A Mini Project Report on

AQI TRACKER

S.E. I.T Engineering.

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CERTIFICATE

This to certify that the Mini Project report on **AQI TRACKER** has been submitted by **VAISHNAVI BHALERAO** (**21204007**), **MAYURESH KALKAR** (**21204010**) and **SAHIL JADHAV** (21204013) **PALLAVI TAMBE** (21204001) 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.

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ACKNOWLEDGEMENT

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1.Introduction

In addition to land and water, air is the prime resource for sustenance of life. With the technological advancements, a vast amount of data on ambient air quality is generated and used to establish the quality of air in different areas. The large monitoring data result in encyclopaedic volumes of information that neither gives a clear picture to a decision maker nor to a common man who simply wants to know how good or bad the air is? One way to describe air quality is to report the concentrations of all pollutants with acceptable levels (standards). As the number of sampling stations and pollution parameters (and their sampling frequencies) increase, such descriptions of air quality tend to become confusing even for the scientific and technical community.

As for the general public, they usually will not be satisfied with raw data, time series plots, statistical analyses, and other complex findings pertaining to air quality. The result is that people tend to lose interest and can neither appreciate the state of air quality nor the pollution mitigation efforts by regulatory agencies. Since awareness of daily levels of urban air pollution is important to those who suffer from illnesses caused by exposure to air pollution, the issue of air quality communication should be addressed in an effective manner. Further, the success of a nation to improve air quality depends on the support of its citizens who are well-informed about local and national air pollution problems and about the progress of mitigation efforts.

To address the above concerns, the concept of an Air Quality Index (AQI) has been developed and used effectively in many developed countries for over last three decades (USEPA 1976, 2014; Ontario, 2013; Shenfeld, 1970). An AQI is defined as an overall scheme that transforms weighted values of individual air pollution related parameters (SO2, CO, visibility, etc.) into a single number or set of numbers. There have not been significant efforts to develop and use AQI in India, primarily due to the fact that a modest air quality monitoring programme was started only in 1984 and public awareness about air pollution was almost non-existent. The challenge of communicating with the people in a comprehensible manner has two dimensions: (i) translate the complex scientific and medical information into simple and precise knowledge and (ii) communicate with the citizens in the 2 historical, current and futuristic sense. Addressing these challenges and thus developing an efficient and comprehensible AQI scale is required for citizens and policy makers to make

decisions to prevent and minimize air pollution exposure and ailments induced from the exposure.

1.1 Purpose

The air quality index (AQI) is an index for reporting air quality on a daily basis. It is a measure of how air pollution affects one's health within a short time period. The purpose of the AQI is to help people know how the local air quality impacts their health. The Environmental Protection Agency (EPA) calculates the AQI for five major air pollutants, for which national air quality standards have been established to safeguard public health.

1. Ground-level ozone

2. Particle pollution/particulate matter (PM2.5/pm 10)

3. Carbon Monoxide

4. Sulfur dioxide

5. Nitrogen dioxide

The higher the AQI value, the greater the level of air pollution and the greater the health concerns. The concept of AQI has been widely used in many developed countries for over the last three decades. AQI quickly disseminates air quality information in real-time.

1.2 Objectives

The project aims to achieve the following:

- Inform public regarding overall status of air quality through a summation parameter that is easy to understand;
- Inform citizens about associated health impacts of air pollution exposure
- Rank cities/towns for prioritizing actions based on measure of AQI.
- Comparing air quality conditions at different locations/cities.
- It also helps in identifying faulty standards and inadequate monitoring programmes.
- AQI helps in analysing the change in air quality (improvement or degradation).
- AQI informs the public about environmental conditions. It is especially useful for people suffering from illnesses aggravated or caused by air pollution.

1.3 Scope

The Scope of the project are as follows:

- Review of available AQIs including international practices.
- Suggest health impact threshold limits for eight parameters for which short-term air quality standards are prescribed.
- Develop a uniform AQI considering objectives, health impacts, air quality standards, existing and future monitoring scenario including parameters, method and frequency of measurements, and other relevant aspects.
- Suggest qualitative description of air quality and associated likely health impacts for different AQI values.
- Evaluate AQI with data from a few major cities and towns.
- Develop web-based system for dissemination of AQI to public using current and historical air quality database and
- Finalize AQI and dissemination system in consultation with leading air quality experts, medical professionals working in the field of air pollution health impacts, State Pollution Control Boards and other stakeholders

2.Problem Definition

From smog hanging over cities to smoke inside the home, **air pollution poses a major threat to health and climate**. Ambient air pollution accounts for an estimated 4.2 million deaths per year due to stroke, heart disease, lung cancer, lung cancer, acute and chronic respiratory diseases.

