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TALKING ENERGY METER

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ABSTRACT

In recent times, by the usage of different household appliances the need for electricity has been increased and at the same time consumers has no idea about their consumption as the demand for electricity increasing day by day there should be a proper awareness to the people. Generally, an energy meter is a device which measures the total energy consumed by the different appliances. The drawback of existing system is that it does not provide voice alert/ SMS to the user. The main aim of our work is to design a circuit which gives the information about unit consumption to the buyers as well as it will help to the illiterates and busy people by giving voice alert. Voice alert may be in any language hence it can be used in any place. This work uses ATMEGA328 micro controller system which helps to blind people to know about their consumption by giving voice alert. Now a day's power theft has become a major problem in electricity transmission and distribution. Many people are consuming power without paying a single rupee to the board. We need to avoid it by power theft detection using current sensor.

KEYWORDS

Energy meter, Current sensor, Meter tampering, Arduino, LCD, Voice module speaker, GSM module.

INTRODUCTION

This work is aims to design a circuit which helps the consumer in taking care of the electrical energy consumption.

The purpose of this work is to build a KWH (Kilo Watt Hour) meter that can alert the users with voice messages. An Energy meter or KWH meter is a device that monitor the KWH readings into the thingspeak cloud through VOICE.

The "**Talking Energy Meter**" using Arduino Uno Microcontroller is an exclusive system which is used to help the blind people to announce their requirements using voice module aPR33A3.This system will detects power theft and it will send this information to the electricity department via SMS through GSM and also give the voice alert to the user. The power status (KWH readings) can be monitor into the thingspeak cloud through esp8266 Wi-Fi module. The status of the work will display on LCD module.

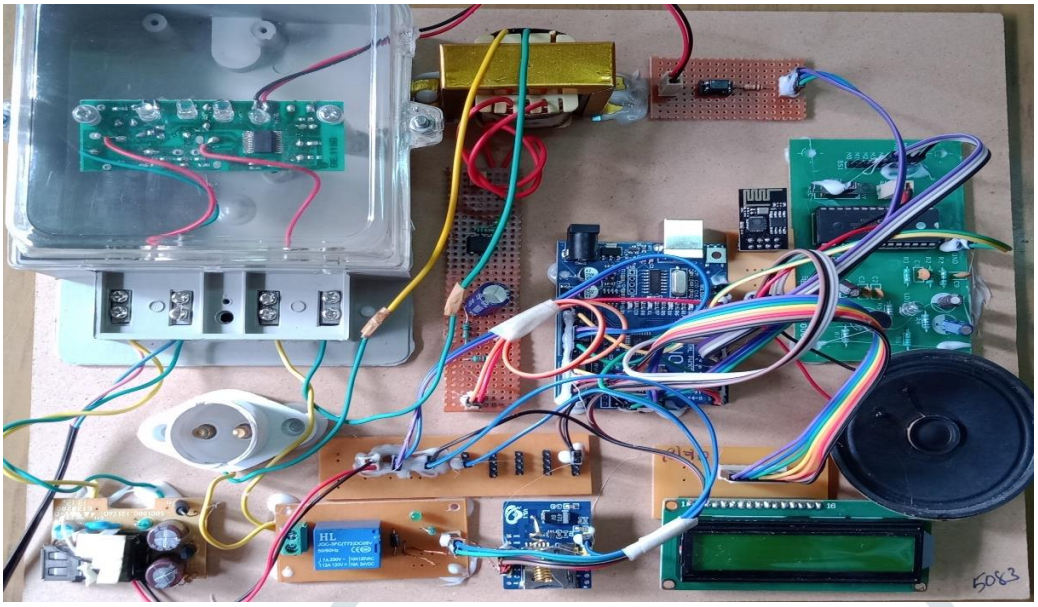

Figure.1 Talking Energy Meter

EXPERIMENTAL SECTION:

i. Equipment's/The main blocks of this work are:

- Regulated power supply with voltage regulator
- Energy meter
- LCD display
- Voice circuit
- Optocoupler
- GSM
- Arduino UNO
- ESP8266 Wi-Fi module
- CURRENT SENSOR
- LED indicators

ii. Working:

For this experiment we divide the working into two parts

a. Working at the Energy Meter
b. Working at Thingspeak platform

Working At The Energy Meter:

- The main controlling device of the work is ARDUINO UNO microcontroller.
- The "**Talking Energy Meter**" using Arduino Uno Microcontroller is an exclusive system which is used to help the blind people to announce their requirements using voice module aPR33A3.
- This system will give us alert SMS through GSM modem and it also give the voice alert if we cross the threshold limit and display on LCD screen.

