A Mini Project Synopsis on

Weather Prediction System

S.E. - I.T Engineering

Submitted By

Rohan Ahire	**20104133**
Chirag Kadam	**20104105**
Pratham Bhagwat	**20104095**
Atharva Anaklwar	**20104098**

Under The Guidance Of

Prof. Manjusha Shelke

DEPARTMENT OF INFORMATION TECHNOLOGY

A.P.SHAH INSTITUTE OF TECHNOLOGY

G.B. Road, Kasarvadavali, Thane (W), Mumbai-400615

UNIVERSITY OF MUMBAI

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CERTIFICATE

This to certify that the Mini Project report on **Weather Prediction System** has been submitted by **Rohan Ahire (20104133)**, **Chirag Kadam (20104105)**, **Pratham Bhagwat (20104095)** and **Atharva Anaklwar (20104098)** who are a Bonafede students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2020-2021** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

Guide :- Prof Manjusha Shelke

Prof. Kiran Deshpande
Head Department of Information Technology

Dr. Uttam D.Kolekar
Principal

External Examiner(s)
1.
2.

Place:A.P.Shah Institute of Technology, Thane
Date:

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Chapter 1

Introduction

Weather Prediction 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 previous data in database(dataset). The role of the admin is to add previous weather data in database, 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.

1.1 Purpose:

The central concept of the application is to allow the user to see the weather prediction virtually using the Internet and allow user free access to weather services and features freely.

There are several reasons why weather forecasts and predictions are important. It is a product of science that impacts the lives of many people. The following is a list of various purposes why weather predictions are important:

1. Helps people prepare for how to dress (i.e. warm weather, cold weather, windy weather, rainy weather).
2. Helps businesses plan for transportation hazards that can result from the weather (i.e. fog, snow, ice, storms, clouds as it relates to driving and flying for example)
3. Helps people prepare if they need to take extra gear to prepare for the weather (i.e. umbrella, rain coat, sun screen).
4. Helps people with health-related issues to plan the day (i.e. allergies, asthma, heat stress).

5.Helps people plan outdoor activities (i.e. to see if rain/storms/cold weather will impact outdoor event).

6. Helps farmers and gardeners plan for crop irrigation and protection (irrigation scheduling, freeze protection).

1.1 Objectives:

- To develop an efficient, reliable and effective Weather Prediction System.
- To manage all the information about weather and its changes at one place.
- To provide detailed information of day and night temperature, climate, wind speed, humidity, pressure, sunrise and sunset time, etc to the user.

1.2 Scope:

Severe weather alerts and advisories:

A major part of modern weather forecasting is the severe weather alerts and advisories which are the national weather service's issue in anticipation of severe or hazardous weather are expected. This is done to protect life and property. Some of the most commonly known of severe weather advisories are the severe thunderstorm and tornado warning, as well as the severe thunderstorm and tornado watch. Other forms of these advisories include winter weather, high wind, flood, tropical cyclone, and fog. Severe weather advisories and alerts are broadcast through the media, including radio, using emergency systems as the Emergency Alert System which breaks into regular programming.

Predicting the behavior of the cloud for Air transport :

The aviation industry is especially sensitive to the weather and accurate weather forecasting is essential. Fog or exceptionally low ceilings can prevent many aircraft from landing and taking off. Turbulence and icing are also significant in-flight hazards. Thunderstorms are a problem for all aircrafts because of severe turbulence due to their updrafts and outflow boundaries, icing due to the heavy precipitation, as well as large hail, strong winds, and lightning, all of which can cause severe damage to an aircraft in flight. Volcanic ash is also a significant problem for aviation, as aircraft can lose engine power within ash clouds.

Prediction of waterways in a sea:

Commercial and recreational use of waterways can be limited significantly by wind direction, speed, wave periodicity, high tides and precipitation. These factors can each influence the safety of marine transit. Consequently, a variety of codes have been established to efficiently transmit detailed marine weather forecasts to vessel pilots via radio, for example marine forecast. Typical weather forecasts can be received at sea through the use of Radio fax.

Agricultural development:

Weather plays an important role in agricultural production. It has a profound influence on the growth, development and yields of a crop. Weather aberrations may cause (i) physical damage to crops and (ii) soil erosion. The quality of the crop produced during movement from field to storage and transport to market depends on weather. Bad weather may affect the quality of the produce during transport and viability and vigor of seeds and planting material during storage.

