WEATHER FORECASTING

Submitted by

K. PRIYADHARSHINI

(22124041)

Guided By

Mr. S. MANOJ (MCA)

Assistant Professor,

Department of Computer Science with Cognitive Systems,

Sri Ramakrishna College of Arts & Science,

Coimbatore – 641 006

APRIL - 2023

DEPARTMENT OF COMPUTER SCIENCE WITH COGNITIVE SYSTEMS

(INTEGRATED WITH TCS)

SRI RAMAKRISHNA COLLEGE OF ARTS & SCIENCE

(An Autonomous Institution – Since 2004)

(Co-Ed, ranked 84th by NIRF 2021, SIRO recognized,
AICTE & UGC approval, ISO 9001:2015 Certified,
Affiliated to BHARATHIAR UNIVERSITY,
Re-Accredited with ‘A+’ Grade by NAAC
Nava India, Coimbatore – 641 006

CERTIFICATE

This is to certify that this project work entitled" **WEATHER FORECASTING"**, submitted to the Sri Ramakrishna College of Arts &Science for in partial fulfillment of the requirement for the completion of the project in II Semester is the record of the original work done by **K. PRIYADHARSHINI (22124041)** during her period of study in Department of Computer Science with Cognitive systems, Sri Ramakrishna College of Arts and Science, Coimbatore under my supervision and guidance.

Forwarded by

Mr. S. MANOJ
Faculty Guide

DR. V. KRISHNAPRIYA
Head of the Department

Submitted for Viva-Voce held on ______________________

Internal Examiner

External Examiner

DECLARATION

I hereby declare that this project work entitled **"WEATHER FORECASTING"**, submitted to Sri Ramakrishna College of Arts & Science for in partial fulfillment of the requirement for the completion of the mini project in II Semester is the record of the original work done by **PRIYADHARSHINI K (22124041),** under the supervision and guidance of **Mr. S. MANOJ Assistant Professor**, Department of Computer Science with Cognitive Systems, Sri Ramakrishna College of Arts and Science, Coimbatore.

Place: Coimbatore K. PRIYADHARSHINI

Date: ______________ (22124041)

Endorsed by

Place: Coimbatore **Mr. S. MANOJ**

Date: ________ **(Faculty Guide)**

ACKNOWLEDGEMENT

I express my whole hearted thanks to **Dr. (MR) B.L. SHIVAKUMAR M.C.A., M.Phil., Ph.D.,** Principal, Sri Ramakrishna College of Arts and Science, Coimbatore, for her support and for all resources.

I also extend my grateful thanks to **Dr. (MRS.) V. KRISHNAPRIYA M.C.A., M.Phil., Ph.D.,** Assistant professor Head of the department, Department of Computer Science with Cognitive Systems, Sri Ramakrishna College of Arts and Science, Coimbatore, for her sustained interest and advice that has contributed to great extent to the completion of the project.

I express my special thanks to **MR. S. MANOJ M.C.A.** Associate Professor & Head of the department, Department of Computer Science with Cognitive Systems, Sri Ramakrishna College of Arts and Science, Coimbatore, for her appropriate guidance and suggestions.

I also express my gratitude to all the faculty members of our department for their timely support and encouragement.

I thank my beloved parents and my friends who have helped me to complete this project successfully.

TABLE OF CONTENTS

ABSTRACT:

This project aims to develop a weather application using Django, a high-level Python web framework. The application will allow users to view current weather conditions, weather forecasts, and weather alerts for their location. The application will use third-party APIs to fetch weather data and will display it in an interactive and user-friendly interface. The application will also allow users to set their preferred weather location and view weather data for multiple locations. The backend will be developed using Django and will store user preferences in a database. The frontend will be developed using HTML, CSS, and JavaScript and will be designed to be responsive and accessible. The project will demonstrate the use of Django and APIs to develop a real-world application. The weather application will utilize the Open Weather Map API to fetch weather data for various locations. The API will provide real-time weather updates, forecasts, and alerts for different weather conditions such as rain, snow, and storms. The application will be designed to be highly scalable