- This system will detect power theft and it will send this information to the electricity department via SMS through GSM and also give the voice alert to the user.
- The status of the work will display on LCD module.

Software's Used**:**

- ARDUINO IDE compiler for dumping the code into the microcontroller.
- Embedded C programming.
- Express SCH for Circuit design.

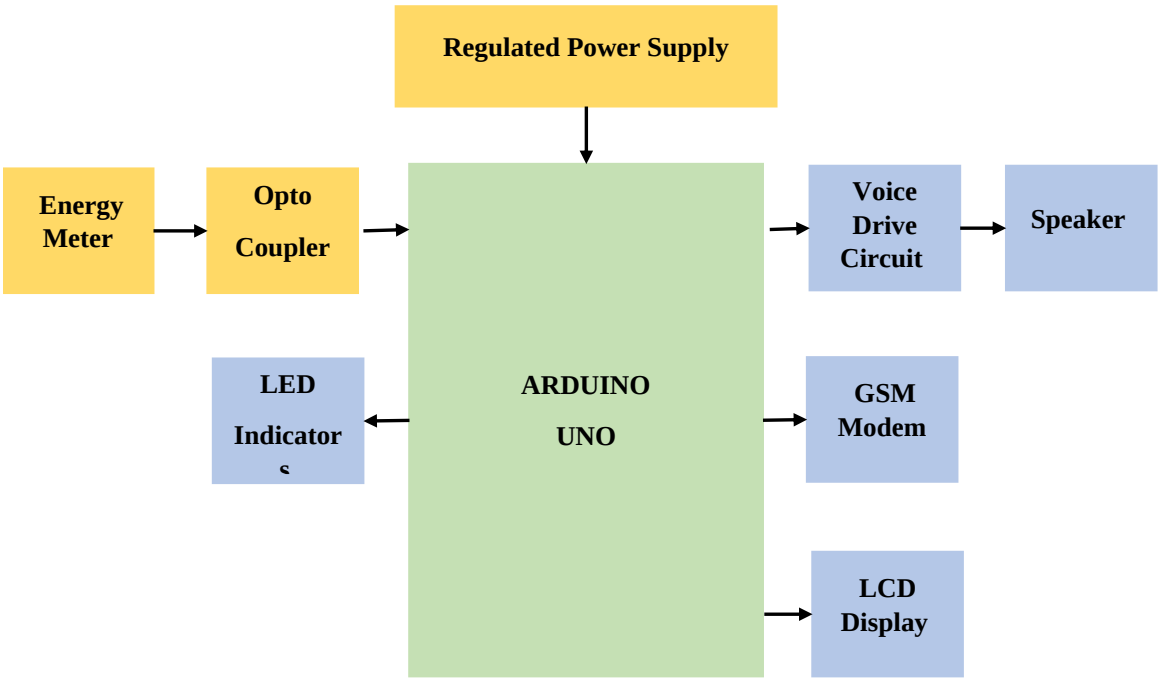

Figure.2 Block Diagram

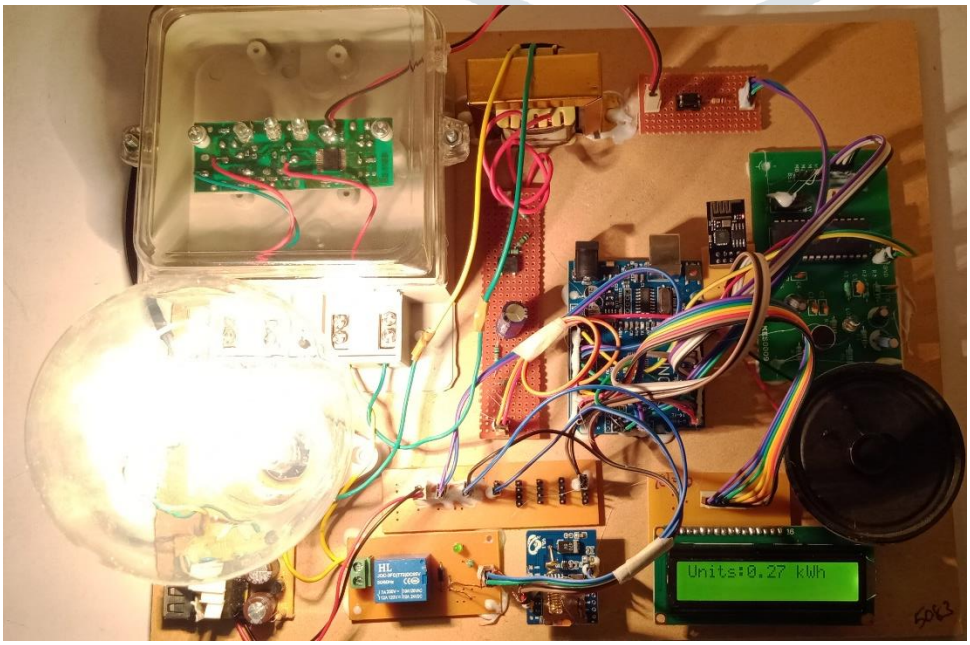

Figure.3 Talking Energy Meter Working

Figure.4 LCD Display while working

FLOWCHART OF CODE AT ENERGY METER:

