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ENERGY EFFICIENT in GPS SENSING

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Abstract - Location is a fundamental service for mobile computing. Typical GPS receivers, although widely available for navigation purposes, may consume too much energy to be useful for many applications. So here focusing to consume less power energy and at the same time geolocation and time of GPS should get updated. Reducing the ON timing thereby reducing the energy efficient of the GPS module in any application. By keep it on for 50% and off for 50% pulse width modulation signal as a input to GPS from the Microcontroller and can able to reduce the power consumed by GPS module. In addition it can be able to track a person location and additional information tracked based on enhancement of this module

Key Words: **GPS**, Microcontroller, Pulse width Modulation,

1. INTRODUCTION

Fundamental principle for mobile computing is location based service. Typical GPS receivers, although widely available for navigation purposes, may consume too much energy to be useful for many applications. Location information can be post-processed if data is uploaded to a server, we design a cloud-offloaded GPS solution that allows a sensing device to aggressively duty-cycle its GPS receiver and log just enough raw GPS signal for post-processing.

Main reasons for the high energy consumption of GPS receivers: 1) the time and satellite trajectory information (called Ephemeris) are sent from the satellites at a data rate as low as 50 bps. A standalone GPS receiver has to be turned on for up to 30 seconds to receive the full data packets from satellites for computing its location. 2) The amount of signal processing required acquiring and tracking satellites due to weak signal strengths.

Leveraging available information such as Location based Services (Cellular Tower), a cloud service can derive good quality GPS locations from a few milliseconds of raw data.Using our design of a portable sensing device platform in hardware board, we evaluate the accuracy and efficiency of the solution.

1.1 Objective

a) Controlling the power signal applied to GPS so that we can save energy and it can be used by some other modules in our application.

b) 50 % of PWM is applied to GPS module to save 50 % of energy from normal uses

1.2 Limitations

a) Many mobile sensing applications are delay-tolerant. Instead of determining the location at the time that each data sample is collected, we can compute the locations off-line after the data is uploaded to server. This is quite different from the turn-by-turn
b) The benefit is even more significant if the data uploading energy is amortized over many data samples.
c) Much of the information necessary to compute the location of a GPS receiver is available on line.
d) Code phases can be derived from any millisecond of satellite signal. If we can derive location without decoding any data from the satellites, there is significant opportunity to duty-cycle the receiver.
e) Comparing the constraints on processing power and energy consumption, storage is relatively cheaper to put on sensor devices, so we can store raw GPS Intermediate Frequency (IF) signals together with sensor data.

2. System Description

The module consisting of Arduino Uno microcontroller, used to control entire operation. GPS module consists of receiver and a transmitter which can provide the exact location. Intel Lumisense Board (IOT) device which supports both GSM and PC where it can upload the data into the server. LCD display which can display the output of the power consumed. Transformer of 12V which can regulate the uniform power supply. Battery support also provided to ensure the uniform power supply without disruption.

Below are the Block Diagram for Energy Efficient in GPS sensing.

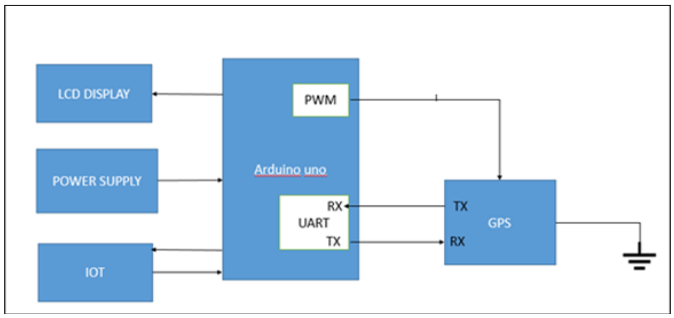

Fig 1: Block Diagram of system

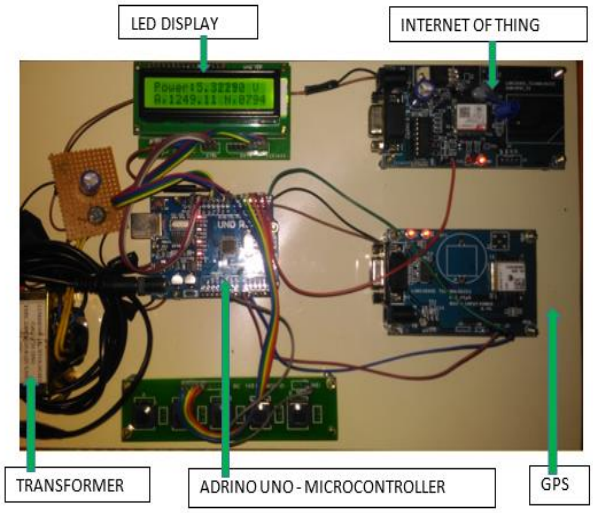

Fig -2: Energy Efficient in GPS Sensing Board

2.1 Softwares.

Arduino - This software is mainly used to activate ATmega 328 microcontroller according to the input received by it. "Embedded C" code is written using this work bench. In this project, coding is written for GPS and IOT circuit which is interfaced with ATmega328 board at the transmitter end. The controller will communicate with the interfaced modules through AT commands.