6 PROBLEMS OF POLLUTION ON HEALTH.

- Pollution has a large impact on human health. ...
- The health impacts from many pollutants are completely.
- Pollution disproportionately kills the poor and the vulnerable. ...
- Pollution is closely tied to climate change and biodiversity. ...
- Pollution is neglected. ...
- Pollution is costly.

3.Proposed System

- The air quality index (AQI) is an index for reporting air quality on a daily basis. It is a measure of how air pollution affects one's health within a short time period.
- AQI quickly disseminates air quality information in real-time
- The purpose of the AQI is to help people know how the local air quality impacts their health.
- Tracking the Aqi of all the states and cities provided in API .
- Fetching the data from API (Application Programming Interface).
- Made used of Kaggle datasets of Past data , 2020 data set

3.1 Features and Functionality

- AQI is the ability to communicated data with the public, both easily and conveniently. AQI can demystify data – you don't need to be an expert to understand AQI values – they're easily scaled and color coded – there is no need to understand units and concentrations.
- Often data are communicated in relation to a standard – but this approach assumes that people understand that there are no safe limits for concentrations, and that just because concentrations are below a guideline doesn't mean that there are no health impacts.
- Transforming your data into something the public can understand is really valuable – you retain your traditional dataset, and for minimal effort and calculation you can present it in an understandable and recognizable form for everyone.
- AQI calculations are very straight forward – often they are as simple as assessing what range of values a concentration falls in.
- Accordingly they're very easy to display on websites or in real time on a screen. Since many AQI are calculated on the highest pollutant concentration, you can calculate an AQI using a single pollutant – so if your network of sites has a bit of variation is not a problem – you can still create a useful AQI from the data you have.

4. Project Outcomes

The AQI scale used for indexing the real-time pollution.

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	*...air quality conditions are:*	*...as symbolized by this color:*
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