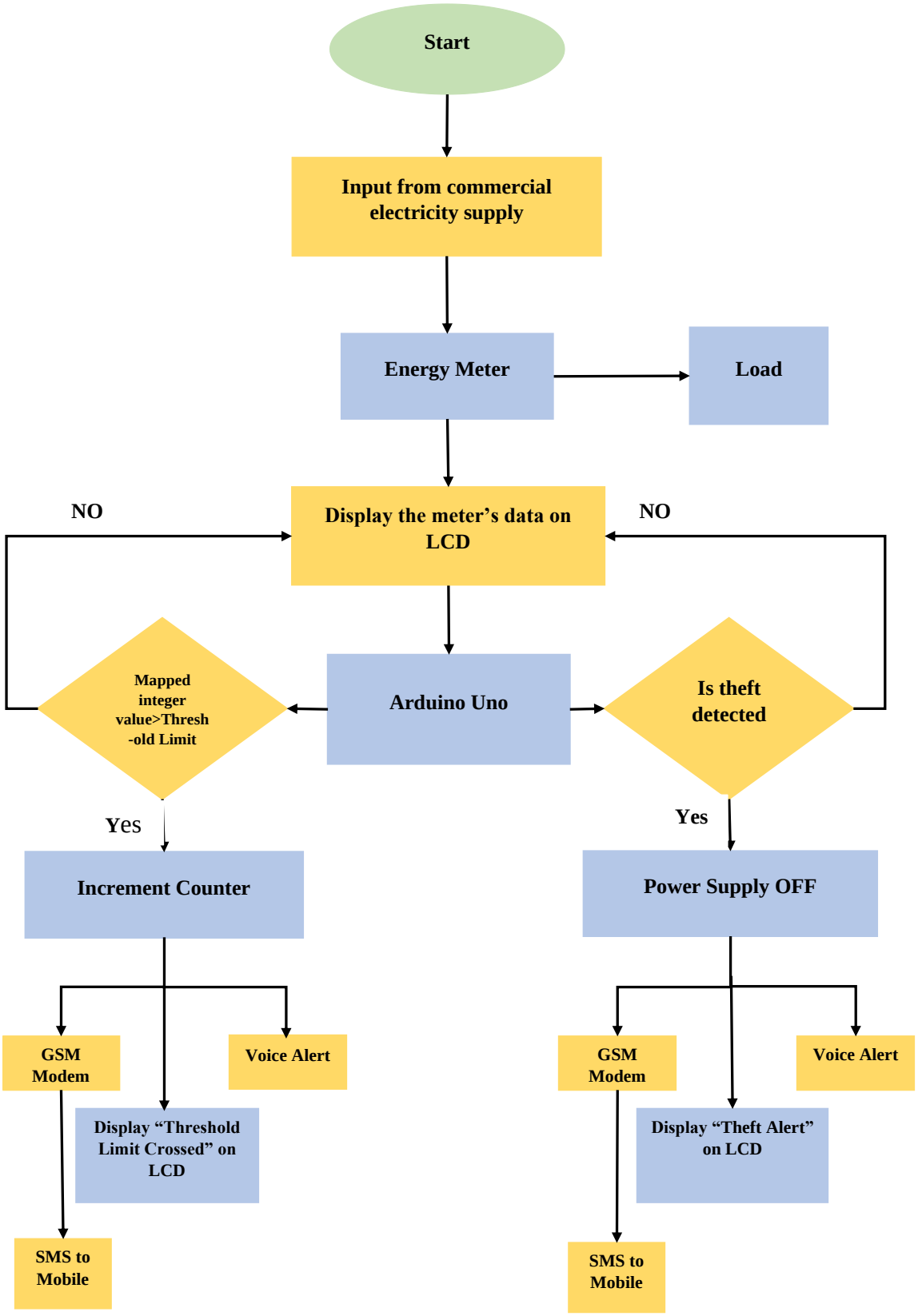

Figure.5 Flowchart of code at Energy Meter

Working at Thingspeak platform:

- The Internet of Things (IoT) is a system of 'connected things'. The things generally comprise of an embedded operating system and an ability to communicate with the internet or with the neighboring things. One of the key elements of a generic IoT system that bridges the various 'things' is an IoT service. An interesting implication from the 'things'

comprising the IoT systems is that the things by themselves cannot do anything. At a bare minimum, they should have an ability to connect to other 'things'. But the real power of IoT is harnessed when the things connect to a 'service' either directly or via other 'things'. In such systems, the service plays the role of an invisible manager by providing capabilities ranging from simple data collection and monitoring to complex data analytics.

- The below **Diagram illustrates where an IoT service fits in an IoT ecosystem:**

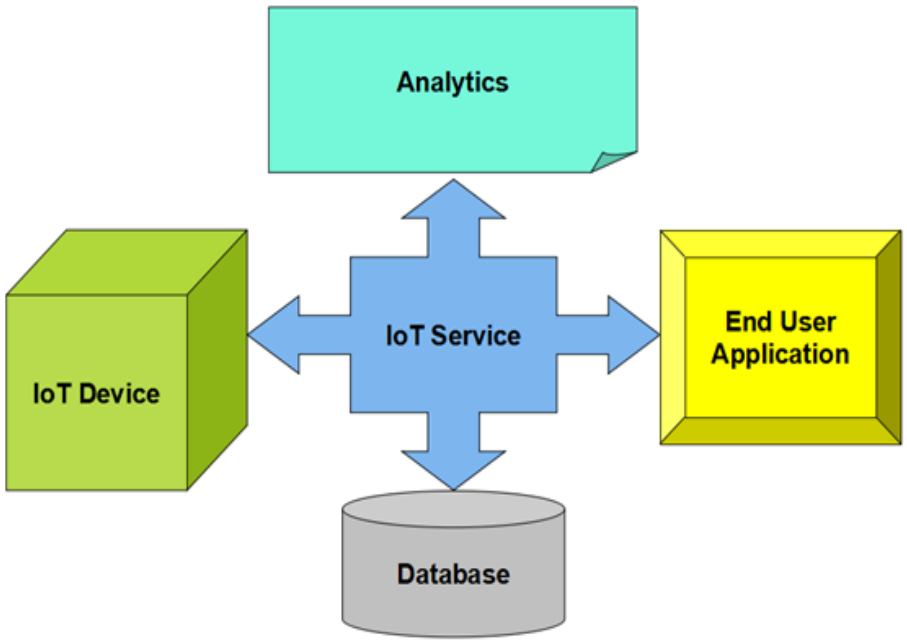

Figure.6 IOT Service

- One such IoT application platform that offers a wide variety of analysis, monitoring and counter-action capabilities is 'ThingSpeak'. Let us consider ThingSpeak in detail.

What is ThingSpeak

ThingSpeak is a platform providing various services exclusively targeted for building IoT applications. It offers the capabilities of real-time data collection, visualizing the collected data in the form of charts, ability to create plugins and apps for collaborating with web services, social network and other APIs. We will consider each of these features in detail below.

The core element of ThingSpeak is a 'ThingSpeak Channel'. A channel stores the data that we send to ThingSpeak and comprises of the below elements:

- 8 fields for storing data of any type - These can be used to store the data from a sensor or from an embedded device.
- 3 location fields - Can be used to store the latitude, longitude and the elevation. These are very useful for tracking a moving device.
- 1 status field - A short message to describe the data stored in the channel.

