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Synthesizing Smart Watch Using OLED

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Abstract:
Smart watch has slowly becoming the mainstream gadgets. Smart watches have many features as it can connect internet wirelessly. This paper proposes the synthesizing of a smart watch which shows the status of temperature and humidity on OLED display using a DHT11 humidity sensor with Arduino at a much cheaper price. This watch is programmed using Arduino's open source libraries and functions. This watch can also be personalized according to the user's requirement for further configurations. This proposed project is very much useful near agriculture areas as for some plants it needs certain temperature to grow. This might be helpful to acknowledge the changes in temperature and humidity of nearby environment. In future it provides the user another way to interact with an android smart phone. Whereas a future enhancement it can be used in air conditioners to automatically sense the present room conditions E.g.: if it is having high temperature it increases the coolness continuously.

Keywords:*Arduino, DHT11, Gadgets, Humidity, OLED, Temperature*.

I. INTRODUCTION

Most of us would be intimate with the 16×2 Dot matrix LCD display that is used in many projects to exhibit some information to the user. But the present LCD displays have lot of limitation in what they can do. Actually the basic models can accomplish basic operations like showing time, date, battery percentage. In this paper, we are launching the OLED and how it would grab the basic information from environment and display the humidity and temperature status. This paper mainly aims to display humidity and temperature on OLED display using a DHT11 humidity sensor with Arduino. This project is very much useful nearconservatories as for cultivation and exhibition of plants under supervised conditions. This might be helpful to acknowledge the changes occurred in temperature and humidity of the plant. As a future enhancement it can be used in air conditioners to automatically sense the situation and change temperature according to room.

II. EXISTING SYSTEM

Using the OLED display we can display date and time, battery percentage, network status by interfacing it to the Arduino Uno and also with Arduino Pro Mini. There was a project named "BUILD A SMART WATCH INTERFACING OLED DISPLAY WITH ARDUINO USING ANDROID PHONE". With this project we can display the above, mentioned details simply by connecting Bluetooth module to it, using an app through phone.

III. LITERATURE REVIEW

• Narayanaswami, C. &Raghunath, M: This paper proposed the Advances in technology have made it possible to package a reasonably powerful processor and memory subsystem coupled with an ultra high-resolution display devices, navigation, applications, power management, and other areas.

In this SW's are not totally modified because different people has different opinions

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• Spence, E. 2014 Will Be The Year Of Wearable Technology: This article examined the factors of adopting wearable smart devices. These wearable devices examined about the two factors as on smart glass and smart watch. There was a survey which is conducted in between college students and working professionals, they said that smart glass is just look and feel whereas about the smart watch availability of fitness apps insisted for adoption.

These are limited because it didn't get its way to develop further. As fitness app is a main factor lagging in both discussions and the rigid factors were not up to the expected rate.

• Bieber, G. Haescher, M., &Vahl, M. Sensor requirements for activity recognition on smart watches. This paper distinguishes the difference between the working of integrated watch and the other electronic gadgets on the heart rate while sleeping.

• Ali NESHATI a , Yumiko SAKAMOTO a, and Pourang IRANI a University of Manitoba, Winnipeg, Maniotba Canada- Challenges in Displaying Health Data on Small Smart watch Screens.

This paper much focussed on the improvements of reducing the user activity much on smart phone.

• Characterizing Smart watch Usage In The Wild-Xing Liu1 Tianyu Chen1 Feng Indiana University Bloomington -Institute of Information Engineering, Chinese Academy of Sciences.

This paper mainly worked on the network traffic and energy consumption in the smart watches.

• A Review on Smart Watch -Kirthika.B, Saiswathika.M and NivyaSree.G Assistant Professor, Information and Technology Department, Sri Krishna Arts and Science College, Coimbatore, India.

This paper proposed mainly about the early models of a smart watch to perform basic operations like calculations, notifications of phone on smart watch.

They are limited by their old formula because now a -days more branded and sophisticated versions came into existence.

• Smart watch: Performance evaluation for long-term by Dung Phan, Deakin university- they proposed that the ECG and PPG heart bate data rate collecting devices are correlated with the smart watch and they got accurate results

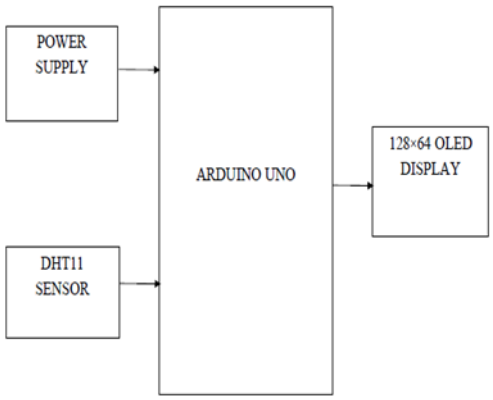
• Smart Watch based Body-Temperature Authentication- This project was developed by the formula of neural networks. Since, a user body temperature is synced as the authentication and the smart watch will give the access.

