

Artificial Intelligence Smart Home

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ABSTRACT: In recent years, the field of Internet of Things (IoT) and Artificial Intelligence has seen significant investments made by the research community and the industry. Specifically, the Smart Home space has been a prime focus with the introduction of devices such as Amazon Echo, Google Home, Samsung Smart Things among others. The growth of an industry results in innovative, economic, and advanced solutions. In this paper, we focus on making non-smart homes smart and how to build a robust, cost-effective system that can be widely used. We power our system using Amazon's cloud services, its speech services. A Raspberry Pi 3 is used as the hardware component for providing smart features for non-smart homes. We describe the different components of our product and we show that our system works effectively to switch on and switch off our appliances.

Keywords -IoT, Smart Home, Artificial Intelligence, Amazon Alexa

I. INTRODUCTION

Now a days, human's life and work are step by step constricted with the quick growth in technology. The society that is changing into info has modified the manner of lifetime of human being's additionally to challenged ancient residence & it's caudate by the fast-economic growth, customary of living keeps rising up day by day in order that the folks have higher necessities for habitation functions. This intellectual society brings swollen info wherever economic, safe, convenient and cozy life has become the right for each trendy family. The construct of the house automation has absorbed the eye of practitioners, lifestyle, customers and also the researchers to be radio-controlled towards the usage of recent technology. therefore, right smart efforts are created for the event of many remote-control systems used for the house automation.

One or additional computers accustomed management home atmosphere mechanically is mostly known as as "Home automation", which can include appliances, centralized management of lighting, HVAC(heating, ventilation and air conditioning)& different systems, to supply increased comfort, security, convenience and energy potency. typically we tend to known as Home Automation as "Smart Home".

Smart Home will offer increased manner of life for aged and physically disabled folks else they need caregivers or the other institutional care. it'll additionally offer a isolated interface to the house appliances or to automation system itself, as an example over phone phone line, over the net or wireless transmission, to supply watching and management. Here during this paper describe the approach that we tend to are implementing to manage varied home appliances with Alexa and Amazon Echo.



Fig.1.1 AI Smart Home

A. LITERATURE SURVEY

Currently there's no cheap system exists. many systems were exhausting to put in, and tough to take care of and use them. Current systems square measure usually proprietary and that they square measure closed which suggests we tend to cannot modify them by our own additionally they're not terribly customizable by the tip user.

B. RELATED WORK

In this segment, we are going to show several systems out there in the market and additionally the recent advancements made as more research is going on. Most of the systems these days will be integrated with IFTTT. To give some context to the reader, IFTTT is that the contraction of If This, and cheap thanks to start with intelligent lighting.

It permits you to control/manage the lights of your home using Internet and your voice. It is part of IoT (Internet of Things) area wherever many services may be integrated to produce a strong solution. The following are some of the good home products out there these days.

C. TECHNOLOGY STACK

In this project, we've added several technical parts and established a seamless operation among them. Our technological stack is as follows.

Physical Layer: Which includes of the devices with which user interacts.

- Raspberry Pi - enabled with WLAN
- Amazon Echo

Application Layer: This layer consists of these components:

- Alexa Skills Kit
- Amazon WebServices (AWS)Lambda

Programming Layer: The supply codes of all our programs were written in Python

The technical stack is explained in the following sections.



Fig.1.2 Echo Device

D. PROPOSED SYSTEM



Fig 1.3 Proposed System For Alexa



Fig2.2 Raspberry pi3

Graphical Liquid Crystal Display:

The 16x2 Character LCDs have their own limitations; they will only show characters of firm dimensions. The Graphical LCDs were accustomed show customized characters and photos. The Graphical LCDs notice use in many applications; they are utilized in video games, mobile phones, lifts etc. as show units.

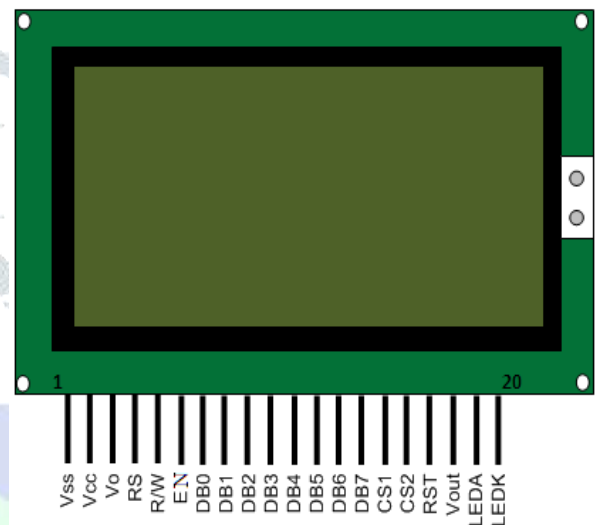


Fig 2.3 Graphical Liquid Crystal Display Gas & Smoke Sensor

MQ-5 gas is acombustive smoke detector and high sensitivity liquefied gas detector, also has a elegant driver circuit, used in gas detecting of LPG of a leakage detecting equipment,iso-butane, LNG combustibile gases,propane. The sensor does not provide measurement with cooking fumes, thenoise of alcohol, and Cigarette smoke.



- 1 = Output
- 2 = Vcc (positive voltage)
- 3 = Gnd

Fig2.4 Gas & Smoke Sensor

LDR Sensor

LDR refers to Light Dependent Resistor which is also called as photo resistor. By this we can vary resistance value based on light intensity.