and will be able to handle a large number of requests without any downtime

1. INTRODUCTION:

1.1 Overview of the project

Weather forecasting is the prediction of the state of the atmosphere for a given location using the application of science and technology. This includes temperature, rain, cloudiness, wind speed, and humidity. Weather warnings are a special kind of short-range forecast carried out for the protection of human life. Weather forecasting is the application of science and technology to predict the state of the atmosphere for a given location. Ancient weather forecasting methods usually relied on observed patterns of events, also termed pattern recognition. For example, it might be observed that if the sunset was particularly red, the following day often brought fair weather. However, not all of these predictions prove reliable. Here this system will predict weather based on parameters such as temperature, humidity and wind. User will enter current temperature; humidity and wind, System will take this parameter and will predict weather (rainfall in inches) from API. The role of the admin is to update API key, so that system will calculate weather (estimated rainfall in inches) based on these data. Weather forecasting system takes parameters such as temperature, humidity, and wind and will forecast weather based on previous record therefore this prediction will prove reliable. This system can be used in Air Traffic, Marine, Agriculture, Forestry, Military, and Navy etc

2.SYSTEM SPECIFICATIONS:

2.1 hardware and software requirements:

2.1.1 hardware requirements

Processor	intel core i3
RAM	8.00GB
Hard disk drive	40 GB

2.1.2 Software requirements

Operating system	windows
Used tool	visual studio code

2.2 SOFTWARE DESCRIPTIONS:

2.2.2 Visual Studio Code

Visual studio code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++**.** Visual studio code can be extended via extensions, available through a central repository

2.2.3 Django

Django is a high-level python web framework that encourage rapid development and clean, pragmatic design. Built by experienced developers, it takes care much of the hassle of web development, so you can focus on writing your app without needing to reinvent the wheel. It's free and open source.

2.2.4 Bootstrap

Bootstrap is a free and open-source CSS framework directed at responsive, mobile-first front-end web development. It contains HTML, CSS and (optionally) JavaScript-based design templates for typography, forms, buttons, navigation, and other interface components.

2.2.5 Java Script

JavaScript is a light-weight object-oriented programming language which is used for several website for scripting the webpages. It is an interpreted full-fledged programming language that enables dynamic interactivity on website when applied to an HTML document.

2.2.6 HTML

The Hyper Text Mark-up Language or HTML is the standard mark-up language for documents designed to be displayed in a web browser. It can be assisted by technologies such as Cascading Style Sheets (CSS) and scripting languages such as JavaScript.

3. SYSTEM ANALYSIS

3.1 EXISTING SYSTEM AND ITS DRAWBACKS

The traditional forecast process employed by most NMHSs involves forecasters producing text-based, sensible, weather-element forecast products (e.g. maximum/minimum temperature, cloud cover) using numerical weather prediction (NWP) output as guidance. The process is typically schedule-driven, product-oriented and labour-intensive. Over the last decade, technological advances and scientific breakthroughs have allowed NMHSs' hydro meteorological forecasts and warnings to become much more specific and accurate. As computer technology and high-speed dissemination systems evolved (e.g. Internet), National Weather Service (NWS) customers/partners were demanding detailed forecasts in gridded, digital and graphic formats. Traditional NWS text forecast products limit the amount of additional information that can be conveyed to the user community. The concept of digital database forecasting provides the capability to meet customer/partner demands for more accurate, detailed hydro meteorological forecasts. Digital database forecasting also offers one of the most exciting opportunities to integrate PWS forecast dissemination and service delivery, which most effectively serves the user community.

3.2 PROPOSED SYSTEM:

User will enter the city name in a search box and get the weather of the city where the user wants to know. It will help the user to get the weather of the city.it will change the weather accurately according to the date. If we enter the city name wrongly, it will display the error message.

