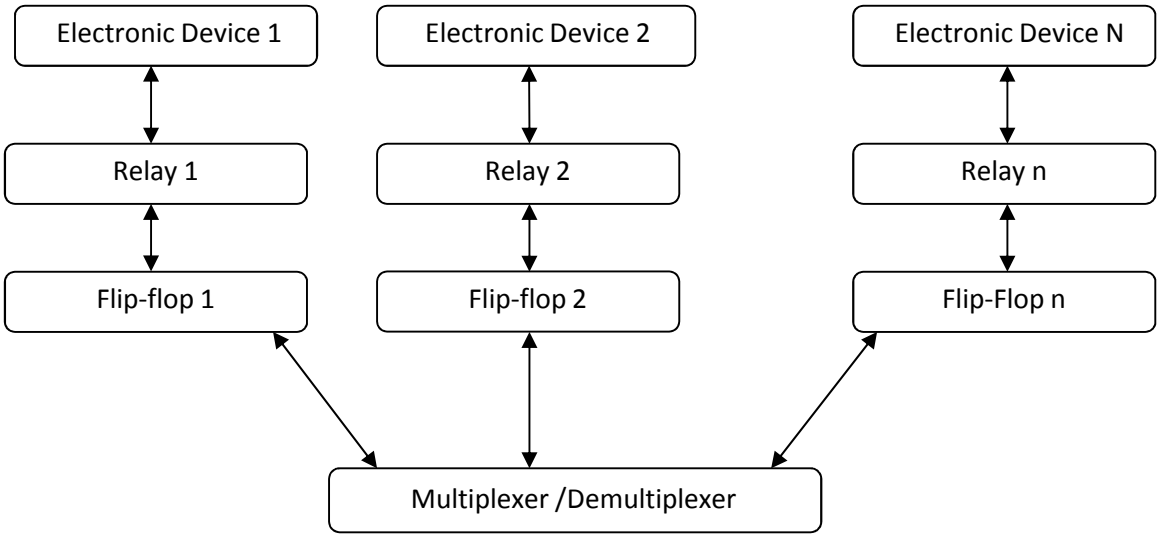
Advantages of the Proposed System

- Compatible with all devices
- GSM powered Internet connectivity
- Interfaces with existing Electrical Systems
- Accessible from all over the world
- User friendly
- Easy Expandability
- Programmable Interface and Automated notification facility

Methodology



Control Circuitry



- Multiplexer to select the required switch
- Flip-flop remembers the previous state of the switch
- Relay to toggle the appliances between on/off states(2-way relay switching Mechanism)

Scope for future work

- Small scale to large scale implementation
- Sensors can be used to automate the appliance environment

Components and Cost

S.No.	Component	Price(Rs)	Quantity	Total
1.	Raspberry Pi B+ (R2)	5000	1	5000.00
2.	Relay	200	12	2400.00
3.	Multiplexer or decoder	490	3	1470.00
4.	Hosting service (hostinger.com with cpanel)	1222	7 Months	8557.00
5.	Wires	10	20 Meters	200.00
6.	Flip-flops	30	12	360.00
7.	Bread board	300	4	1200.00
9.	Electric bulbs	81	6	486.00
10.	A.C. Motors	75	2	150.00
11.	LCD Display	611	1	611.00
12.	Electric Fans	800	1	800.00
13.	Switches	20	12	240.00
14.	Raspberry Pi Ninja case	2815	1	2815.00
15.	Raspberry pi Connecting Kit	2090	1	2090.00
16.	Sim card(with GPRS)	200	7 Months	1400.00
17.	GSM Modem (SainSmart SIM900 GSM/GPRS Module for Raspberry PI)	5600	1	5600.00

Total Amount: Rs. 33,379/-

Time Period (7months)