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Secure Smart Home System

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ABSTRACT

This paper presents the design and implementation of an Ethernet-based Smart Home system for monitoring the electrical energy consumption based upon the real time tracking devices at home and device RASPBERRY PI generation development board, which can be used in homes and societies. The proposed system works on real time monitoring and voice control, so that the electrical devices can be remotely controlled and monitored with or without an Android app. It uses various sensors not only monitor the real time device tracking but also maintaining the security of your house.

Keywords—Home automation System (HAS), Internet of Things (IoT), Cloud networking, Wi-Fi network, RASPBERRY PI kit.

I. INTRODUCTION

The Internet of Things is the network of "things" which are connected to a common network in order to communicate, exchange data & control each other. The network can be interconnected with the "things" being either embedded software, hardware or any sensor. IOT refers to the state where the things will have more and more data associated with them and has a ability to communicate, produce new information and become the integral part of the free world wide web. IOT not only features internet connectivity but also features cloud and data management, security management and all other fields concerned with the era of Internet.

II. LITERATURE SURVEY

IOT is generally divided into three layers: perception layer, network layer and application layer. This hierarchy determines that the design of security mechanisms of things should base on technical Characteristics of each layer. Data encryption technology aims to protect the confidentiality and also PKI (Public Key Infrastructure) to achieve two-way public key certificate based strong authentication can resolve the physical authentication problem in IOT.

Smart things is the easiest way to turn your home into a smart home like a monitor, control and secure your home from anywhere. To incorporate strong security in deploying IOT for smart home system, together with due to consideration given to user convenience in operating the system. The IOT smart home system runs on convection Wi-Fi network. A Wi-Fi gateway is to use as centre node of the system to perform the system initial configuration.

It is responsible for authenticating the communication between the IOT devices as well as providing a mean for the user setup, access control the software through Android based mobile device. Security challenges in IOT include privacy, authentication and secure end to end connection and proposed system uses a gateway to provide a better authentication process.

III. EXISTING SYSTEM

Some of the related works in the field of Home Automation are listed below.

LEVITON

Levi ton provides you products that keep you safe, automate your everyday tasks, manage energy usage and provide a comfortable lifestyle. It features different packages for different income levels and so goes easy on your pocket by simply choosing the automation, energy management, and convenience features as per your

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needs. Levi ton systems can be controlled by your Smartphone and can be suitably installed in new or existing.

Lumina RF Eco-System

This system is intended for commercial applications where the main focus is on energy management in a simple way in order to lessen the business interruption. The services are free of cost and are centrally controlled by a single app and used by franchisees. Omni Security & Automation Systems This service is created for residences and commercial applications providing features like security, access control, video surveillance, temperature control, lighting control, automation of appliances and many more. Third party integrations grow the platform even further by using Z-Wave, Xbee and other communication protocols.

Bitwise AV

It is a perfect system to integrate automated boardrooms, classrooms, lecture halls, movie theaters, offices etc. It utilizes a custom interface to control all audio/video components and also control lightning levels, temperature, and even Omni Security systems.

HONEYWELL HOME AUTOMATION

Home automation features a comfortable automation that extends to automatic temperature control based upon the weather conditions, automatic control of lights according to the sunlight, unlocking your door through your Smartphone and many more other features. Honeywell can bring your home to life with a customized and robust solution to work with your lifestyle and adjust according to your growing needs.

IV. PROPOSED SYSTEM

The proposed secure home automation system has the capabilities to control the following components in users home and monitor the following alarms:

- Temperature and humidity.
- Motion detection.
- Fire and smoke detection.
- Light level.

The proposed home automation system can control the following appliance:

- Lights On/Off/Dim.
- Fan On/Off.
- On/Off different appliance.