4 SYSTEM DESIGN DEVELOPMENT

4.1 Module Description

4.1.1 Module 1: Interactive Web Application

An interactive website is essentially an internet page that uses different kinds of software to create a rich, interactive experience for the user. The Django framework and bootstrap present themes gives the web application a pleasant look to interact with, it provides a simple and yet sophisticated look to the user every time they into the web application.

4.1.2 Module 2: Location Based Prediction

Where the user will be naming the location for which he wants to know the weather updates. After entering the city name, this model gives the weather forecast for the city entered by the user by providing details like Date, Time Maximum Temperature, Minimum Temperature and picture describing rainfall or sunshine. It also predicts the future of weather in maximum and minimum temperature with accuracy. The user can also view the same result in graphical representation module which the amount of rainfall in centimetres and the amount of sunshine in degrees.

4.1.3 Module 3: Graphical Representation

Bootstrap polishes the application with a better user interface which is elegant and simple for better user experience. The application features colour full theme like allocated for the title, topics and user greeting on the home page.

4.2. Data Flow Diagram

A Data flow diagram is a graphical representation of data movement, processes, and files (data stores) used in support of an information system. Data flow diagram models are used to a system by external entities from which data flows to a process, which go to other processes or external entities or files.

- Data flow is represented by an arrow.
- People, procedures or devices that use or produce will be represented in circle.
- External sources or destinations of data, which may be people, programs, organizations, or other entities that interact with the system but are outside its boundary are represented in rectangle.
- Data are stored or referenced by a process in the system. The data store may be representing with the open rectangle.

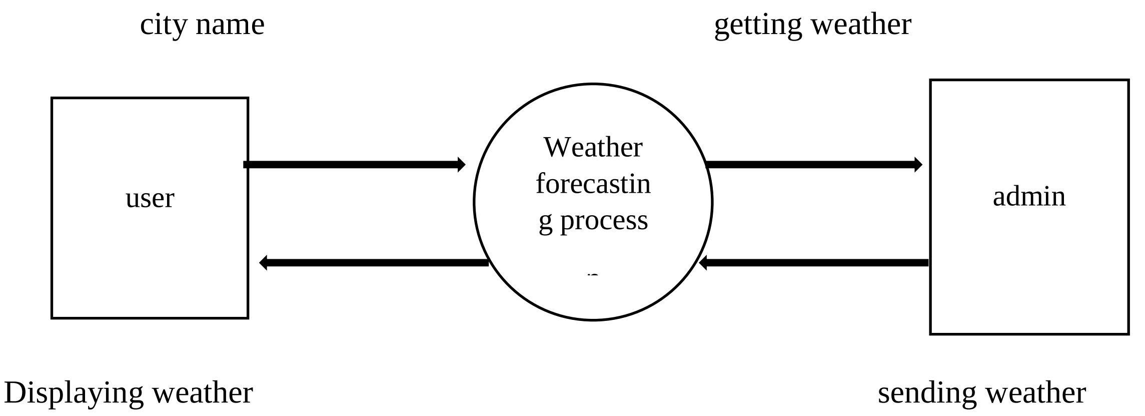
In normal DFD can be completed using only three notations.

