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Analytics Use Case for One M2M

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ABSTRACT

The current state of the atmosphere plays a major role in the field of agriculture, forestry, marine, utility companies etc. Due to the recent advancements in technology functionality of many home appliances is being controlled based on the conditions of weather. In this we use an Arduino Yun board interfacing with different sensors placed in local environment to measure temperature, humidity. This paper involves the measuring of humidity and temperature wirelessly. Depending on the data collected from sensors we perform Artificial intelligence algorithm to predict future value of humidity. Based on the predicted value we will monitor the functionality of devices.

Keywords: Artificial Intelligence, Temperature, Humidity, Arduino Yun, Coolterm

I. INTRODUCTION

Humidity is one of the important parameters in the atmospheric gases. The natural air can contain humidity and varies from season to season. Humidity indicates the likelihood of precipitation, dew, or fog. There are three main measurements of humidity: absolute, relative and specific. Absolute humidity is the water content of air. Relative humidity, expressed as a percent, measures the current absolute humidity relative to the maximum for that temperature. Specific humidity is a ratio of the water vapour content of the mixture to the total air content on a mass basis.

The temperature is a numerical measure of hot and cold in a body that is in its own state of internal thermal equilibrium. Its measurement is by detection of heat radiation or particle velocity or kinetic energy, or by the bulk behaviour of a thermometric material. Temperature is important in all fields of natural science, including physics, geology, chemistry, atmospheric sciences and biology.

Arduino yun is a single-board microcontroller, intended to make the application of interactive objects or environments more accessible. It's an open-source physical computing platform and a development environment for writing software for the board.

Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors, and controlling a variety of lights, motors, and other physical outputs. Arduino has some advantages for educational and interested recreational over other systems like Inexpensive, Open source and extensible software, extensible hardware.

CoolTerm is a simple serial port terminal application (no terminal emulation) that is geared towards exchange of data with hardware connected to serial ports such as servo controllers, robotic kits, GPS receivers, microcontrollers, etc.

II. METHODS AND MATERIAL

1. Interfacing of Lm 35 & St-Hs-230 To Arduino Yun

Temperature measurement is performed by an integrated circuit temperature sensor LM35.The output voltage of sensor is linearly proportional to temperature with a gradient of 10mV/ºC and able to operate in the range -55ºC to+150ºC with an accuracy of ± 0.5ºC. These make LM35 good choice for patient temperature monitoring. The LM 35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with

single power supply, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.10C in air. The LM 35 sensor has three terminals, the first terminal is connected to 5 Volts Vcc supply and the third terminal is grounded. The centre terminal is terminal two and this is the output terminal Vout that gives the output voltage corresponding to the sensed temperature The centigrade temperature is converted to Fahrenheit temperature and displayed.

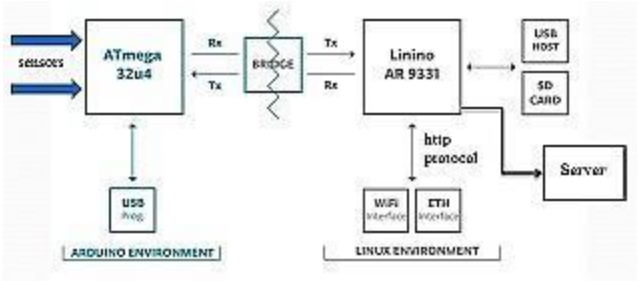


Figure 1. Block Diagram of the System

LM35 is a transducer or temperature sensor that converts heat energy into electrical energy i.e. it senses the temperature and gives an output voltage corresponding to the sensed temperature. The Fig (1) shows the hardware interfacing of LM35 and SY-HS-230 sensors to the Arduino Yun board.

Humidity measurement is performed by the humidity sensor SY-HS-230. The SY-HS-230 is a resistance type humidity sensor. This sensor's resistance varies exponentially with variation of relative humidity.

SY-HS-230 series modules consist of an SYH-2 sensor and an integrated circuit to provide a linear DC voltage output for 0-100%RH to enable easy user application of the SYH-2 sensor. They are specially designed for use in appliances and controllers and offers low cost and high accuracy.

2. Modeling Of The System

The program has been developed for sensing the voltage from sensor, process data and display the room temperature and humidity. The software CoolTerm is used to collect data from the sensors interfaced to Arduino Yun board as shown in fig.2 and saves the collected data as a text file.

The output of the LM35 sensor is connected to the pin A0 of the Arduino Yun. Using Serial Communication the Arduino Yun board is interfaced to CoolTerm. And the output of SY-HS-230 is connected to the pin A1 of the Arduino Yun. In the very first step Arduino Yun was initialized. The temperature sensor reads the temperature of the particular environment, which we want to measure and converts the temperature into corresponding electrical signal. Then the analog value is converted into digital by means of analog to digital converter in order to read microcontroller. From the Arduino resource by using analog read we can read the values of temperature and humidity in terms of the voltage.