Avoiding Forest fire:

Weather forecasting of wind, precipitations and humidity is essential for preventing and controlling wildfires. Different indices, like the Forest fire weather indexand the Haines Index, have been developed to predict the areas more at risk to experience fire from natural or human causes. Conditions for the development of harmful insects can also be predicted by weather forecasting.

Chapter 2

Problem Definition

Progress toward an organizational solution of the weather forecasting problem depends directly on the nature of the problem itself, that is, how it is viewed and formulated. The real problem may be identified through an enquiry into the nature of prediction and the physical properties of the atmosphere whose future state we wish to know. An analysis of prediction shows it to be generically similar to problem-solving or decision-making.

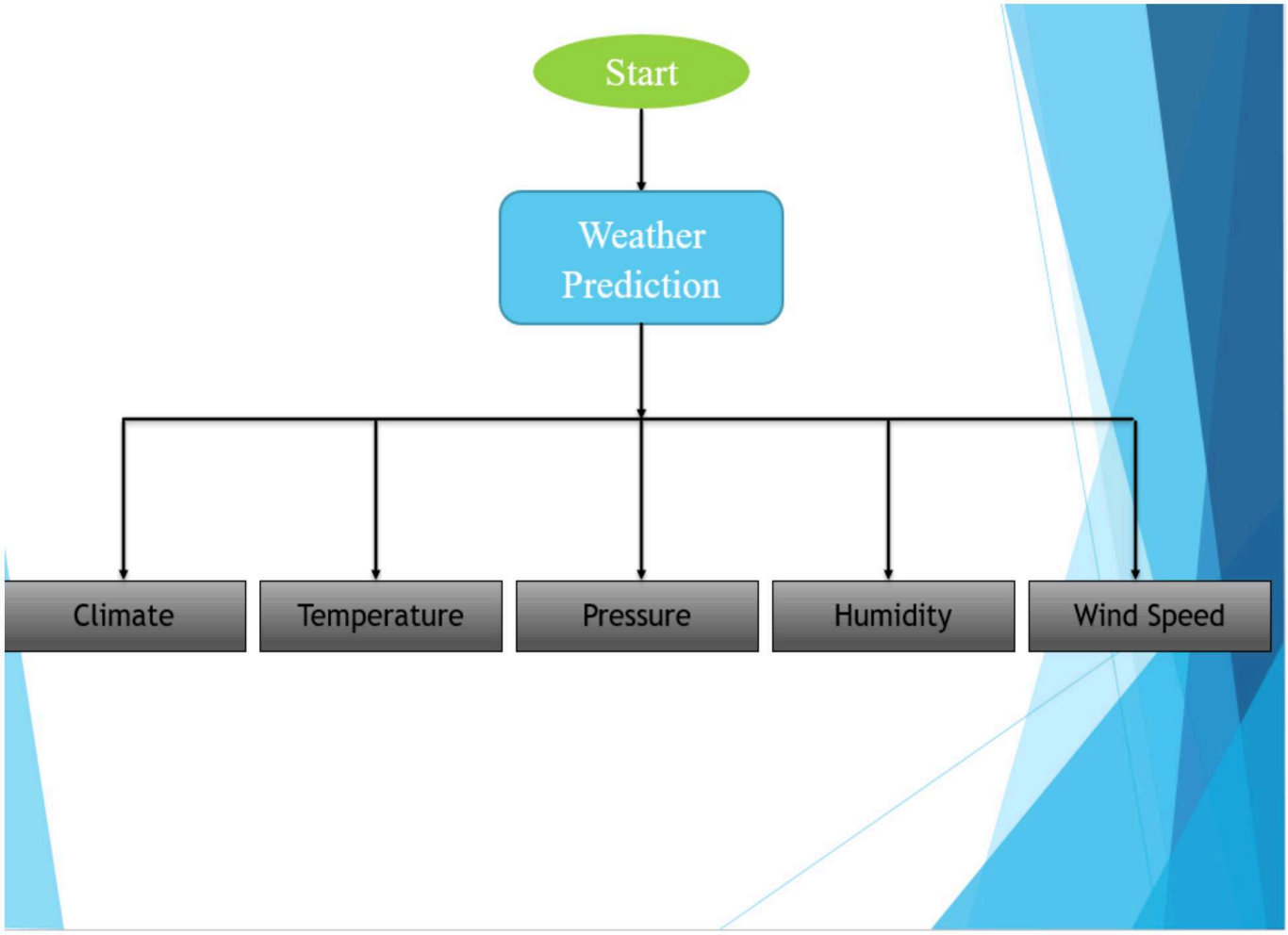
There are five known prediction techniques or methods for computing future events—persistence, trend, cyclic, associative and analogue. Regarding the second aspect of the enquiry, the atmosphere has certain distinguishable scales of motion or eddy size having different time and space characteristics, commonly called macro or planetary scale, synoptic scale, meso-scale and micro-scale, respectively. Weather forecasting is then considered as a special case of prediction applied to the atmosphere, leading to the formulation of a general schematic solution to the complete weather forecasting problem.