□ represent the source and destination

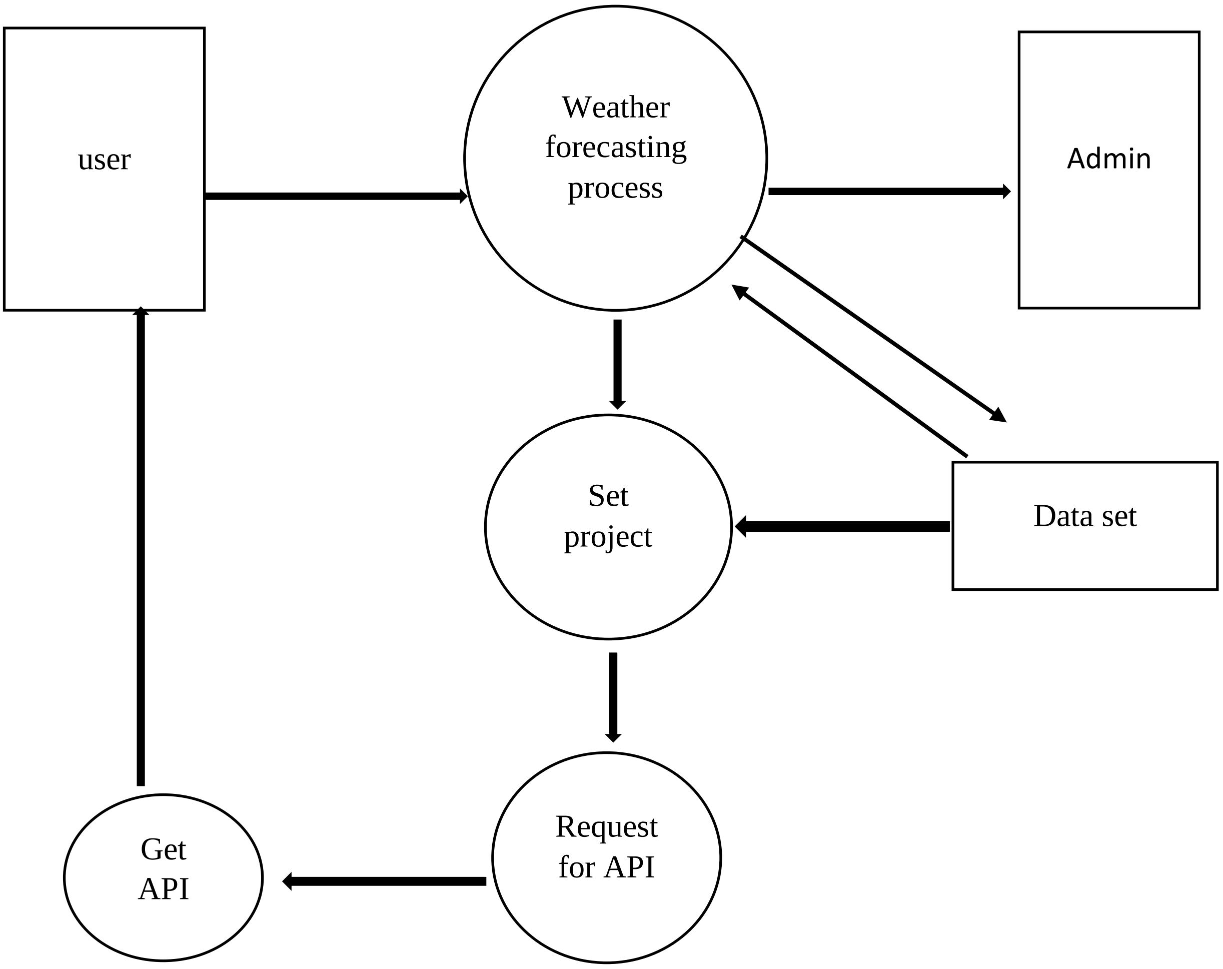
⟹ represent the data flow lines

⬭ represent a process that transform incoming data outgoing flow.

