IoT based Digital Smart Home

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Abstract— The aim of this paper is to provide IOT based Digital Smart Home that can provide remotely access of Home Appliances from anywhere around the globe with the help of Smartphone and Internet using the IOT(Internet Of Things)technology. Digital Smart Home has a highly secured pin protected Smart Door. Every sensor and smart devices is connected to Smartphone via wireless connection, for switching operations of electronic gadgets. Even if the user does not have the internet access, their presence is enough to switch on the lights as user enter inside the room. An automatic water supply for lawn, if the lawn is dry, the water supply will water the lawn. Rain sensor will detect the rain and automatically move shade over the clothes. The electrical power that will be saved here can be employed in rural areas.
Key words: Arduino Controller, Node MCU Microcontroller, Remote Control, Automatic Irrigation System, Rain Sensing Mechanism

I. INTRODUCTION

IOT based Digital Smart Homes provides the easy access of Home Appliances from anywhere around the globe with the help of Smartphone. In this first we have Secure Door Lock system in this the door is protected with Password and Password can be entered with the help of Smartphone or Keypad. In second we have the IOT based Home Appliances control in this the Appliances are connected through the Internet with the help of ESP 8266 Wi-Fi module and with the Cloud. By using this technology we can monitor and control the appliances in easy way like switching of lights, Live Temperature and humidity of the house, Water level etc. In third we have automations such as automatic irrigation system, Automatic clothes come under the shade if there is rain in the outside, Automatic turn ON/OFF of water pump according to the Water level in the water tank and Automatic turn Off the Home lights in the midnight to save the energy and other automation features.

II. INTRODUCTION/MOTIVATION

Over the last thirty years, energy demand has shown a huge increase in residential, industrial as well as rural region. The demand for electricity in India increased by 30% between 2014 and 2017, on the other hand population has increased many folds. Therefore new homes will be built for increased population. As these homes are going to be the conventional homes, features like power conservation and generation are missing. Hence more power loss will take place.

Therefore, our aim is to create Digital Smart Home which is able to save energy while creating a highly user friendly home environment. Due to their relatively low-cost, wireless nature, flexibility and easy deployment, sensor networks represent a promising technology for providing such systems. Our objective is to create a home equipped with smart devices, appliances and sensors that can work on wishes of user and can be controlled remotely.

III. LITERATURE SURVEY/PRIOR ARTWORK

The rapid growth of wireless communication is the reason behind the motivation to use Smartphones to remotely control household appliances. Usually, the conventional house uses traditional electric wired connection. Central Control Unit or Microcontrollers are used to control devices. SMS (Short Message Service) on the mobile phone as a remote control can be implemented [1]. The concept of Electric Current Controlling is easy, however the process will spend much data storage since there will be a lot of SMS sent from the GSM module data transmission that will increase the cost of operation [2]. Therefore, by using a Smartphone connected to internet is a better option. Smartphone is chosen because of the mobile webpage capability [3]. The main idea is that the target persons, particularly the physically challenged and children are living at home most of the time. Project describes how IoT and Cloud computing can work together to provide automation of domestic things so as to reduce human intervention that save time and energy [4].

IV. PROBLEM STATEMENT

Power conservation and generation, are the critical issues in conventional homes. Habits like, forgetting to switch off Fan, Light, Geyser, etc. leads to power wastage. The abundance of sunlight can be exploited for generation of power using solar panels.

V. COMPONENTS REQUIRED

Hardware	Quantity	Software	Version
ARDUINO UNO	1	ARDUINO IDE	1.5.0<
NODE MCU	1	IOT CONTROL APP	-
4*4 KEYPAD	1		
LCD DISPLAY	1		
DC MOTORS	1		
SERVO MOTOR	1		
LED LIGHTS	5		
4 CHANNEL RELAY	1		
UVSENSOR	1		
LIGHT DEPENDENT RESISTOR(LDR)	1		
SOIL-MOISTURE SENSOR	1		
DHT 11 TEMP. SENSOR	1		
RAIN SENSOR	1		

