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Balloon Imaging Satellite

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Abstract: In urban areas, it has been long a challenge topic to automatically extract urban objects from images due to the high object density and scene complexity. Applying normal image processing methods could not achieve satisfied performance, especially for high-resolution satellite images. This paper presents a Balloon imaging satellite approach for building extraction from high-resolution satellite images by combining height data. Multiple cues derived from both data sources are integrated into our Balloon imaging satellite model to precisely control the movement of contours so that the boundary of buildings can be located with good accuracy and efficiency.

Keywords: GSM Model, LPC2148 Controller, LM35 Sensor, HS220 Sensor, IP Camera, Battery,

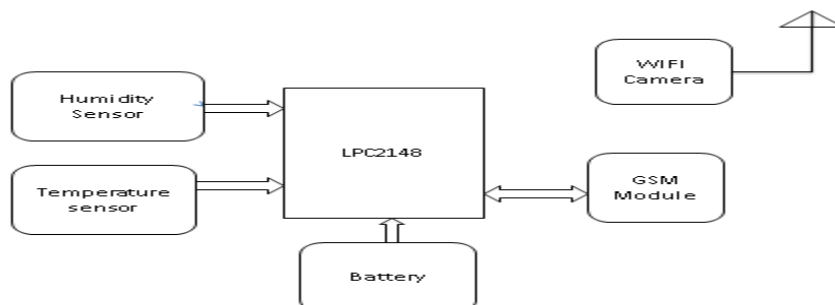
I. INTRODUCTION

The Balloon Satellite is made up of helium filled latex balloon with payload that has a variety of data acquisition instruments on board. The simplicity of a balloon satellite allows it to be operated with ease for atmospheric sensing temperature. Balloon satellites are ideal in telecommunication for transmitting and receiving data. In this project, we will take pictures of the house, surrounding of campus. It Snap aerial photos from 50-60feet up by suspending a hacked camera with 3 helium balloon. The use of balloon satellite provides aerial pictures. Users use balloon satellite for capturing pictures from any places where human can't reach. This project is also helps to measure the temperature and humidity present in air by using sensor. The output of sensor will come to GSM Modem through SMS [3]. A major goal of the team is to succeed in the educational aspect, while accomplishing missions that will be useful to the India government and space industry. The brightness of the surrounding area depends on the angle between the incident light and observer. It also observes the trend and changes in atmospheric condition. The primary purpose of our project was collect atmospheric data and topographic pictures and video. The atmospheric data was collected included humidity and temperature [5].

We are using the LM35 sensor and HS220 sensor which can detect the presence of Temperature and Humidity, when helium balloon goes up and up will change its output. This output is given to LPC2148 controller, which is the main building block of the system. Depending on the output of the sensors LPC2148 will perform actions which are given in the program by the programmer. That is, it will send the AT commands to GSM module to send message or to make a call to a predefined number given by the owner. Using IP Camera installed in laptop. We can see live video and also snap the pictures.

II. SYSTEM ARCHITECTURE

The below fig.1. shows the architecture of Balloon Imaging Satellite. It contains two types of sensors Temperature and Humidity sensors. These two sensors are used to detect the presence of temperature and humidity in the surrounding. When the sensor senses the presence of temperature and humidity it gives signal to the LPC2148 controller. When LPC2148 receives this signal & it will send message or makes call through GSM modem.



System architecture of Balloon Imaging Satellite

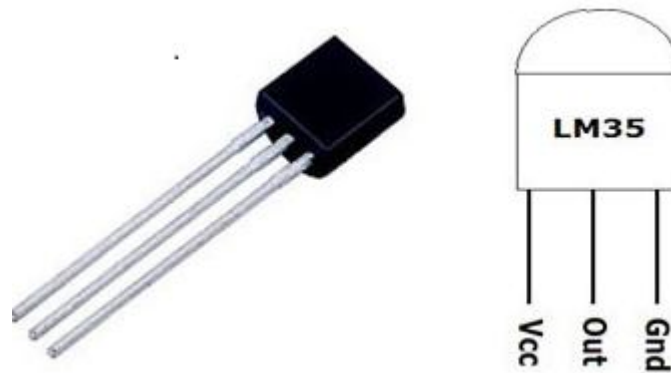
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A. LM35 Sensor(Temperature Sensor)

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius(Centigrade) temperature. The advantage of LM35 linear temperature sensors measured in ° Kelvin. The user is not required to reducing a large constant voltage from this output to achieving convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55 to $+150^{\circ}\text{C}$ temperature range. Confident by Low cost. The output impedance is low of LM35 also linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy.