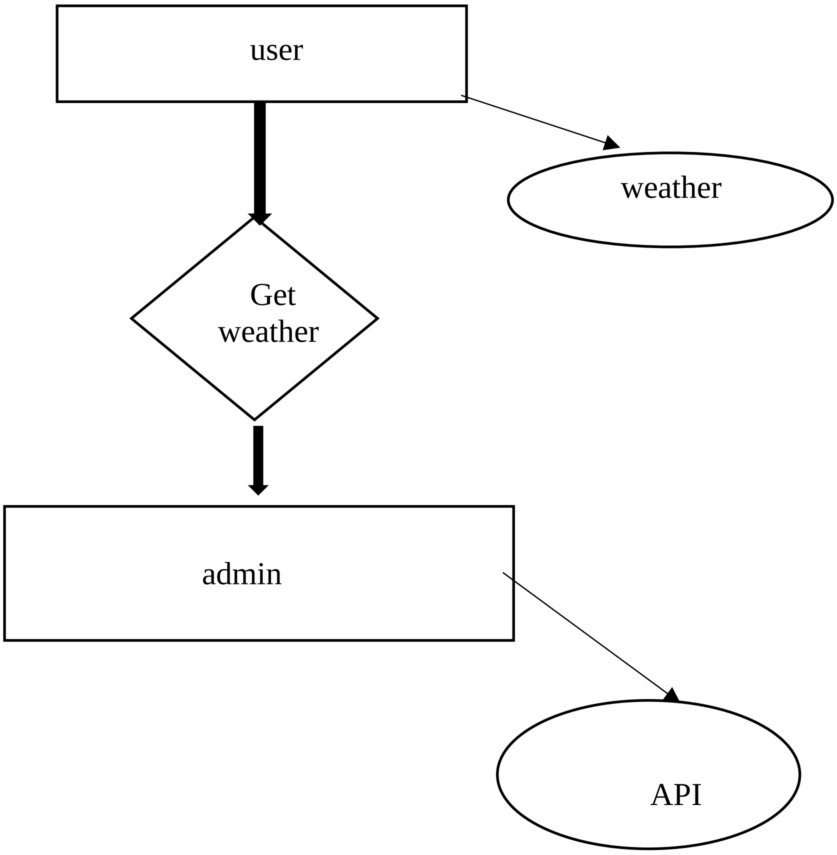
LEVEL0



LEVEL1
city name



4.3 ERDIAGRAM



4.4TABLE DESIGN

Input	Datatype	Key
City name	Char	Primary key

4.5 INPUT DESIGN

In an information system, input is the raw data that is processed to produce output.

- Guideline of input design:
- The four guidelines for well-designed input forms are the following.

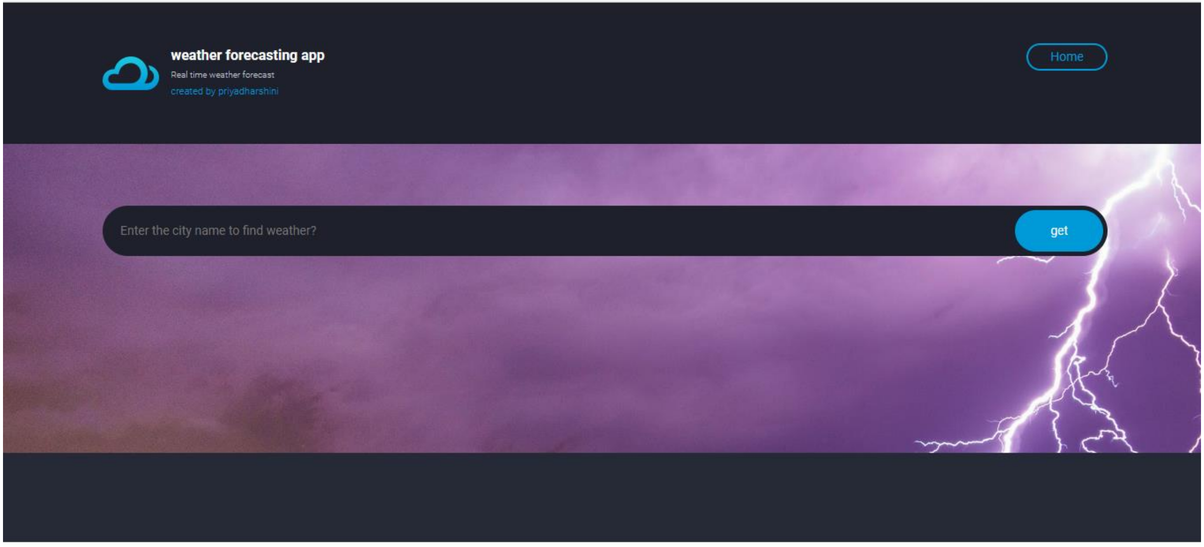
1. Make forms easy to fill in.
2. Ensure that forms meet the purpose for which they are designed.
3. Design forms to ensure accurate completion.
4. Keep forms attractive

