# Weather Reporting Bot With R-PI and Twitter Interface

**F. Jerald**[1]**, M. Anand**[2] **and S. Ravi**[3]

**ABSTRACT**

In this research work, twitter interfaced with raspberry-pi to get the data from weather reporting bot and displayed in twitter. The purpose of the weather reporting bot is to collect data on environmental conditions such as temperature, pressure, humidity and light in an area using multiple end nodes. The weather information by sending tweets on Twitter. The end node is comprised of a Raspberry Pi minicomputer, temperature, humidity, pressure and light sensors. The system consists of multiple nodes placed in different locations for monitoring temperature, humidity and pressure in an area. The end nodes are equipped with various sensors (such as temperature, pressure, humidity and light). The end nodes send the data to the cloud and the data is stored in a cloud database. The analysis of data is done in the cloud to aggregate the data and make predictions.

*Keywords:* Twitter, Raspberry-pi, Sensors and weather monitoring

## 1. RELATED WORKS

K P J Pradeep et al., (2014) designed weather monitoring system using LabVIEW. In this paper an Arduino board with LabVIEW interfacing different sensors placed in local environment is used. This paper involves the measuring and the monitoring of the temperature, humidity, pressure, wind speed and radiation using Virtual Instrumentation-LabVIEW.

Karthik Krishnamurthi et al., (2015) developed an automated system which monitors the weather condition. This paper is formulate the weather and be able to forecast the weather without human error. A limitation of the weather system is developed for Small area. It is not web based system. In future, sensors to analyze air quality using gas detectors could be included and a web interface or service to feed the data directly to internet could also be built.

Karl A. Hribernik et al., (2016) aims to contribute to the discussion about the co-creation of Intelligent Products in the emerging paradigm of the "Internet of Things". This paper discusses the potential of applying the Arduino Platform as a lowcost, easy-to-use micro-controller and sensor kit to facilitate co-creation.

Takashi Yamanoue et al., (2012) proposed a machine to machine system which uses Arduino, Android, and Wi-Fi software. This system consists of mobile terminals and web sites with wiki software. A mobile terminal of the system consists of an Android terminal and an Arduino board with sensors and actuators. The mobile terminal reads data from the sensors in the Arduino board and sends the data to a wiki page. The mobile terminal also reads commands on the wiki page and controls the actuators of the Arduino board.

## 2. CONTROLLER CODE

Twitter.py file is the code for controller native service that runs on Raspberry Pi. The controller service obtains temperature and humidity from DHT22 sensor, pressure and temperature from BMP085 sensor and

---

[1]  Research Scholar, ECE Department, Dr. M.G.R. Educational and Research Institute, Chennai, *Email: francisjeral@gmail.com*

[2]  Professor, ECE Department, Dr. M.G.R. Educational and Research Institute, Chennai, *Email: harshini.anand@gmail.com*