Sometimes, it may cause some vulnerabilities that it can give access to the another user if his/her body temperature may be same at the moment. By, this it can cause damage and also lot of information is required to prepare data sheet about thee users and that must be fed to the neural networks.

• Blakeway, L. (2014). A growing role in health care for Smart watches. The New York Times.

This paper mainly concentrates on the developing work of smart watch. It mainly consider about the Doctor and patients remotely interaction. But, it cannot predict the inside psychology problems as sleeping and other health factors.

IV. BLOCK DIAGRAM



Actually in the block diagram we are connecting the Power supply, DHT11 Sensor, OLED to the Arduino. In this, Arduino acts as the heart of the design.

Hardware Setup:

- Arduino Uno board
- 128×64 OLED display Module (SSD1306)

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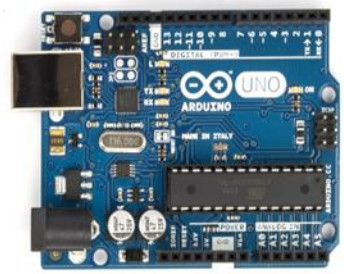
- DHT11 Sensor
- Jumpers
- Power Supply

a) Arduino Uno Board:

Arduino Uno comes with USB interface i.e. USB port is affixed on the board to emerge serial communication with the computer. Arduino is an open-source cybernetics platform based on easy-to-use hardware andoperating system. This board can accomodate a microcontroller which is able to be programmed to sense and control objects in the physical world. By interpreting to sensors and inputs, the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays.



b) OLED Display:

OLED panels are made from imperative materials that emit light when electricity is applied through them. Since OLEDs do not claim a backlight and filters (like LCD displays do), they are more operative, simpler to make, and much thinner - and in fact can be made flexible. OLEDs have a great picture quality - brilliant colours, infinite contrast, fast response rate and wide viewing angles. OLEDs can also be used to make OLED lighting - thin, efficient and without any bad metals.The main component in an OLED display is the OLED emitter - an organic (carbon-based) material that emits light when electricity is applied. The primary structure of an OLED is an submissivelayer sandwiched between a cathode (which injects electrons) and an anode (which removes electrons).

Differences between OLED and LCD:

OLED displays have the following advantages than LCD:

• Improved image quality - better contrast, higher brightness, fuller viewing angle, a wider colour range and much faster refresh rates.
• Lower power consumption.
• Stripped design that enables ultra-thin, flexible, foldable and translucent displays
• Moresubsistence - OLEDs are very durable and can handle in a broader temperature range
• More adeptable- Since LCD needs a white backlight, but in OLED it doesn't needed

Pin out diagram of OLED display:

Fig 1: Front side of an OLED display

Fig 2: Back side of an OLED display

c) DHT11Sensor

It is defined asDIGITAL HUMIDITY and TEMPERATURE (DHT) sensor and which is used in embedded projects. The element is a 3-pin single row package and the major feature of this sensor is that the data for both temperature and humidity is available on a single data pin of the sensor.Its temperature range is from 0 to 50 degrees Celsius with +-2 degrees accuracy. Its humidity range is from 20 to 80 percent with 5 percent accuracy.The DHT11 is basically a low-cost digital temperature and humidity sensor. It employs a capacitive humidity sensor and a thermistor to expedient the surrounding air, and spits out a digital signal on the data pin (no Analog input pins needed). It's very homely to use, but requires attentive timing to grab

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data. The actual impairment of this sensor is you can only get new data from it once every 2seconds.

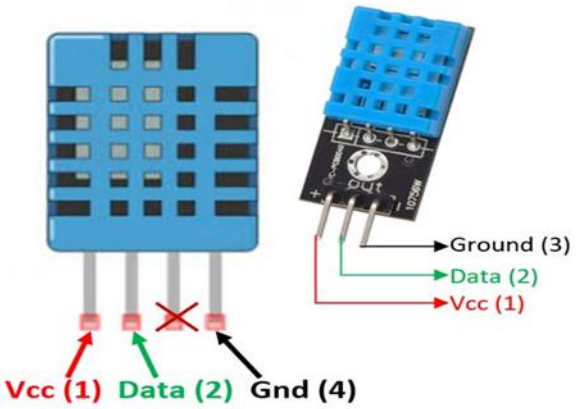


Fig 3: Pin out of DHT11 sensor

V. EXPERIMENTAL STEPS

Take an Arduino Uno board, DHT11 humidity sensor and an OLED Display.