The input design used in project are as follow:

- MAIN PAGE:

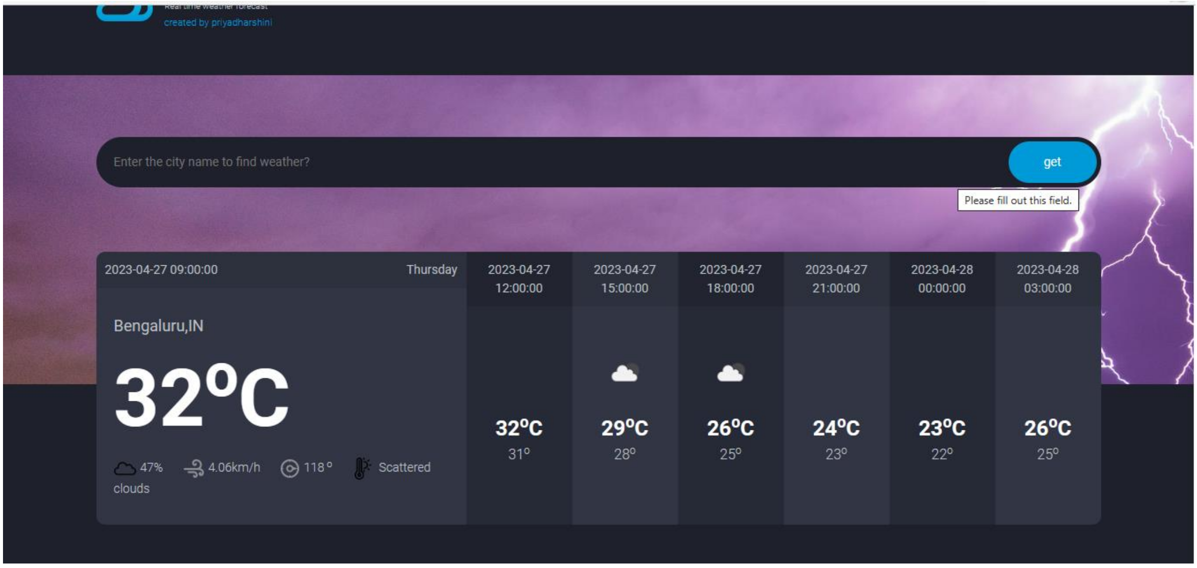
Main page template

The main page consists of search box to enter the city name as follow



weather forecasting app
Real time weather forecast
created by priyadharshini
Home
Enter the city name to find weather?
get

4.6 OUTPUT DESIGN



Real time weather forecast

created by priyadharshini

Enter the city name to find weather?

Please fill out this field.

2023-04-27 09:00:00 Thursday

Bengaluru,IN

32°C

47% clouds 4.06km/h 118 ° Scattered

2023-04-27 12:00:00	2023-04-27 15:00:00	2023-04-27 18:00:00	2023-04-27 21:00:00	2023-04-28 00:00:00	2023-04-28 03:00:00
32°C	29°C	26°C	24°C	23°C	26°C
31°	28°	25°	23°	22°	25°

In the output screen it displays with images such as location, clouds etc

5.SYSTEM TESTING AND IMPLEMENTATION:

The application is going to be constructed through python IDE for GUI and SQLlite3 for database management. It is designed to improve the accuracy enhance safety and efficiency of database. It is a web application-based system which helps us to improve the accuracy of the forecast. The homepage with a banner explains the web page’s monologue with a title. In which users can enter the city name to know about weather forecasting about that city. Once the user enters the city name and click the find weather forecast they can see the accurate weather forecast of that city. The application has a neat user interface for better interaction and it works smoothly