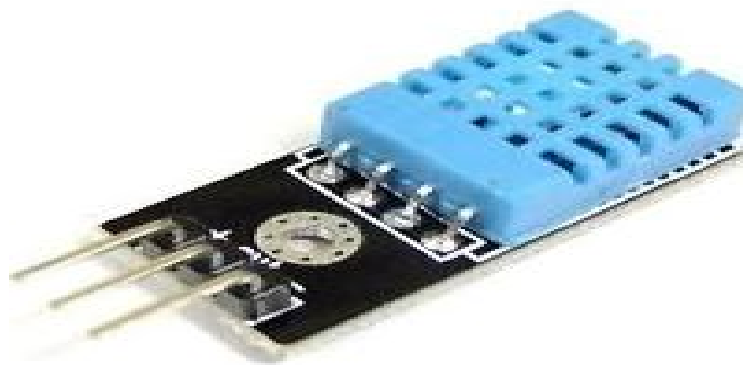
1) Features :

- a) Calibrated directly in ° Celsius (Centigrade)
- b) Linear + 10.0 mV/°C scale factor n 0.5°C accuracy guaranteeable (at +25°C)
- c) Rated for full -55° to $+150^{\circ}\text{C}$ range n Suitable for remote applications
- d) Low cost due to wafer-level trimming
- e) Operates from 4 to 30 volts n Less than 60 μA current drain



B. HS220 Sensor(Humidity Sensor)

Libratherm offers Economical, rugged, reliable and fairly accurate HS sensor (imported from Japan) model HS-220 for measuring Humidity in the atmosphere / environment / AHU or DHU Chamber. The sensor is easy to mount and comes with 2 meter PVC colour coded multicore cable. The sensor is housed in a rugged ABS enclosure. For Indication purpose, external digital display can be used with calibrated scale as given below in the technical specifications.



C. ARM Controller

16-bit/32-bit ARM 7 TDMI-S microcontroller in a tiny LQFP64 package. 8 KB to 40 KB of on-chip static RAM and 32 KB to 512 KB of on-chip flash memory 128-bit wide interface/accelerator enables high-speed 60 MHz operation. In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot load software. Single flash sector or full chip erase in 400 MS and programming of 256 bytes in 1 MS Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with then chip

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Real Monitor software and high-speed tracing of instruction execution USB 2. the LPC2146/48 provides 8 KB of on-chip RAM One or two .

D. GSM Mode

This GSM modem acts just like a mobile phone. The modem uses RS232 standard for communication. The modem connected to serial port of PC and controller. GSM modem is used to send and receive SMS or to make/receive voice calls. It can also be used as GPRS modem to use internet service. When LPC2148 receives signal from sensors it send AT commands to GSM modem to send message or make a call to a predefined number stored in program.

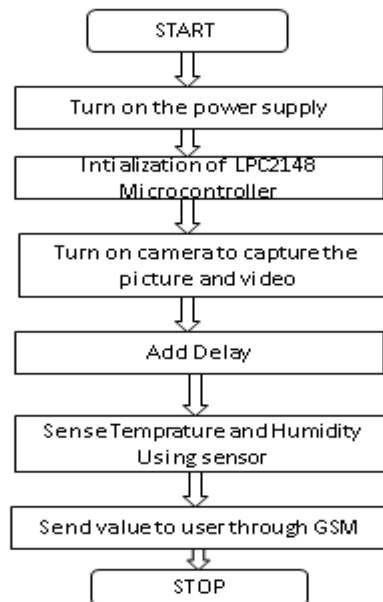
E. IP Camera

Camera1 is used to capture the image of intruder. When sensor sense the presence of intruder the Arduino sends command to camera to capture the image of that intruder and store to computer .

Camera is used to the live video streaming of intruder. When owner is out of this place then he easily see the status of this system that is live video stream in.

2 mega pixel security camera provide a resolution of 1080p that is equivalent to blue-ray quality. If you are looking for economical HD security camera ,then 2MP surveillance camera are a good starting point. There are 2 main type of 2MP camera .i.e 1080p IP camera and 1080p HDCN camera .the video capture by these camera allows for facial recognition up to 30ft at a wide 80 degree viewing angle.