[3]  Professor & Head, ECE Department, Dr. M.G.R. Educational and Research Institute, Chennai, *Email: ravi_mls@yahoo.com*
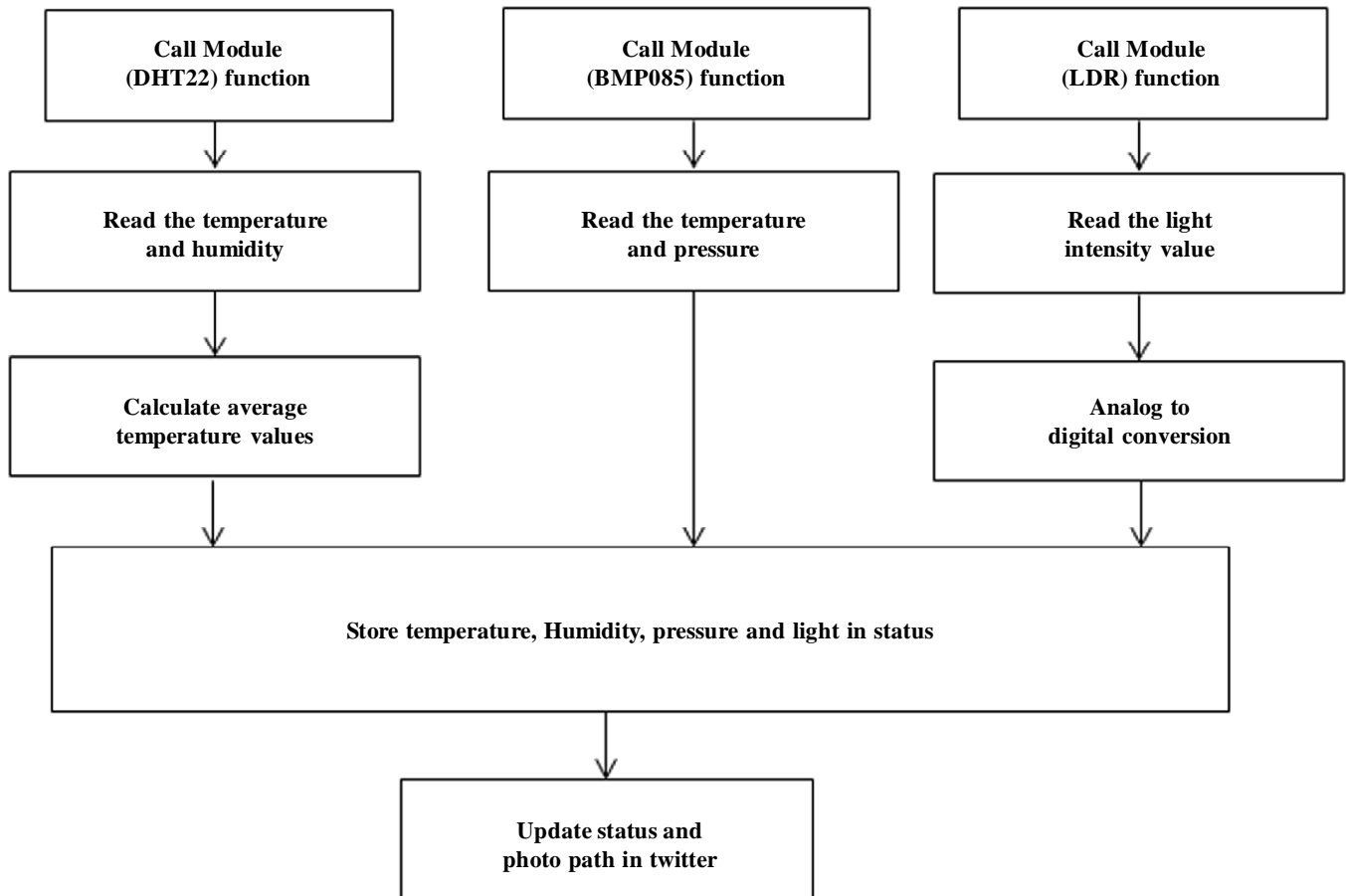
```
┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│   Call Module   │      │   Call Module   │      │   Call Module   │
│ (DHT22) function│      │(BMP085) function│      │  (LDR) function │
└─────────────────┘      └─────────────────┘      └─────────────────┘
         │                        │                        │
         ▼                        ▼                        ▼
┌─────────────────┐      ┌─────────────────┐      ┌─────────────────┐
│ Read the        │      │ Read the        │      │ Read the light  │
│ temperature     │      │ temperature     │      │ intensity value │
│ and humidity    │      │ and pressure    │      │                 │
└─────────────────┘      └─────────────────┘      └─────────────────┘
         │                                                 │
         ▼                                                 ▼
┌─────────────────┐                              ┌─────────────────┐
│ Calculate       │                              │ Analog to       │
│ average         │                              │ digital         │
│ temperature     │                              │ conversion      │
│ values          │                              │                 │
└─────────────────┘                              └─────────────────┘
         │                        │                        │
         ▼                        ▼                        ▼
┌─────────────────────────────────────────────────────────────────┐
│    Store temperature, Humidity, pressure and light in status     │
└─────────────────────────────────────────────────────────────────┘
                              │
                              ▼
                  ┌─────────────────────┐
                  │ Update status and   │
                  │ photo path in twitter│
                  └─────────────────────┘
```

**Figure: 1 Workflow of controller**

light intensity from LDR sensor connected through analog-to-digital (A/D) converter MCP3008. The controller service obtains the temperature, humidity, pressure and light readings from the sensors, every 10 seconds. The sensor readings and the images is then sent as a tweet on Twitter. The workflow of controller is shown in figure 1.