Chapter 3

Proposed System :

User will enter current temperature; humidity and wind, System will take this parameter and will predict weather from previous data in database. The role of the admin is to add previous weather data in database, so that system will calculate weather 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.

Figure 3.1 ER – Diagram



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3.1 Features And Functionality:

- Time to Time Weather Updates.
- Temperature Updates.
- Data prediction from last 7 days
- Displays Weather changes in every hours.
- Provides accurate information about weather and its changes.
- User can search Weather related information anytime and anywhere.
- It provides Weather Data of any places.
- Helps user in decision making.
- Helps user for future plans.

Chapter 4

- **Project Outcome:**

- The goal of weather prediction is to provide information to people and organizations about the weather.

- Can be used to reduce weather-related losses.

- To make it convenient to the user to get the information of weather easily at any time.

- To enhance societal benefits, including protection of life and property, public health and safety from bad conditions of weather.

Chapter 5

Software Requirements:

Technology Used:

- **Front-end:** Tkinter
- **Integrated Development Environment (IDE):** VS Code
- **Platform:** Windows 10/11

Python :

Python is a high-level, general-purpose programming language with an elegant syntax that allows programmers to focus more on problem-solving than on syntax errors. One of the primary goals of Python Developers is to keep it fun to use. Python has become a big buzz in the field of modern software development, infrastructure management, and especially in Data Science and Artificial Intelligence. Python is a high-level, general-purpose programming language. Its design philosophy emphasizes code readability with the use of significant indentation. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small- and large-scale projects.

Tkinter :

Tkinter is a graphical user interface (GUI) module for Python, you can make desktop apps with Python. You can make windows, buttons, show text and images amongst other things.Tk and Tkinter apps can run on most Unix platforms. This also works on Windows and Mac OS. The module Tkinter is an interface to the Tk GUI toolkit. Tkinter is a Python binding to the Tk GUI toolkit. It is the standard Python interface to the Tk GUI toolkit, and is Python's de facto standard GUI. Tkinter is included with standard GNU/Linux, Microsoft Windows and macOS installs of Python. The name Tkinter comes from Tk interface. Tkinter is one of the most popular Python GUI libraries for developing desktop applications.

This framework provides Python users with a simple way to create GUI elements using the widgets found in the Tk toolkit. Tk widgets can be used to construct buttons, menus, data fields, etc. in a Python application. Python has a lot of GUI frameworks, but Tkinter is the only framework that's built into the Python standard library. Tkinter has several strengths. It's cross-platform, so the same code works on

Windows, macOS, and Linux. However, Tkinter is lightweight and relatively painless to use compared to other frameworks. This makes it a compelling choice for building GUI applications in Python, especially for applications where a modern sheen is unnecessary, and the top priority is to quickly build something that's functional and cross-platform.

Python GUI Programming With Tkinter :

- Displaying Text and Images With Label Widgets.
- Displaying Clickable Buttons With Button Widgets.
- Getting User Input With Entry Widgets.
- Getting Multiline User Input With Text Widgets.
- Assigning Widgets to Frames With Frame Widgets.
- Adjusting Frame Appearance With Reliefs.

Chapter 6

Project Design :

In this phase, a logical system is built which fulfils the given requirements. Design phase of software development deals with transforming the clients's requirements into a logically working system. Normally, design is performed in the following in the following two steps:

1. **Primary Design Phase:**

   In this phase, the system is designed at block level. The blocks are created on the basis of analysis done in the problem identification phase. Different blocks are created for different functions emphasis is put on minimizing the information flow between blocks.
   Thus, all activities which require more interaction are kept in
   one block.

2. **Secondary Design Phase:**

   In the secondary phase the detailed design of every block is performed.