Flowchart



III. SOFTWARE

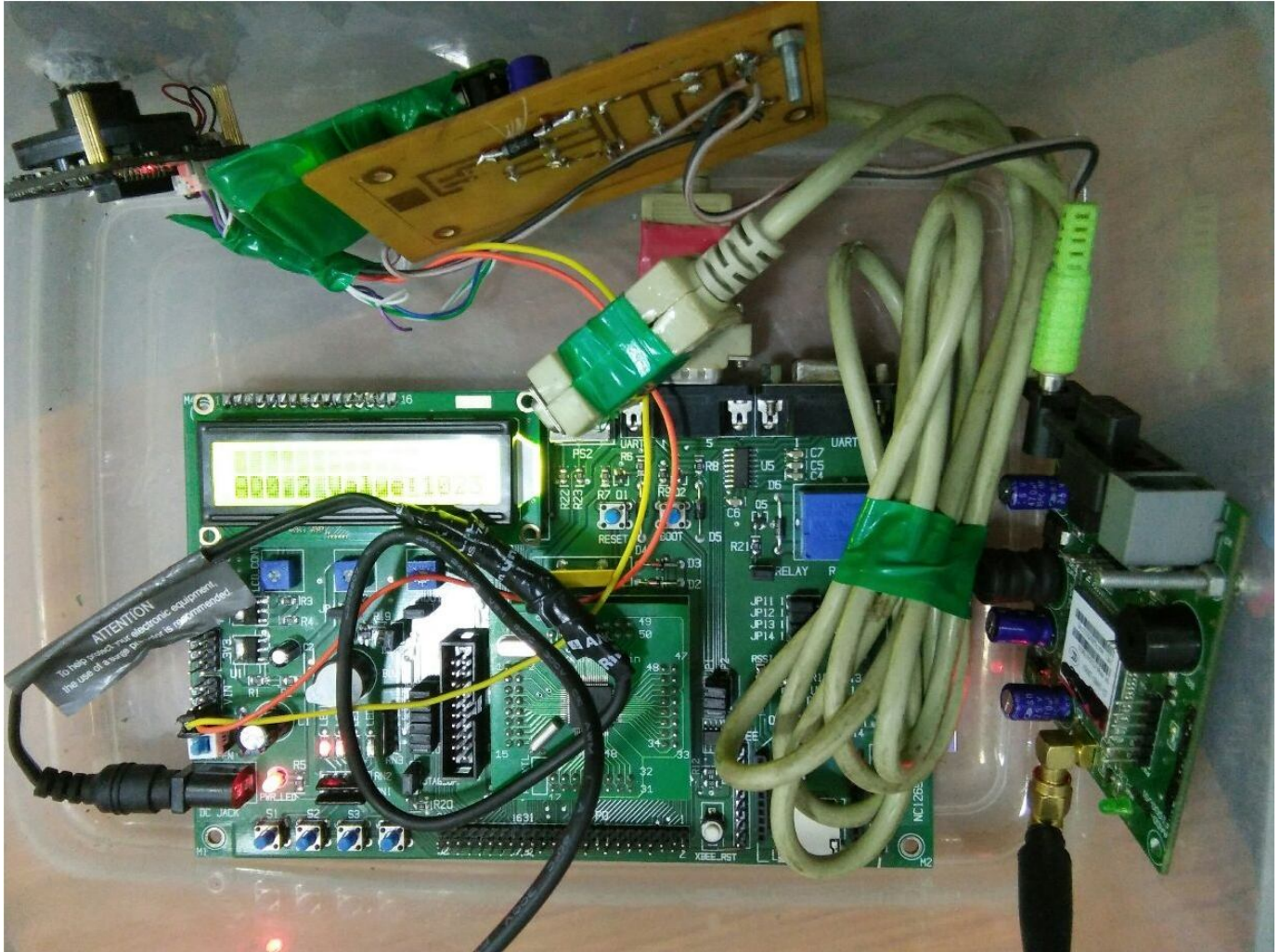
The whole system is depend on the ARM controller. ARM controller is programmed using ARM Integrated Development Environment, Programming languages used are C. Program is compiled & burned using Arduino Integrated Development Environment . Program written in ARM Software) is called sketch. The extension used for ARM sketches is in and high-speed tracing of instruction execution USB 2.0 .In addition, the LPC2146/48 provides 8 KB of on-chip The editor has features for cutting or pasting and for searching or replacing text. The console is used to display text output by the ARM Software (IDE), including error messages and other information. The toolbar contains buttons to verify and upload programs, create, open, and save sketches, and open the serial monitor.

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IV. FUTURE SCOPE

New application is utilizing there recently added thermal imaging capability of balloon sat will be developed in the near future. By making this satellite balloon wireless, we can identify count vehicles in campus open parking lot. Another new application is the darker area where internet is not reached ,we can send balloon there to provide network to people .We can use ARM controller in future scope for different applications .

V. RESULT



VI. CONCLUSION

The objective of this project have been achieved. Based on microcontroller, Temperature and Humidity sensor, GSM technology, or by using balloon satellite, we can take pictures of such area we human cant reach such as aerial platform, where human eye sight can't reach & shaded area. This is also equipped with temperature and Humidity sensor. This temperature and Humidity sensor in air is sense and send the data to user by using GSM which is interface with LPC2148 .The experimentation results are very successful and can be easily implemented in real time. Although this project was done on a small budget and a small scale, the same concepts and ideas can be applied

VII. ACKNOWLEDGMENT

By using balloon satellite, we can take pictures of such area we human cant reach such as aerial platform, where human eye sight can't reach & shaded area. This is also equipped with temperature and Humidity sensor. This temperature and Humidity sensor in air is sense and send the data to user by using GSM which is interface with LPC2148.

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Today on completion of this project report, the persons we need to thank the most who have helped us throughout the making of this report and without whose help it would not have seen the light of the day.

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