## 3. CLOUD SIDE PROGRAMMING

Cloud side setup is done using Twitter App. The controller service uses a Python library for Twitter to send tweets called as tweepy. Twitter REST API to send tweets using tweepy. Before using the twitter API, twitter developer account is needed to set up and then a new application (with read-write permissions) created. Upon creating the application the API key, API secret and access tokens for user are generated. These credentials and token are used in the controller service. The circuit diagram of proposed system is shown in figure 2. The connection diagram is shown in figure 3.

## 4. CREATING TWITTER APP

The https://twitter.com web link is used to create twitter account. The https://apps.twitter.com, web link is used to sign in to create a Twitter app. The step by step procedure for creating new App is given below. Create new App option is used to create new application. This is shown in figure 4.

The name of the application and the website address is filled and 'create your Twitter Application' is used to create app as apk file. This is shown in figure 5.

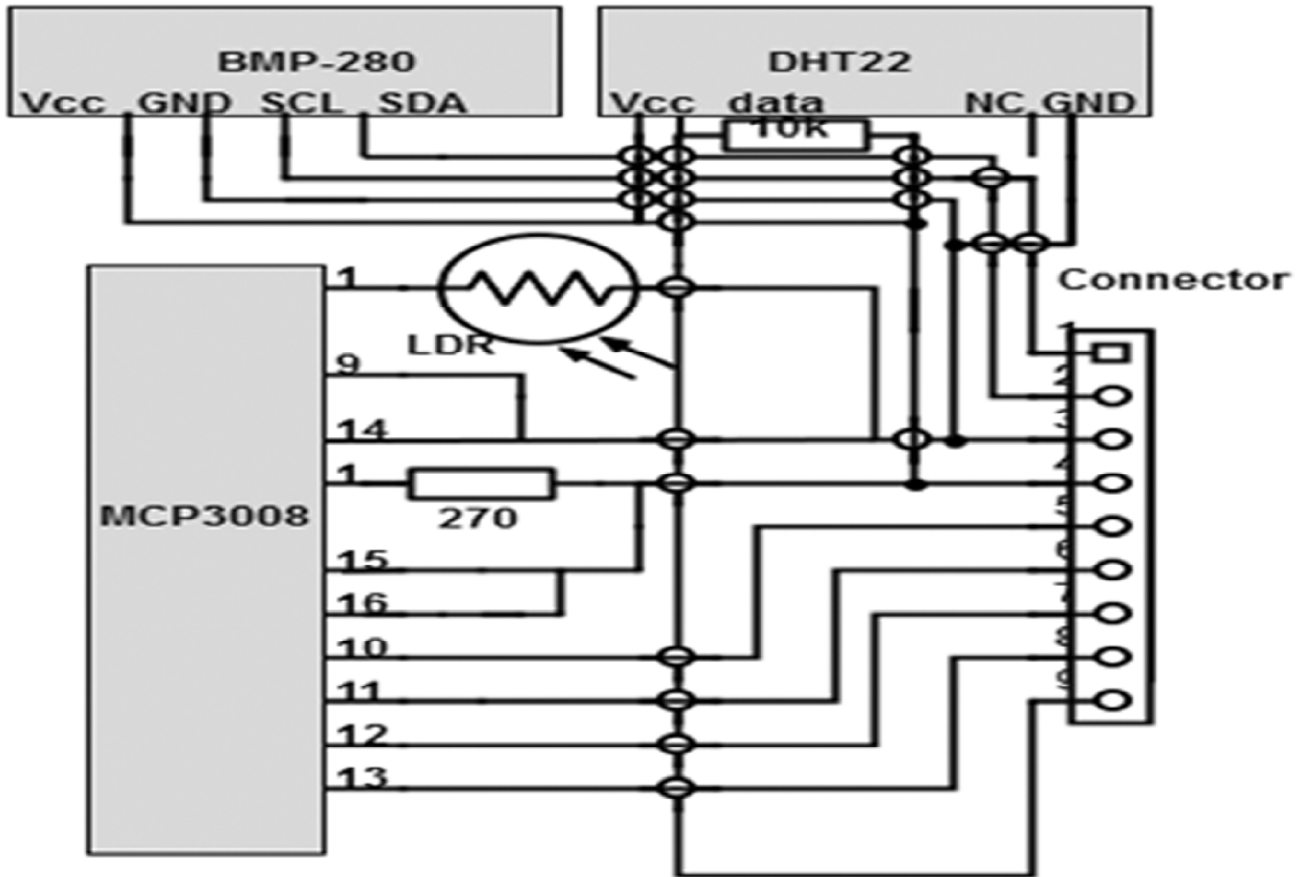The developed weather Reporting Bot app is shown in figure 6.