6.CONCLUSION

In the era of the global warming, research in weather measurement, monitoring and forecasting are become more and more relevant. This research demonstrates the design and implementation of an affordable mini weather monitoring system that ensures flexibility, portability, scalability and user-friendly operations which can provide data of some weather variables including temperature, humidity and pressure. With the advancement of technology weather forecasting has developed to its level best, but there is yet to develop, as far as a nature is so unpredictable. Weather forecasts are increasingly accurate and useful, and their benefits extend widely across the economy. While much has been accomplished in improving weather forecasts, there remains much room for improvement. Simultaneously, they are developing new technologies and observational networks that can enhance forecaster skill and the value of their services to their users.

7.SCOPE FOR FUTURE ENHANCEMENT

The website we created in this project can be further developed into get the weather by touch the place on the map, and this can be developed for a mobile application.it gives the time to weather update and warn about the weather.

8.BIBILOGRAPHY

[1] https://www.javatpoint.com/weather-app-in-django

[2]https://www.geeksforgeeks.org

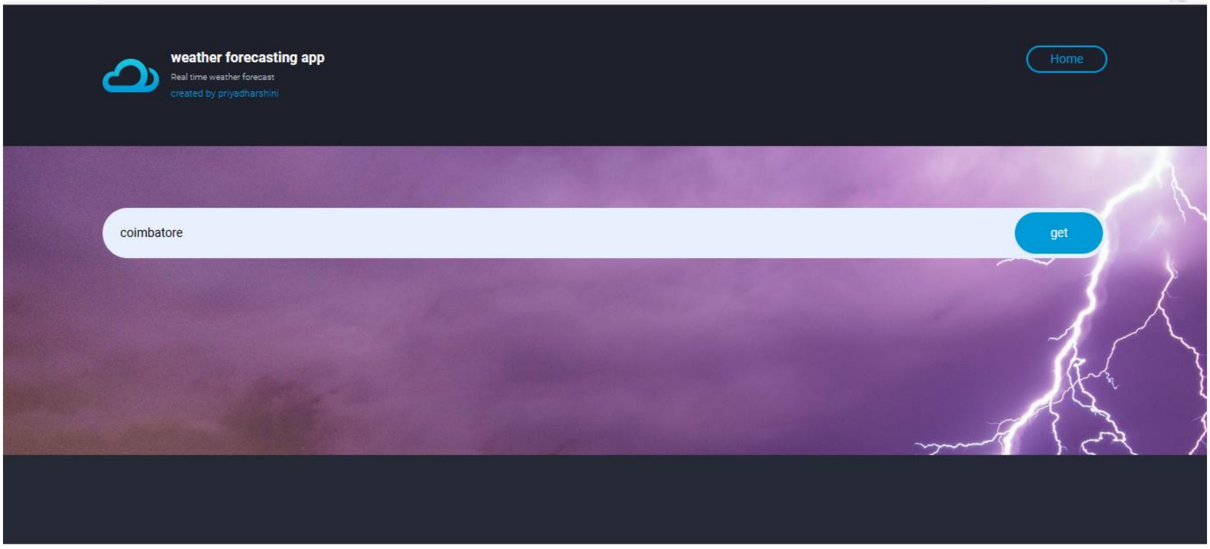
[3] www.digitalocean.com

[4**]** Samuli natri (2019) Django the easy way**.** third edition

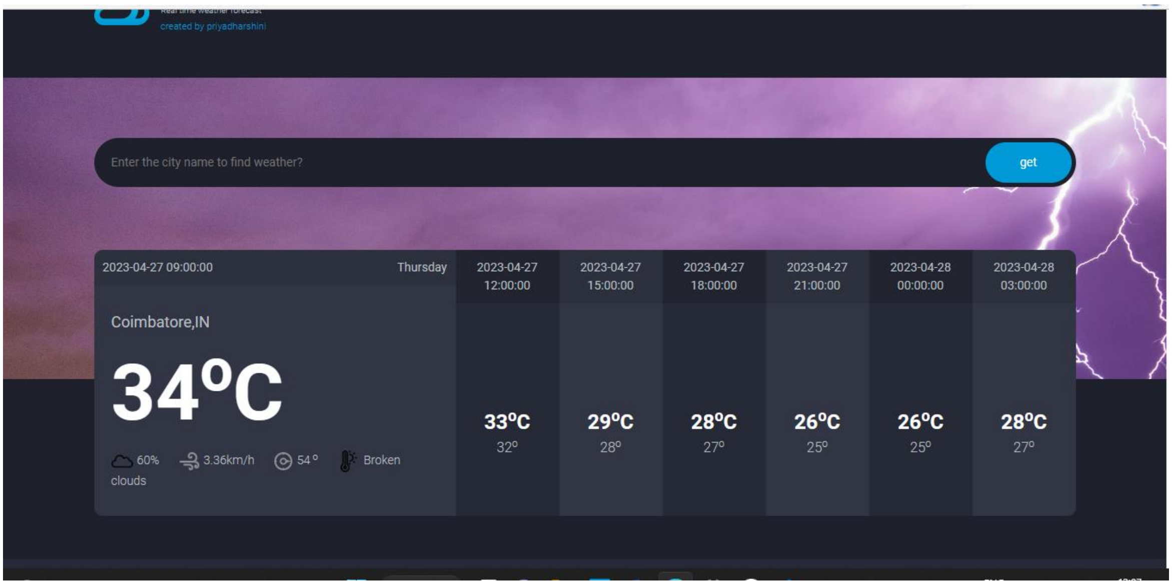
[5] William S Vincent (2020) Django for beginners build website with python & *Django. Welcometocode* 4th edition

9. APPENDICS

A. SCREENSHORTS



coimbatore


Real time weather forecast