The general tasks involved in the design process are the following:

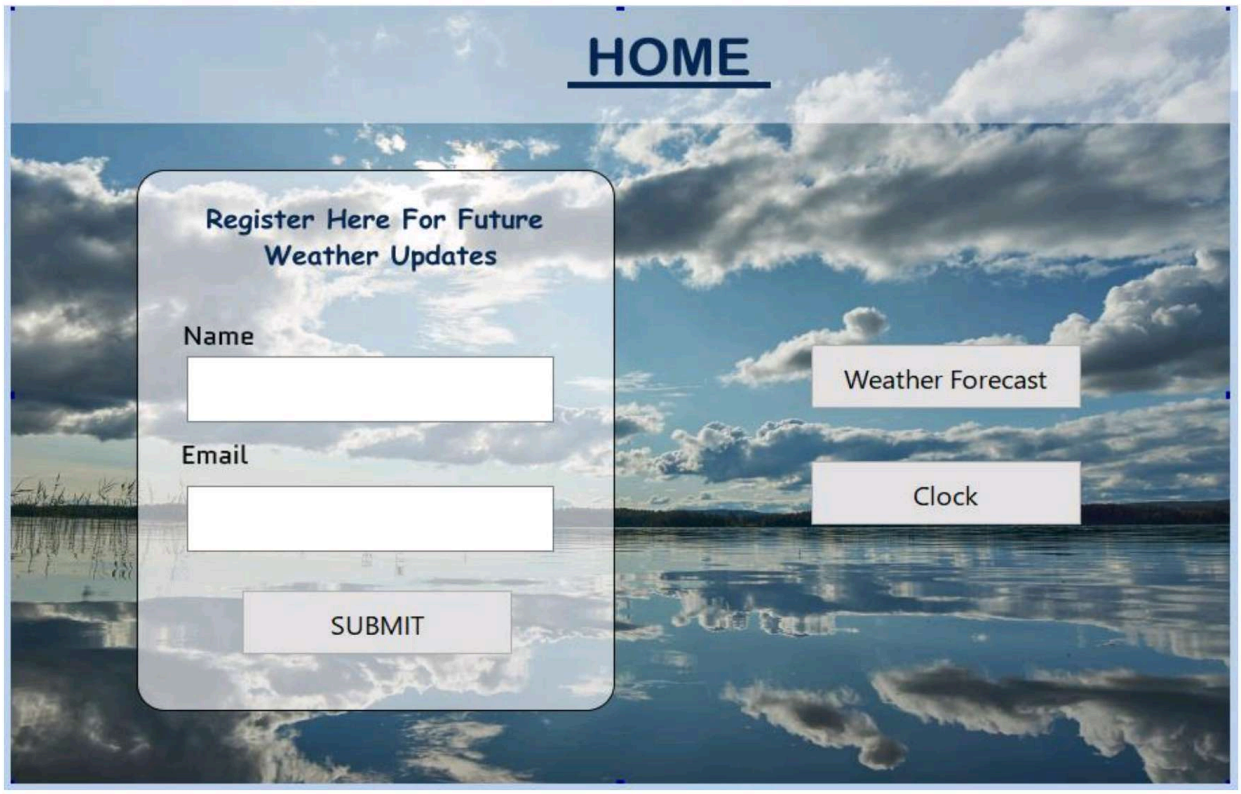
- Design various blocks for overall system processes.
- Design smaller, compact and workable modules in each block.
- Design various database structures.
- Specify details of programs to achieve desired functionality.
- Design the form of inputs, and outputs of the system.
- Perform documentation of the design.
- System reviews.