**Figure: 2 Circuit Diagram**

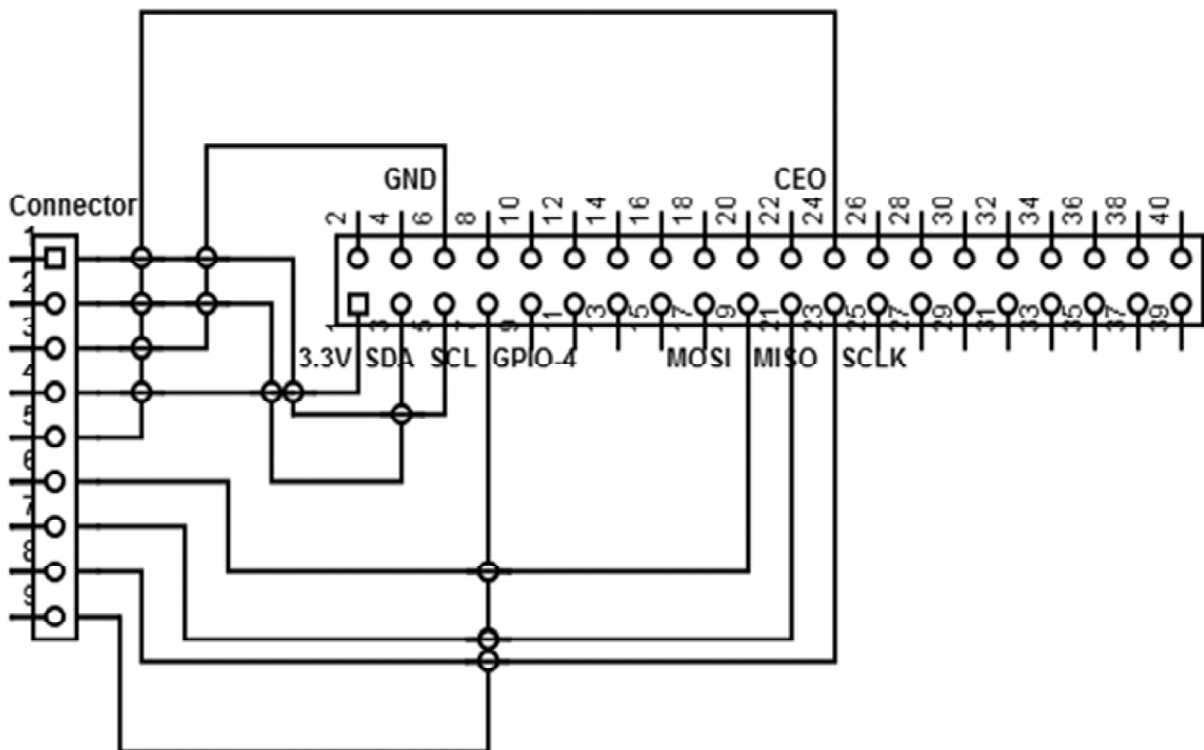**Figure: 3 Connection diagram**

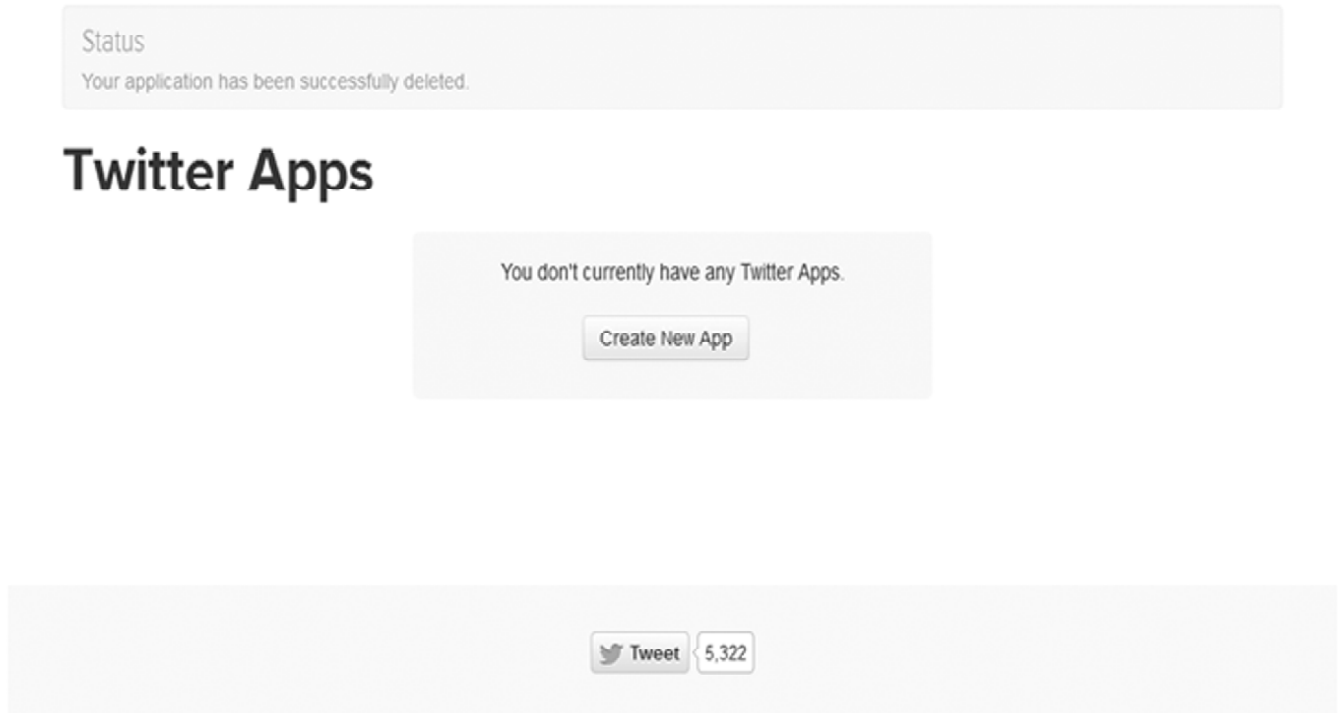Status
Your application has been successfully deleted.

# Twitter Apps

You don't currently have any Twitter Apps.

Create New App

Tweet   5,322

**Figure: 4 Creating twitter App**

# Create an application

Application Details

**Name** *

weather Reporting Bot

Your application name. This is used to attribute the source of a tweet and in user-facing authorization screens. 32 characters max.

**Description** *

weather Reporting Bot

Your application description, which will be shown in user-facing authorization screens. Between 10 and 200 characters max.

**Website** *

https://abc.com

Your application's publicly accessible home page, where users can go to download, make use of, or find out more information about your application. This fully-qualified URL is used in the source attribution for tweets created by your application and will be shown in user-facing authorization screens.

(If you don't have a URL yet, just put a placeholder here but remember to change it later.)