To use ThingSpeak, we need to signup and create a channel. Once we have a channel, we can send the data, allow ThingSpeak to process it and also retrieve the same. Let us start exploring ThingSpeak by signing up and setting up a channel.

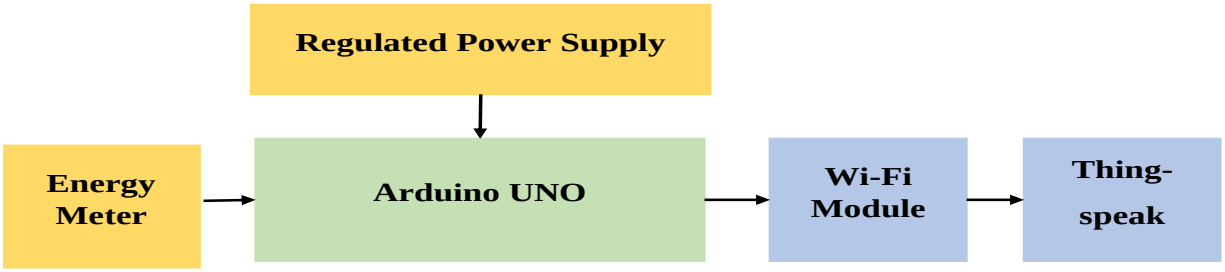

Figure.7 Block Diagram through Wi-Fi Module

- The power status (KWH readings) can be monitor into the thingspeak cloud through esp8266 Wi-Fi module.
- ThingSpeak is an IoT analytics platform service that allows our to aggregate, visualize, and analyze live data streams in the cloud.

FLOWCHART OF CODE AT THINGSPEAK:

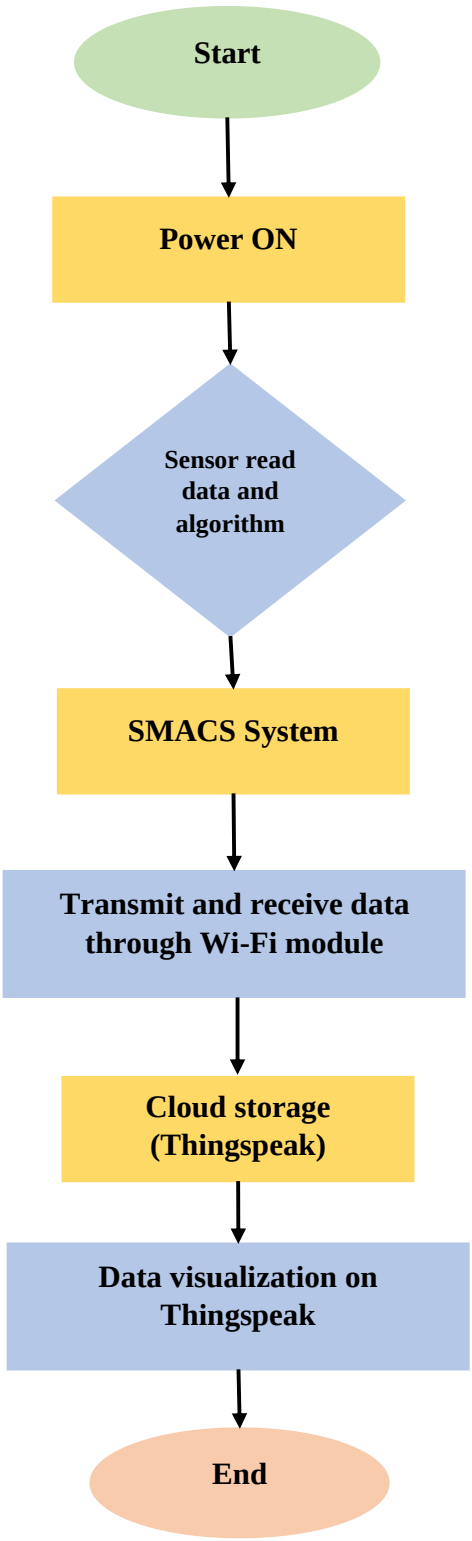

Figure.8 Flowchart of code at THINGSPEAK platform

Figure.9 LCD Display

CONCLUSION

It concludes that, Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the work has been successfully implemented. Thus the work has been successfully designed and tested. This "Talking Energy Meter" can be updated in future by adding circuit breaker if the system detects over load.

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