- STEP-1

Connect the OLED's ground pin to the ground pin of Arduino board and also connect the VCC to the 3.3V in Arduino Uno. Pin the SCL to the A5 and SDA of the OLED to the A4 of Arduino Uno.

- STEP-2

Now see how to connect DHT11 to the Arduino board, first place the DHT11 on the bread board. We know that there are 3pins for DHT11. So, the -ve pin is connected to the GND of Arduino Uno and the +ve pin to the VCC of Arduino Uno. make sure the OUT pin of DHT11 must be connected to the 2 pins of the Arduino Uno board.

- STEP-3

Observe the OLED displaying humidity and temperature. After dumping the code into Arduino we get the result as displaying humidity and temperature values on OLED. Connect the DHT11 and OLED on bread board. Give the data pin of the DHT11 to the 2(data pin) of Arduino Uno board.

Experimental Result 1:

OLED GND →GND OF ARDUINO
VCC → 3.3v
SCL → A5
SDA → A4
Thus by these connections we get the values

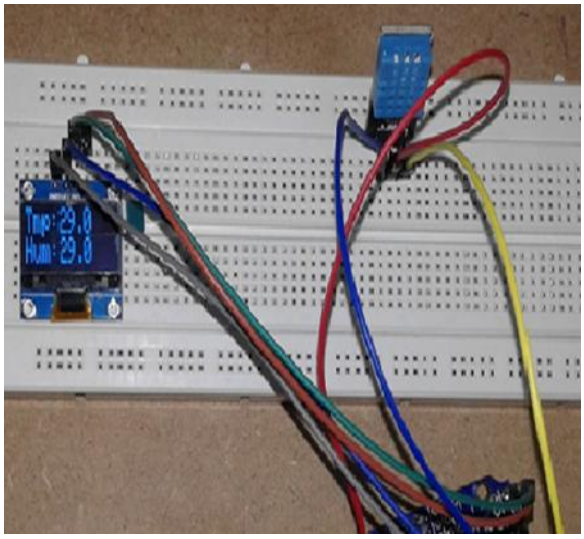
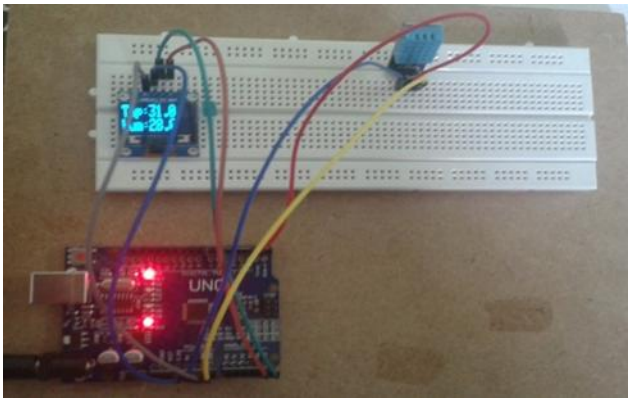


Fig 4: Where it shows the temperature as 29.C and the humidity as 29.0

Here the main thing we have to observe that the values appeared are the serial data input and output values. In this total research we have to remember that the SCL and SDA are acting as the input and output to receive the data and digitalize the humidity values and shows that values on OLED display.

Experimental Result 2:

Based on these results we know that temperature and humidity is displayed is varied according to the climatic variations and that values are displayed on OLED. By this we can get the expected result is obtained by dumping the code into the Arduino Uno



Here also the values are shown based upon the SDA and SCL i e .., input and output by connecting the voltage pin to VCC we got the value as 31.0c as temperature and humidity as 28.0

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Table 1: list of values of temperature and humidity.

Sl.no	Vcc	Temperature	Humidity
1	5v	29.0	29.0
2	5v	31.0	28.0
3	5v	30.0	28.0

VI. CONCLUSION

The method of interfacing OLED display using Arduino and DHT11 humidity sensor is the ideal choice to display humidity and temperature by making simple connections. The proposed project has produced good results for displaying values according to the weather conditions.

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