**Callback URL**

**Figure: 5 creating application**
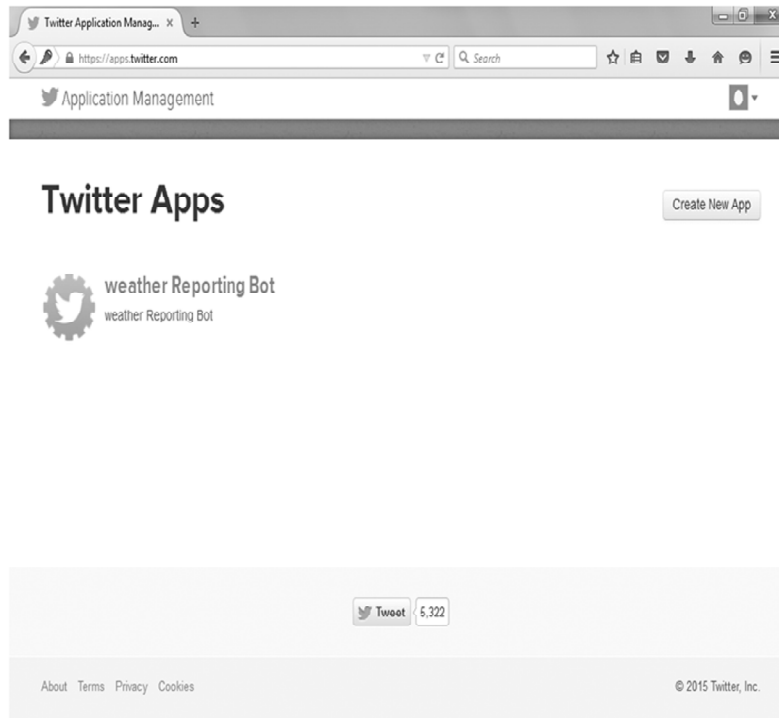
**Figure: 6 Developed Twitter App**
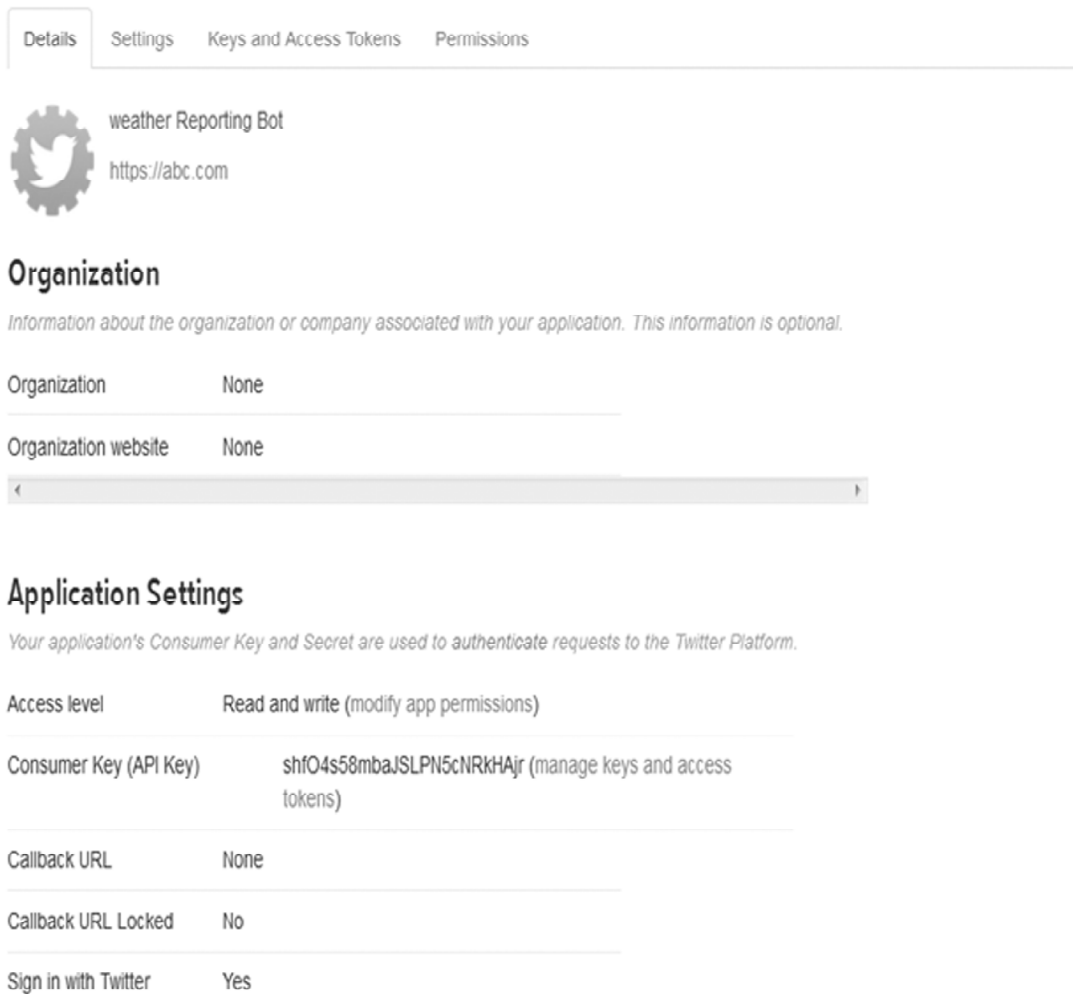


