Anti Smuggling for Trees in Forest with Solar Power Generation

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ABSTRACT: As the biggest plants on the planets, they give us oxygen, carbon dioxide, stabilize the soil and give life to the worldn wildlife. Hence, we are coming across the smuggling of trees which are highly expensive like sandal, sagwan etc. To avoid such type of smuggling and to save the forest around the globe some preventive systems need to be developed. We are forming a system which can be used to restrict this smuggling.

KEYWORDS: micro controller, sensors, gsm, solar panel.

I. INTRODUCTION

In order to avoid the smuggling a system which consists of an electronic division is made. Each and every tree will have one small electronic division which consists of renesas microcontroller, three sensors, GSM and a solar power generator. There will be one area selected where the high cost trees are more. The data for those trees will be collected by this units. The information about the trees will be send by the GSM module to the server unit. At main server, there will be one authorized person who will receive the messages and can take actions accordingly to provide security.

II. PROPOSED SYSTEM

We are forming a system which can be used to avoid the smuggling of the trees which would in turn stop the deforestation and uphold the Environmental stability, which would help to solve one of the issues with the Global Warming. Each tree is having with one electronic division, which consists of Micro Controller, Flex Sensor, accelerometer sensor, TEMP sensor, Zigbee and GSM module. Tree cutting will be detected by flex sensor, accelerometer sensor. Communication between the trees and server will be done by GSM modulesMaintaining the Integrity of the Specifications

The system consists of two modules:
   a) Tree Unit.
   b) Main server unit.
a) Tree Unit: The tree unit is considered as the primary unit for the implementation of the system. This unit would consists of three sensors which is used to detect whether the trees are cut down or damaged with fire.
The three sensors are,

> 1). Accelerometer sensor
> 2). Flex sensor
> 3). Temperature sensor

b) Main server unit: This unit is used to display the data transmitted from the base tree unit. The main server would consist of GSM module which is nothing but the authorized persons mobile phone.
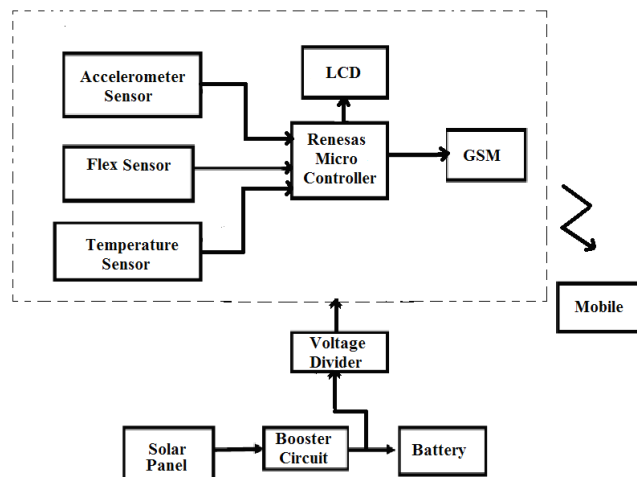
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III. BLOCK DIAGRAM

A. *Accelerometer sensor*

An accelerometer is a transducer that is used to measure the physical or measurable acceleration that is made by an object it is also called as vibrating sensor. Vibration sensors are used for the measurement of vibrations in the object due to any external forces. The ADXL335 is a complete 3-axis acceleration measurement system. The ADXL335 has a measurement range of ±3 g minimum. It contains a polysilicon surface-micro machined sensor and signal conditioning circuitry to implement an open-loop acceleration measurement architecture. The output signals are analog voltages that are proportional to acceleration. The accelerometer can measure the static acceleration of gravity in tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration.
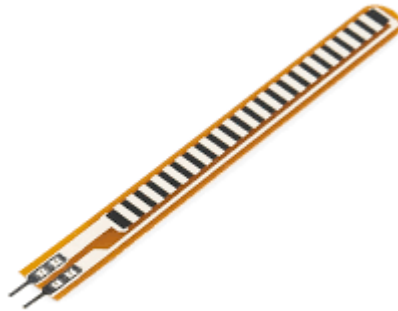