Table 1: Components

VI. IMPLEMENTATION

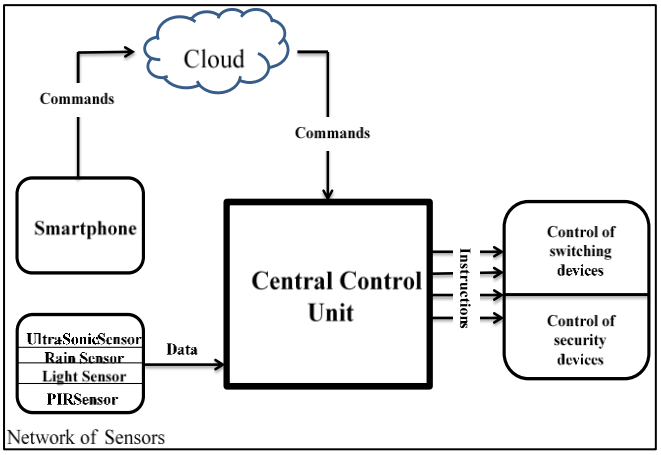


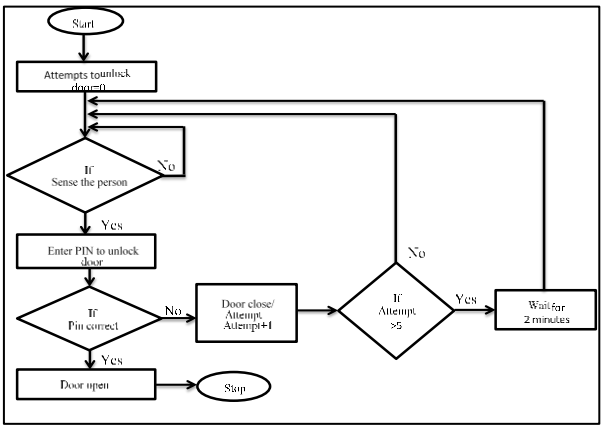
Fig. 1: Diagram of Implementation of IoT with Cloud & Hardware

Sensors are embedded in home to fetch data. Data is the change in environment conditions and surroundings. The job of sensors is to provide flux of data to Central Control Unit (CCU) continuously, for e.g. change in daylight, temperature, moisture etc. One of the objectives of this project is the easy accessibility of home appliances by using web page. Irrespective of data, sensors provides to CCU, the user can still control the fan speed, intensity of light on his own by sending commands from webpage in the way user desire. Commands could be the instruction to switch on and off the light, fan and other devices.

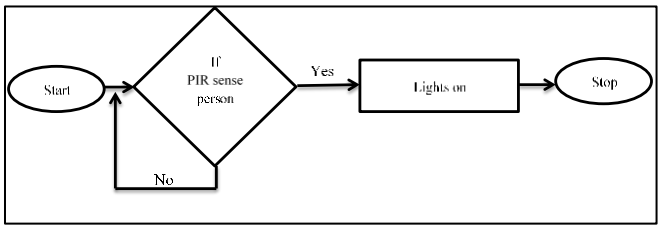
Data provided by sensors and user commands generated from smartphone are wirelessly send to cloud, from cloud data is send to CCU. It compares the data it receives from sensors to certain limit and decides to initiate some action, for e.g. Light Detecting Sensor at the door sends data to Control Unit. It compares the data to some user defined value and if it is below that level, the light will glow. Smartphone generated commands requires no decision making from Control Unit. It will straight away initiate action corresponding to commands. Hence, it can be seen that user need not worry about switching on/off Light, Fan, and AC etc. The command of home does lie in the hand of the user.

VII. FLOW CHART

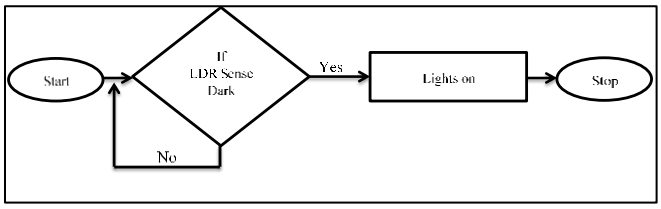
A. Pin Protected Door



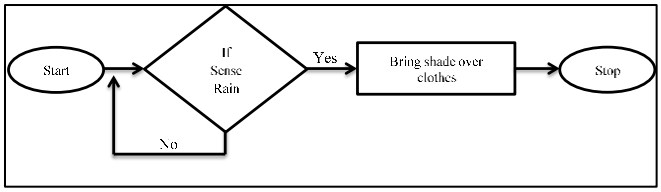
B. Automatic Light (Indoor)



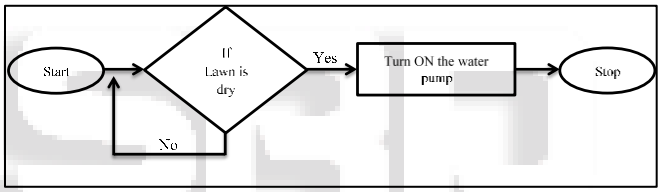
C. Automatic Light (Outdoor)



D. Rain Sensing



E. Water Supply



VIII. CONCLUSION

IOT Based Digital Smart Home Provides easy access of Home Appliances and monitoring of Home from anywhere around the globe with security with the help of IOT (Internet of Technology) Technology. For this we require some Hardware and a cloud server to communicate from Smartphone to Microcontroller so that controlling and monitoring can be happen in efficient and smart way. IOT based Digital Smart Home provides highly secure and smart features in house so that day to day life can be easy and wastage of power can be avoided with the help of Smart sensors Remote control features.

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