**Figure: 7 Keys and Token access**

## weather Reporting Bot

Test OAuth

Details    Settings    Keys and Access Tokens    Permissions

## Application Settings

*Keep the "Consumer Secret" a secret. This key should never be human-readable in your application.*

| | |
|---|---|
| Consumer Key (API Key) | shfO4s58mbaJSLPN5cNRkHAjr |
| Consumer Secret (API Secret) | XLvSJpL1Jq93HLix0WEh9meqP0Q4ILiADSMp7ZBk6LwnTt2hni |
| Access Level | Read and write (modify app permissions) |
| Owner | Harsha_MC |
| Owner ID | 3289623331 |

## Application Actions

Regenerate Consumer Key and Secret    Change App Permissions

**Figure: 8 Application settings**

## Your Access Token

*This access token can be used to make API requests on your own account's behalf. Do not share your access token secret with anyone.*

| | |
|---|---|
| Access Token | 3289623331-ju8qmg4S1qNGznrbxtWF3IUJBUg24FBKKKmzs8a |
| Access Token Secret | 2wFUkpavrYdENRI0uLtXw4IS5jaOTjGU8Qv11cASC8ert |
| Access Level | Read and write |
| Owner | Harsha_MC |
| Owner ID | 3289623331 |

## Token Actions

Regenerate My Access Token and Token Secret    Revoke Token Access

**Figure: 9 Generated access token**

The keys and access tokens are shown in figure 7.

Consumer Key and Consumer Secret get from application settings. In Twitter.py Consumer Key used instead of CONSUMER_KEY and Consumer Secret used instead of CONSUMER_SECRET. This is shown in figure 8.

The 'Create my access token' option is used to get Access Token and Access Token Secret. In Twitter.py Access Token used instead of ACCESS_KEY and Access Token Secret used instead of ACCESS_SECRET. This is shown in figure 9.

## 5.   SIMULATION SETUP

Initially connect keyboard, mouse and WIFI dongle to USB. The power supply is connected to Raspberry Pi through USB. The verification of WIFI availability is done by pinging to the Server IP Address. Connection is made as per the circuit diagram. The 'python.Twitter.py' command is used to run the code on raspberry Pi.

## 6.   RASPBERRY PI SCREENSHOTS

Updated Data on Twitter: (with ScreenShots)



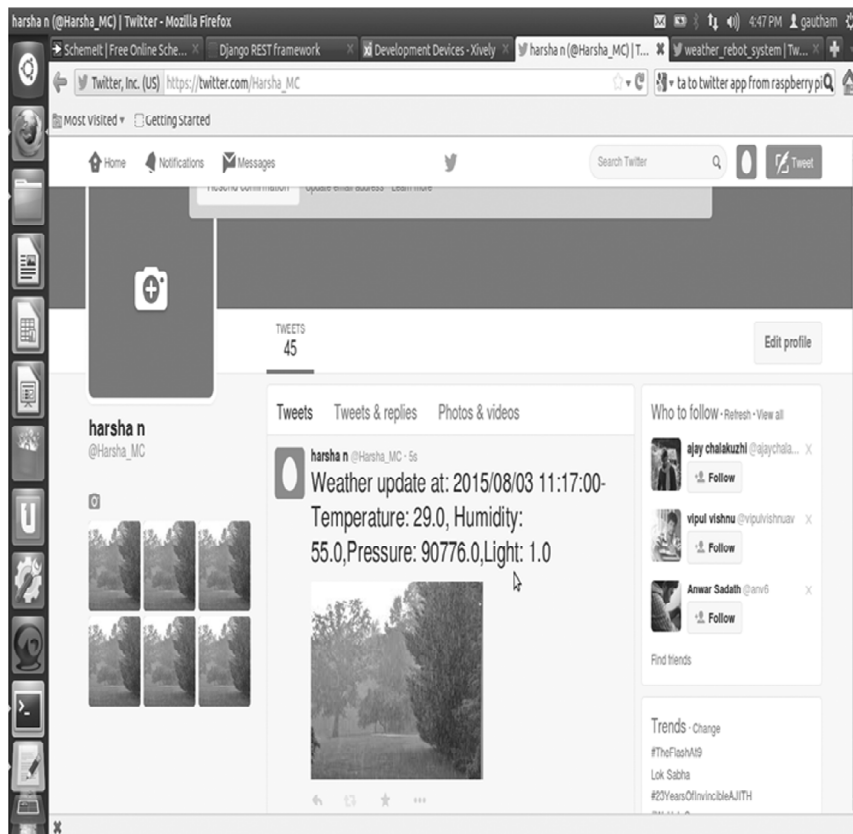**Figure: 10 Output screen shot of arduino**