created by priyadharshini
Enter the city name to find weather?
get

2023-04-27 09:00:00 Thursday

Coimbatore,IN

34°C

60% clouds 3.36km/h 54 ° Broken

2023-04-27 12:00:00	2023-04-27 15:00:00	2023-04-27 18:00:00	2023-04-27 21:00:00	2023-04-28 00:00:00	2023-04-28 03:00:00
33°C	29°C	28°C	26°C	26°C	28°C
32°	28°	27°	25°	25°	27°

B. SAMPLE CODING:

```
INSTALLED_APPS = [
    'django.contrib.admin',

    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
    'weather_api'
]

MIDDLEWARE = [
    'django.middleware.security.SecurityMiddleware',
    'django.contrib.sessions.middleware.SessionMiddleware',
    'django.middleware.common.CommonMiddleware',
    'django.middleware.csrf.CsrfViewMiddleware',
    'django.contrib.auth.middleware.AuthenticationMiddleware',
    'django.contrib.messages.middleware.MessageMiddleware',
    'django.middleware.clickjacking.XFrameOptionsMiddleware',
]
ROOT_URLCONF = 'WeatherBug.urls'

TEMPLATES = [
    {
        'BACKEND': 'django.template.backends.django.DjangoTemplates',
        'DIRS': [os.path.join(BASE_DIR, 'templates')],
        'APP_DIRS': True,
        'OPTIONS': {
            'context_processors': [
                'django.template.context_processors.debug',
                'django.template.context_processors.request',
                'django.contrib.auth.context_processors.auth',
                'django.contrib.messages.context_processors.messages',
            ],
        },
    },
]

WSGI_APPLICATION = 'WeatherBug.wsgi.application'

# Database
# https://docs.djangoproject.com/en/3.0/ref/settings/#databases
DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': os.path.join(BASE_DIR, 'db.sqlite3'),
    }
}
```