II. HARDWARE DESIGN

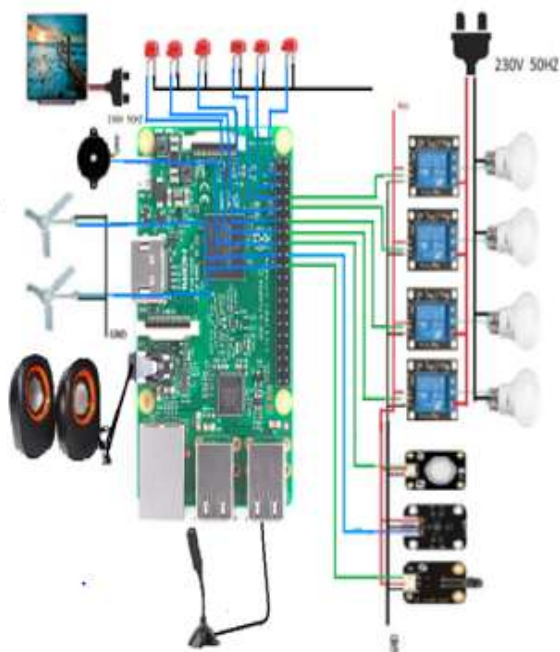


Fig2.1 Hardware setup

Our system as User, Raspberry Pi and Alexa Voice Service, Amazon Echo. In this section, each component's role which is used to function the system will be explained in this section.

Raspberry pi3

Here we are using Raspberry pi which is more accurate and faster to control any type of operation since we are using Rasbian OS.



Fig.2.5 LDR

Fire Sensor

This sensing element uses IR technology, that were used for fire detection at short distance and are often used for monitoring purpose or can be used for devices to be on/off (as a safety provision). This device is tested and up to 3feet it's a lot of correct. If you would like to test the Flame detector to see it's working properly then the VCC pin is coupled to a 5v power supply and GND pin is connected to Ground.



Fig 2.6 Fire Sensor

Relays



Fig 2.7 Relay

A relay is nothing but an electrical switch which will be controlled by other electrical circuit to on and off, usually an electromagnet controls the switch to close or open. This relay has many number of links or one link to other internal circuits. To manipulate the output circuit of high power than the input circuit this device does the work for us, and if you think in generally it's just like an amplifier.

Speakers

Here we are using speakers which a part of alexa echo dot to give acknowledgement in the form of sound.



Fig2.8 Speaker

III. SOFTWARE DESCRIPTION

Platform and Language Used:

- 1) IoT platform for PubNub Services
- 2) Alexa Voice Service
- 3) Linux based Raspbian OS
- 4) Python programming language

PubNub Services

Securely monitor, control, provision and stream data between smart devices, sensor networks, hubs, and more. Trigger device action, monitor meta data, or stream and process incoming and outgoing data. PubNub provides the infrastructure and APIs for communication for any size IoT deployment.

Alexa Voice Service (AVS)

Alexa Voice Service is that the nice voice management service that powers the device, Amazon Echo. Alexa uses language methodology methods trained by the programmers and in addition the user Amazon community to runs user requests and cater to their individual wants. "Alexa" is that the keyword accustomed trigger voice service.

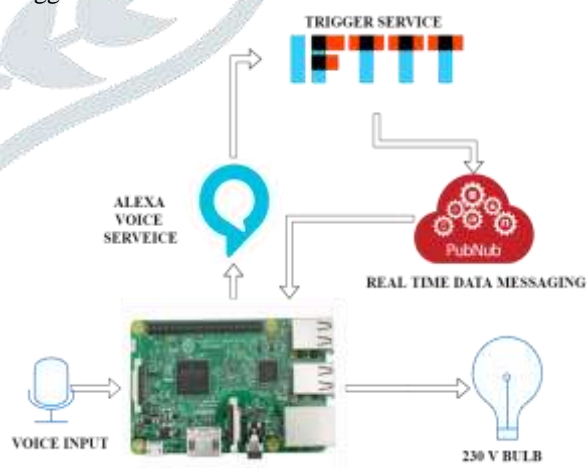


Fig 3.1 Pubnub and AVS services

Raspbian

Raspbian is this recommended operating system for normal use on a Raspberry Pi. Raspbian is a free operating system based on Debian, optimized for this Raspberry Pi hardware. Raspbian comes accompanied by over 35,000 packages; precompiled software bundled in a nice format for easy installation on your Raspberry Pi.

Python:

Python is a powerful high-level, object-oriented programming language created by Guido van Rossum. It has simple easy-to-use syntax, making it this perfect language for someone trying to learn computer programming for this first time.

IV. RESULTS

When we give command "TRIGGER TURN ON THE HALL LIGHT" from the Alexa, the load connected to the relay1 (in case here Light) will ON, Similarly when we give command "



TRIGGER TURN OFF THE HALL LIGHT " from the Alexa, the load connected to the relay1 (in case here Light) will OFF.

Fig 4.1 Controlling Appliance1 Hall

Similarly when we give commands we can control all the appliances With the help of LDR we can control the lights, during the morning times lights will turned OFF and during evening times lights automatically turned ON.



Fig4.2 : Controlling All Appliances

V. CONCLUSION

Our prime objective is to help handicapped/old aged folks and there's additionally another objective is to present basic plan of the way to remotely monitor the door and to secure home from theives. This work provides basic plan of the way to management varied home appliances and supply a security mistreatment Alexa and. This project is predicated on Alexa and raspberry pi platform each of that ar python package. that the overall implementation value is extremely low-cost and it's reasonable by a standard person. gazing the present situation we've got chosen raspberry pi platform in order that most of the folks will get profit.

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