NetBeans -Application in web page is created using NetBeans software. Java language is preferred as the basic platform for application creation. In this project application named "WEB" is created using NetBeans which enables the parents at receiving end to visually see the place in Google map corresponding to the position of their child at the transmitting end.

FEATURES

NetBeans IDE
Reduces Development and Testing Time

- Makes User Interface-Creation easier
- Makes Application Description Easier

Programming Language(s)

- Java – officially supported
- C/C++ – also possible but not supported

2.2 Methodology

Arduino Uno is connected to Power sources and its output captured in LCD display. Microcontroller programmed in such way it control the entire operation of IOT board and GPS module.12V DC transformer gives the Power supply to all the circuits. Actual power required for GPS module is 5V when it is in idle state. 50 % duty cycle Pulse width modulation given to the microcontroller in order to regulate the Power supply. Hence GPS will take utilize lesser power during the idle state and during that period it will transfer data to IOT board. This IOT board has provision for mobile GSM based on the Mobile services it will connect to the nearest location and connected the data storage. In the webpage data were captured for power values and location details like Latitude and Longitude.

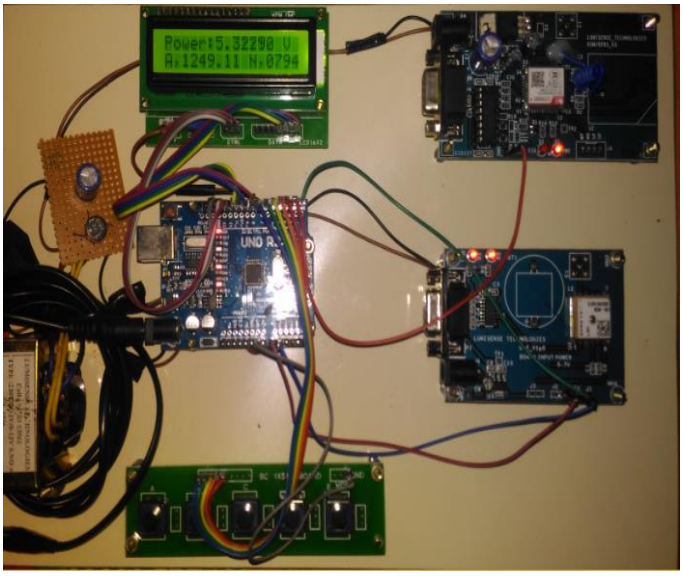

Fig -3: Energy Efficient in GPS Sensing without PWM

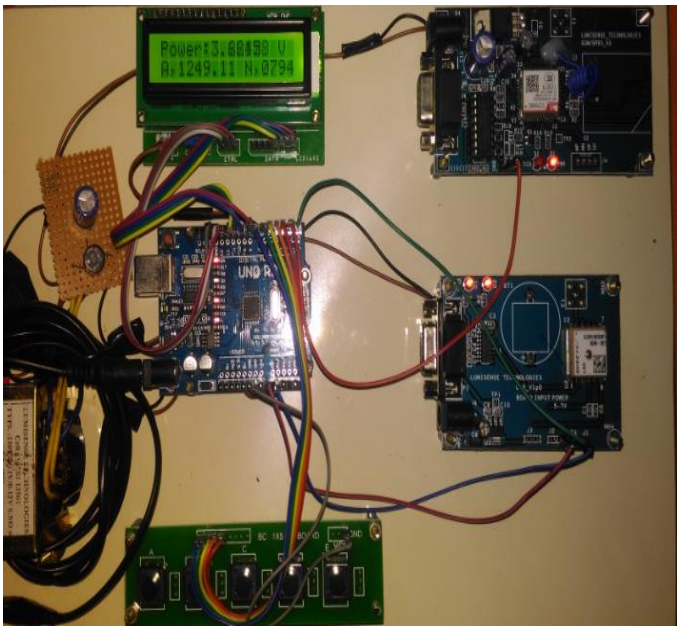

Fig -4: Energy Efficient in GPS Sensing with PWM

LogID	Power	Latitude	Longitude	Logdate	LogTime
1	5.1845	A,1259.24	N,08011.	05/12/2017	12:27:12
2	3.2845	A,1259.24	N,08011.	05/12/2017	12:27:59
3	5.6845	A,1259.24	N,08011.	05/12/2017	12:29:05
4	3.4815	A,1259.24	N,08011.	05/12/2017	12:29:35
5	5.3815	A,1259.24	N,08011.	05/12/2017	12:30:10
6	3.3862	A,1259.24	N,08011.	05/12/2017	12:30:44

Fig -5: Data storage in Web page.

3. CONCLUSIONS

This project focuses on tracking of person's position and its location is sent to the web page and also capturing power consumption of system. It can be extended to health level tracking of person, weather monitoring of that location. The working of this system can also be extended by tracking the movement of missed person in deep sea fishing and wildlife tracking. Voice tracking system can be added as an additional feature which can give Signal alert can be given through voice alarm stating and can be tracking in web page. Advantages of High Energy saving, Offers Low cost and it can be used for collecting the multiple information based on the application used.

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BIOGRAPHIES

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