B. *Flex sensor*

A flex sensor or bend sensor is a sensor that measures the amount of deflection or bending. Usually the sensor is stuck to the surface, and if any changes in the object like bending then it will sense and produce an output. The flex sensor pictured below changes resistance when bent. It will only change resistance in one direction (out of the screen in relation to the picture below). An unflexed sensor has a resistance of about 10,000 ohms. As the flex sensor is bent, the resistance increases to 30-40 kohms at 90 degrees. The sensor measures 1/4 inch wide, 4-1/2 inches long and 0.19 inches thick.

C. *Temperature sensor*

Temperature sensor measure the amount of heat energy or even coldness that is generated by an object or system, then it senses the change in temperature and produces the analogue or digital output. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4\,^\circ$C at room temperature and $\pm 3/4\,^\circ$C over a full -55 to $+150\,^\circ$C temperature range. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

The LM35 can be applied easily in the same way as other integrated-circuit temperature sensors. It can be glued or cemented to a surface and its temperature will be within about $0.01\,^\circ$C of the surface temperature. This presumes that the ambient air temperature is almost the same as the surface temperature; if the air temperature were much higher or lower than the surface temperature, the actual temperature of the LM35 die would be at an intermediate temperature between the surface temperature and the air temperature.

D. *Renesas micro controller*

R5F100LEA microcontroller from renesas RL78 series, which is a 16-bit controller is used to implement this project, which controls the whole system. It contains the Flash ROM 64 KB, RAM 4 KB and Data Flash 4 KB and it has high speed on-chip oscillator, self-programmable under software control, 58 GPIO's, 3UART's simplified 12C, 10bit resolution ADC, 28 Interrupt sources, ISP Programming support etc.
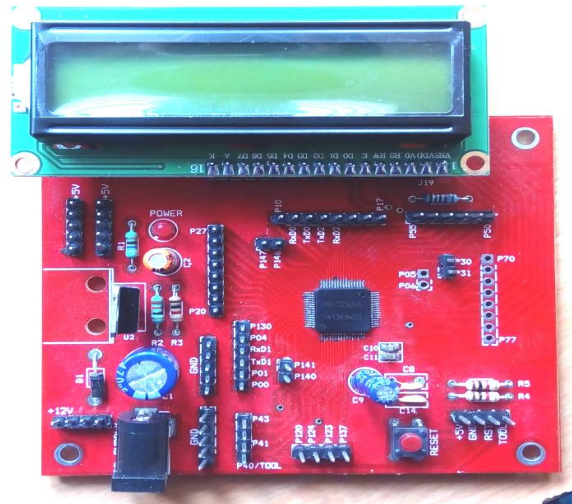
- General-purpose register: 8 bits $\times$ 32 registers (8 bits $\times$ 8   registers $\times$ 4 banks)
- ROM: 512 KB, RAM: 32 KB, Data flash memory: 8 KB On-   chip high-speed on-chip oscillator
- Different potential interface: Can connect to a 1.8/2.5/3 V device

E. GSM

GSM(Global System for Mobile Communication) is a technology which is mainly used for transmitting the signal to the concerned devices such as mobile phones.SIM900 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS 1900 MHz.SIM900 features GPRS multi-slot class 10/ class 8 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4.GSM can use AT Command to get information in SIM card.