V. SYSTEM DESIGN AND IMPLEMENTATION

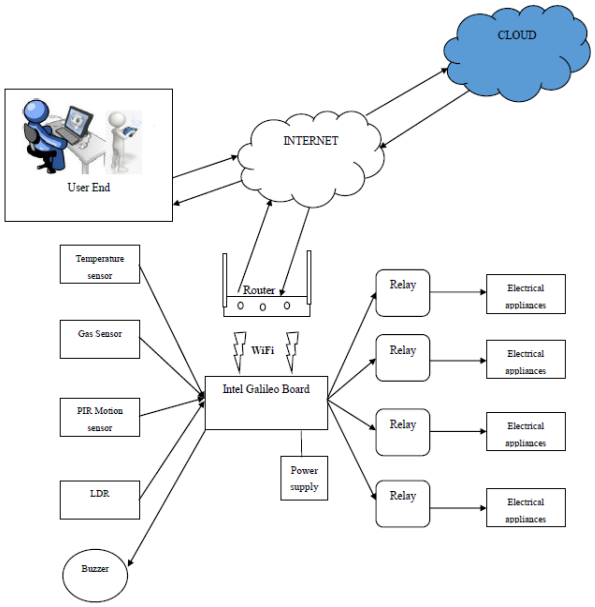

Fig1. Architecture Diagram

The user can operate the RASPBERRY PI through the internet. This raspberry pi is connected through Wi-Fi.

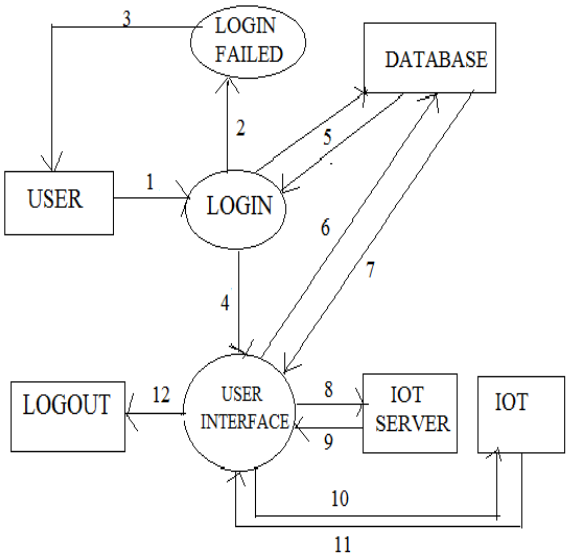

Fig2. Data flow Diagram

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STEPS

- Request for login.
- Login fail.
- Return to login page.
- Login successful.
- Checking the authentication in the data base.
- Storing into database.
- Retrieving from the database.
- Requesting for the ticket for IOT server to establishing the communication between user and IOT (RASPBERRY PI).
- Sends ticket to the user.
- Sends the command to be performed along with the ticket.
- Returns the acknowledgment of action performed.
- Users can logout.

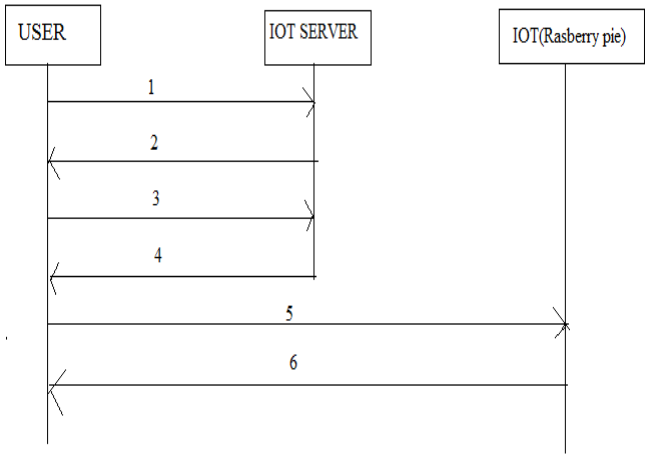

Fig3. Sequence Diagram

STEPS

1. User logins and request for the ticket to IOT server to establish communication between user and IOT (raspberry pie).
2. IOT server creates a ticket which is encrypted by user public key and sent to user.
3. User decrypts it using his private key and hashes it using hashing function and sends to IOT server.
4. IOT server sends acknowledgment back to server.
5. Now a secure connection is established between user and IOT (RASPBERRY PI). User sends the ticket and a command to be operated.
6. In-return the IOT (RASPBERRY PI) sends an acknowledgment back to user.

VI. CONCLUSION AND FUTURE ENHANCEMENT

This paper provides an efficient security protocol for the Internet of Things through IOT App. The proposed system given has proved to be a better way of energy and security management. The main idea of this system is to monitor the energy usage and security of the house in a user friendly and a mobile way so that a user can manage the power management as well as security of their house even when not at the house itself.

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