The temperature is measure in Degree Celsius (°C) and Humidity is measured with respect to perfect vacuum (%RH).

By using artificial intelligence algorithm, here linear regression, the future values of the collected data are obtained. By changing the extension of the text document saved from coolterm to .xls we can open the data in excel. Here select the data analytics option and regression as the method. By providing the necessary input data we can obtain the regression output as shown in fig.3. By considering all the data obtained the devices are controlled.

III. RESULTS AND DISCUSSION

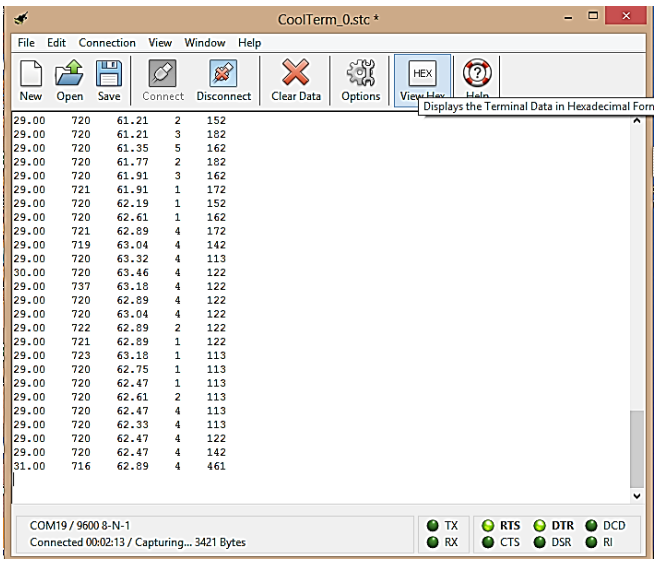
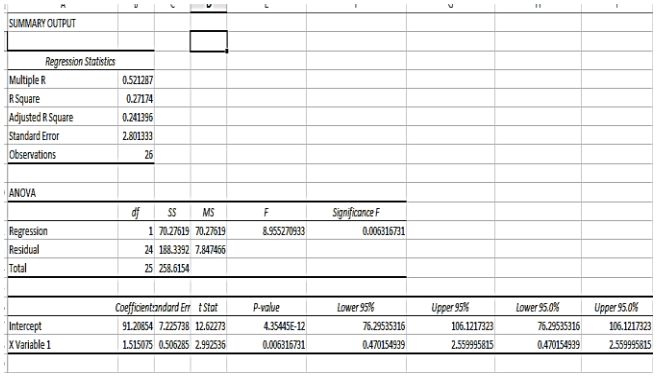


Figure 2. Data Collected In Coolterm



SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.521287
R Square	0.27174
Adjusted R Square	0.241396
Standard Error	2.801333
Observations	26

ANOVA

	df	SS	MS	F	Significance F
Regression	1	70.27619	70.27619	8.955270933	0.006316731
Residual	24	188.3392	7.847466		
Total	25	258.6154			

	Coefficients	tandard Err	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	91.20854	7.225738	12.62273	4.35445E-12	76.29535316	106.1217323	76.29535316	106.1217323
X Variable 1	1.515075	0.506285	2.992536	0.006316731	0.470154939	2.559995815	0.470154939	2.559995815

Figure 3. Regression Output in Excel

IV. CONCLUSION

M2M communication does not involve human intervention. Different Sensors are integrated with arduino yun and the data is collected and analytics is done and is delivered back to the device. As a result the device is controlled automatically and M2M communication is achieved. This can also be implemented using other protocols like MQTT, CoAP and also through Lab View, MATLAB. M2M communication has a variety of applications in the areas of security, tracking and tracing, payment, health, metering, manufacturing, remote maintenance, facility management.

V. REFERENCES

[1] Mark Fell "Roadmap for the emerging internet of things-its impact, Architecture and future Governance".

[2] Harald Naumann."IoT M2M cookbook-How to develop a device based on wireless wide area network modules".

[3] Machine-to-Machine (M2M) Communications, MobileIN

[4] How Machine-to-Machine Communication Works", HowStuffWorks.com

[5] M2M.com

[6] M2M standardization in ITU-T and its perspective, Hyoung Jun Kim, ETRI (khj@etri.re.kr), Chair of WP3 in ITU-T SG13, Vice-chair of FG on M2M in ITU-T SG11

[7] ETSI M2M / oneM2M and the need for semantics by Joerg Swetina (NEC).