*SIM900A provides a RF antenna interface***:** The "AT" or enter <CR>. Commands are usually followed by a response that includes."<CR><LF><response><CR><LF>".Throughout this document, only the responses are presented, <CR><LF> are omitted intentionally. "at" prefix must be set at the beginning of each command line. To terminate a command line.The SIM interface supports the functionality of the GSM Phase 1 specification and also supports the functionality of the new GSM Phase 2+ specification for FAST 64 kbps SIM (intended for use with a SIM application Tool-kit).Both 1.8V and 3.0V SIM Cards are supported. The SIM interface is powered from an internal regulator in the module having nominal voltage 2.8V. All pins reset as outputs driving low.
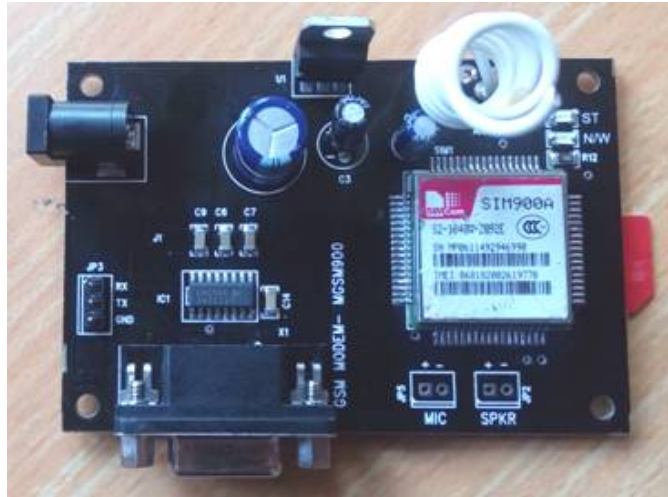
Syntax:
Command syntax: AT+CGMI

Command	Possible responses
AT+CGMI	FLYFOT MODEM
	OK
Note: Get manufacture identification	Note: Command valid, FLYFOT modem
AT+CGMI=?	OK
AT+CGMI?	+CME ERROR 3
AT+CGMI=1	Note: not support

F. Solar penal

The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Because a single solar panel can produce only a limited amount of power, many installations contain several panels.. Depending on construction, photovoltaic panels can produce electricity from a range of, but usually cannot cover the entire solar range (specifically, and low or diffused light). Hence much of the incident energy is wasted by solar panels, and they can give far higher efficiencies if illuminated with monochromatic light.

Therefore, another design concept is to split the light into different wavelength ranges and direct the beams onto different cells tuned to those ranges. This has been projected to be capable of raising efficiency by 50%.Currently the best achieved sunlight conversion rate (solar panel efficiency) is around 21% in commercial products, typically lower
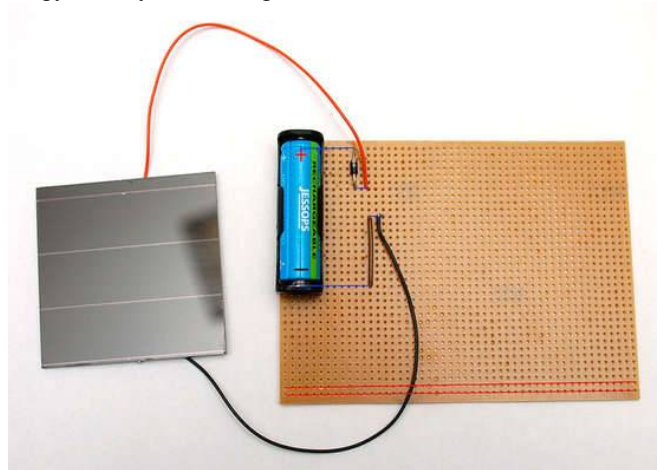
than the efficiencies of their cells in isolation. The of a solar panel is the efficiency described in terms of peak power output per unit of surface area, commonly expressed in units of watts per square foot (W/ft^2). The most efficient mass-produced solar panels have energy density values of greater than 13 W/ft^2 (140 W/m^2)

G. LCD

 LCD (Liquid Crystal Display) is used to display the happenings in the tree. It is used to display the information about the status of the tree.The LCD displays name or number of the tree,accelerometer sensor output,flex sensor output and displys the tree surrounding temperature.

H. Conculation

In this manner we are increasing the system which able to control the smuggling of trees in forestry where the human being not capable to provide security. Such system we are developing in the forest where the tree are costly and their safety is important fact. By this system, we can easily track the activities done by smugglers which in turn stop the deforestation and maintain the Environmental balance which would help to solve one of the issues with the global warming and to protect the wildlife. In this area we are provide such kind of system.

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