**Figure: 11 Output screen shot of twitter**

## 7. CONCLUSION

A Twitter app is used for visualizing the data. The centralized controller sends control commands to the end nodes, for example, to configure the monitoring interval on the end nodes. The devices and components used in this research work are Raspberry Pi minicomputer, temperature and humidity sensor (DHT22), pressure and temperature sensor (BMP085) and LDR sensor. An analog-to-digital (A/D) converter (MCP3008) is used for converting the analog input from LDR to digital.

## REFERENCES

[1] Arduino. Arduino homepage. [Online]. http:// arduino. cc/

[2] Raspberry Pi. Raspberry Pi homepage. [Online]. www. raspberrypi. org

[3] K P J Pradeep, C Chandra Mouli, K Sai Prasad Reddy, K Nagabhushan Raju, "WEATHER MONITORING USING LIFA", International Journal of Emerging Trends in Engineering and Development, Issue 4, Vol. 6 (Oct.-Nov. 2014).

[4] Karthik Krishnamurthi, Suraj Thapa, Lokesh Kothari and Arun Prakash, "Arduino Based Weather Monitoring System", International Journal of Engineering Research and General Science Volume 3, Issue 2, March-April, 2015.

[5] Antonio Pintus, Davide Carboni and Andrea Piras, "Paraimpu: a Platform for a Social Web of Things", WWW 2012– Demos Track April 16–20, 2012, Lyon, France.

[6] William I. Grosky and Utz Westermann, "SenseWeb: An Infrastructure for Shared Sensing", 1070-986X/07/$25.00 © 2007 IEEE

[7] Karl A. Hribernik, Zied Ghrairi, Carl Hans and Klaus-Dieter Thoben, "Co-creating the Internet of Things-First Experiences in the Participatory Design of Intelligent Products with Arduino", https://www.researchgate.net/publication/252050606.

[8] Takashi Yamanoue, Kentaro Oda and Koichi Shimozono, "A M2M system using Arduino, Android and Wiki Software", 978-0-7695-4826-5/12 $26.00 © 2012 IEEE.

[9] A. Abdullah, O. Sidek, N.A. Amran, U.N. Za'bah, F. Nikmat, Hadi Jafar and Munajat Abdul Hadi, "Development of Wireless Sensor Network for Monitoring Global Warming", ICACSIS 2012 ISBN: 978-979-1421-15-7

[10] PM Korake and MK Bhanarkar, "Humidity and Temperature Measurement WSN node for Grapes Environmental Condition Monitoring", Research Gate, European Journal of Advances in Engineering and Technology, 2015, 2(5): 72-76.

[11] Arko Djajadi and Michael Wijanarko, "Ambient Environmental Quality Monitoring Using IoT Sensor Network", INTERNETWORKING INDONESIA JOURNAL Vol.8/No.1 (2016).

[12] Mr. P.K. Jayalakshmi and Mr. A. Pritviraj, "A REAL TIME WEATHER MONITORING SYSTEM WITH FM CHANNEL", IJAICT Volume-1, Issue-1, May 2014.

[13] Prof. Satyashil Nagrale, Ms. Poonam Khetmalis, Ms. Sanika Doke, Ms. Varsha Dherange, "Real Time Data Transmission for Weather Monitoring System", Volume: 03 Issue: 02 | Feb-2016.

[14] Divyavani Palle, Aruna Kommu and Raghavendra Rao Kanchi, "Design and Development of CC3200-based CloudIoT for Measuring Humidity and Temperature", International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT)-2016.