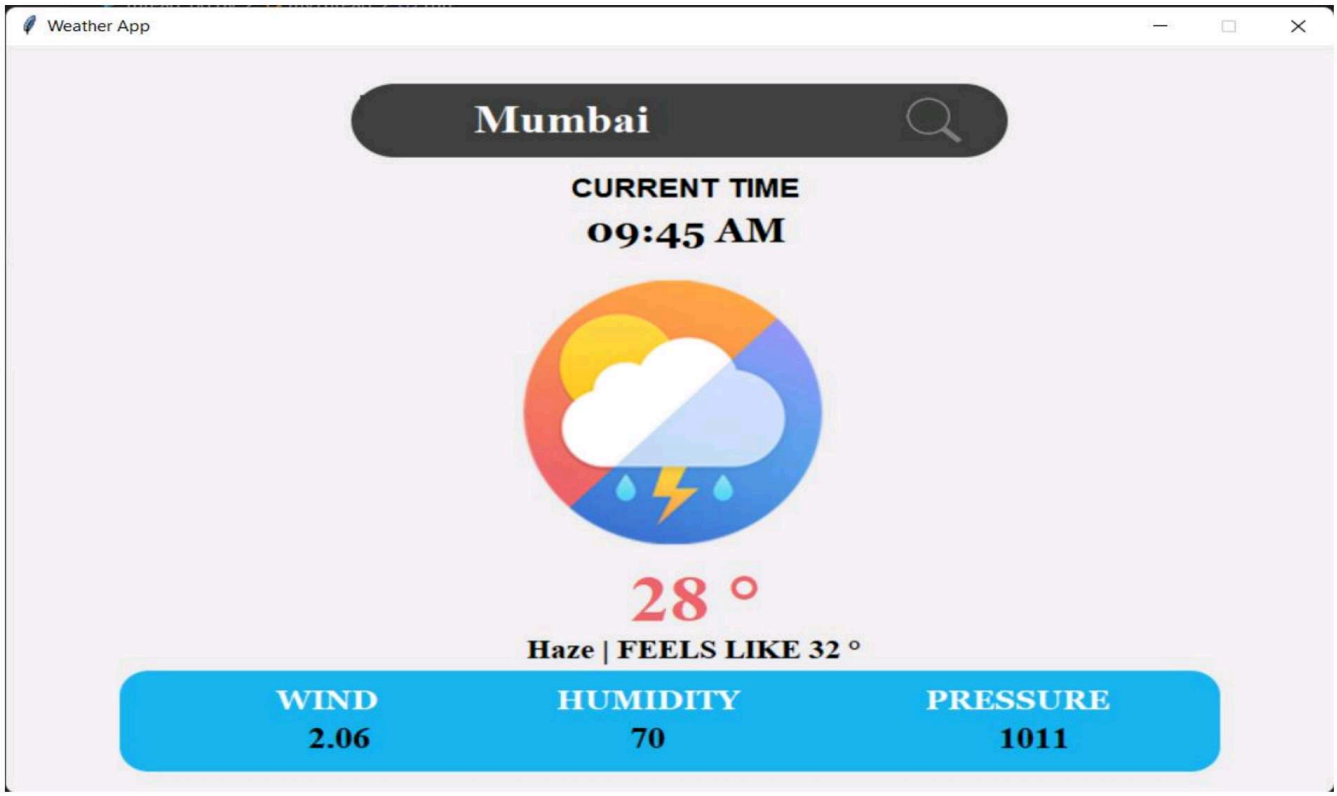
User Interface Design:

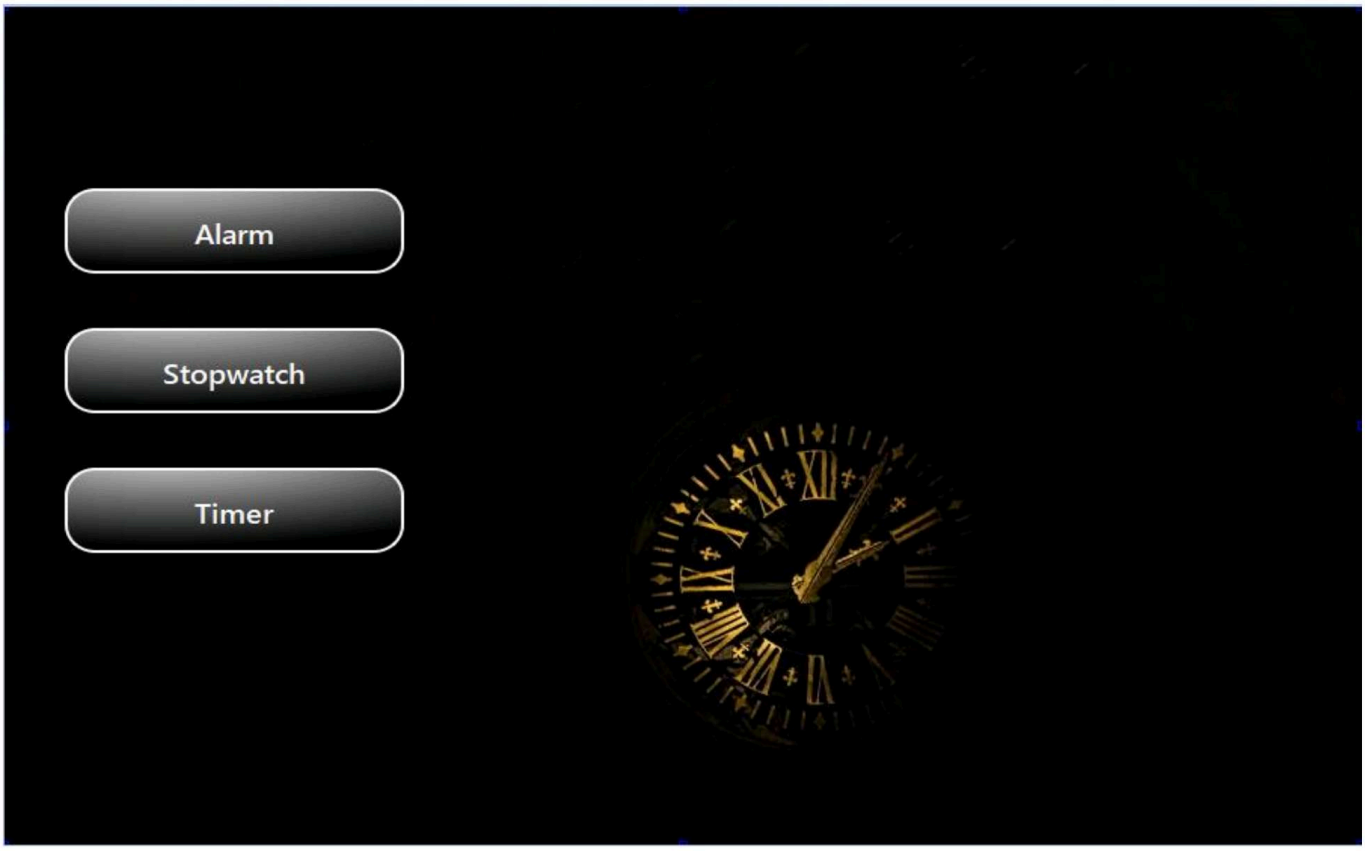
User Interface Design is concerned with the dialogue between a user and the computer. It is concerned with everything from starting the system or logging into the system to the eventually presentation of desired inputs and outputs. The overall flow of screens and messages is called a dialogue.

The following steps are various guidelines for User Interface Design:

- The system user should always be aware of what to do next.
- The screen should be formatted so that various types of information, instructions, and messages always appear in the same general display area.
- Message, instructions, or information should be displayed long enough to allow the system user to read them.
- Use display attributes sparingly.
- Default values for fields and answers to be entered by the user should be specified.
- A user should not be allowed to proceed without correcting an error.
- The system user should never get an operating system message or fatal error.




Weather App
Mumbai
CURRENT TIME
09:45 AM
28 °
Haze | FEELS LIKE 32 °
WIND
2.06
HUMIDITY
70
PRESSURE
1011


Alarm
Stopwatch
Timer

Chapter 7

Project Scheduling Template

Sr. No	Group Member	Time duration	Work to be done
1	**Rohan Ahire Chirag Kadam Pratham Bhagwat Atharva Ankalwar**	1st week of February to end of 2nd week of February	Designing of user Interface
2	**Rohan Ahire Chirag Kadam Pratham Bhagwat Atharva Ankalwar**	3rd week of February to end of February.	Testing GUI with data base with Registration Page
	Rohan Ahire Chirag Kadam Pratham Bhagwat Atharva Ankalwar	1 st week of March to end of 2nd week of March	Fixing all major bugs and Errors
3	**Rohan Ahire Chirag Kadam Pratham Bhagwat Atharva Ankalwar**	3rd week of March to end of March.	Implementing GUI frames and connecting each other

4	**Rohan Ahire** **Chirag Kadam** **Pratham Bhagwat** **Atharva Ankalwar**	1 st and 2nd week of April.	GUI with database ********** connectivity

Chapter 8

Conclusion:

Our project is only a humble venture to satisfy the needs of user for getting weather information services. Several user friendly coding have also adopted. This package shall prove to be a powerful package in satisfying all the requirements for Weather Prediction System

At the end it is concluded that we have made effort on following points…

- A description of the background and context of the project and its relation to work already done in the area.
- Made statement of the aims and objectives of the project.
- The description of Purpose, Scope, and applicability.
- We define the problem on which we are working in the project.
- We describe the requirement Specifications of the system and the actions that can be done on these things.
- We understand the problem domain and produce a model of the system, which describes operations that can be performed on the system.
- We included features and operations in detail, including screen layouts.
- We designed user interface and security issues related to system.
- Finally the system is implemented and tested according to test cases.

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