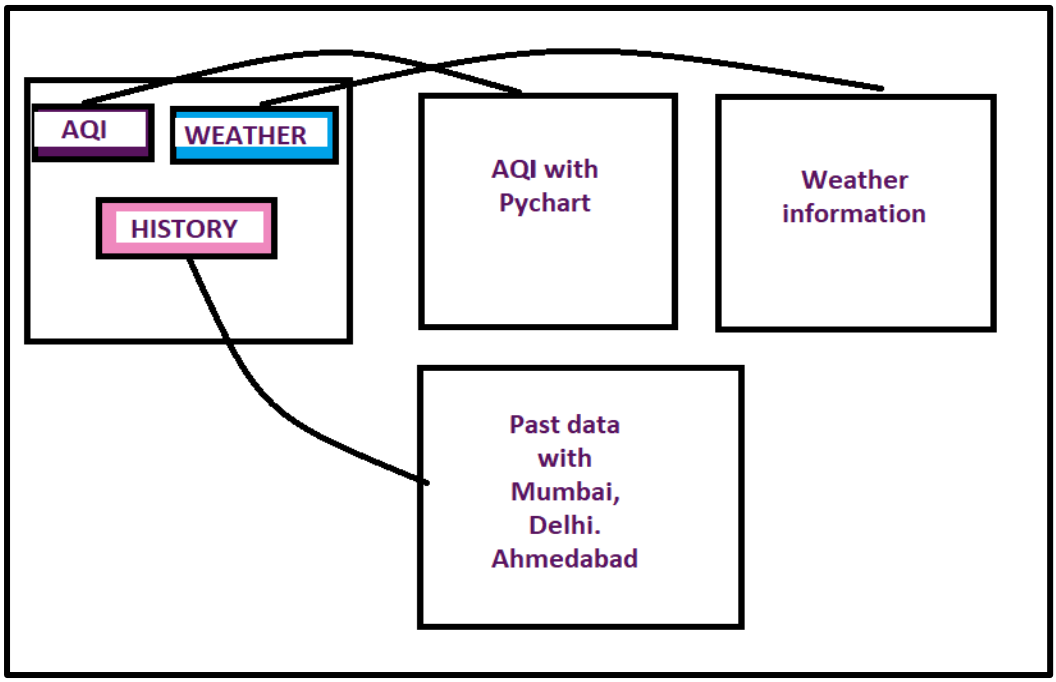
Air Quality Index Categories

- **Good (0–50) -** Minimal Impact
- **Satisfactory (51–100) -** May cause minor breathing difficulties in sensitive people.
- **Moderately polluted (101–200) -** May cause breathing difficulties in people with lung disease like asthma, and discomfort to people with heart disease, children and older adults.
- **Poor (201–300) -** May cause breathing difficulties in people on prolonged exposure, and discomfort to people with heart disease
- **Very Poor (301–400) -** May cause respiratory illness in people on prolonged exposure. Effect may be more pronounced in people with lung and heart diseases.
- **Severe (401-500) -** May cause respiratory issues in healthy people, and serious health issues in people with lung/heart disease. Difficulties may be experienced even during light physical active.

5. Software Requirements

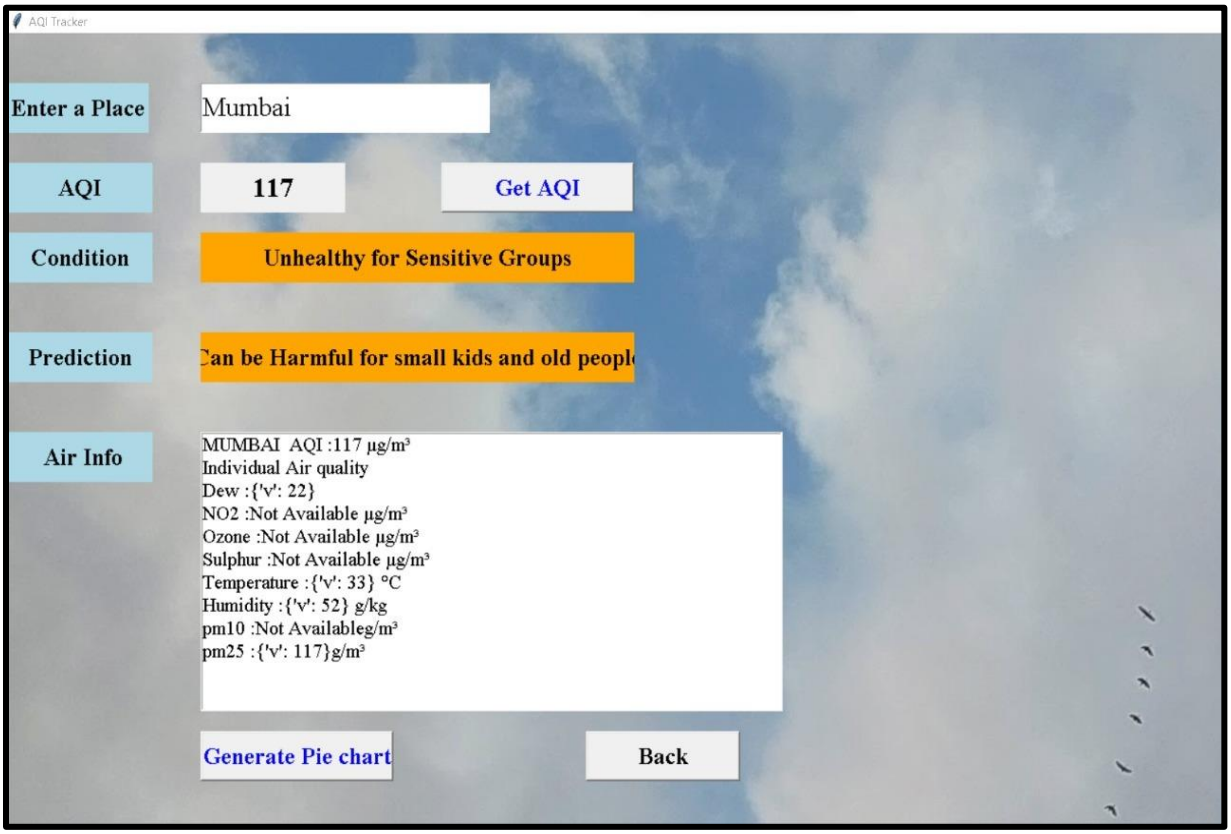
- VScode
- Python 3.0.1
- IDLE
- Python, Tkinter
- Database: xampp server

6. Project Design

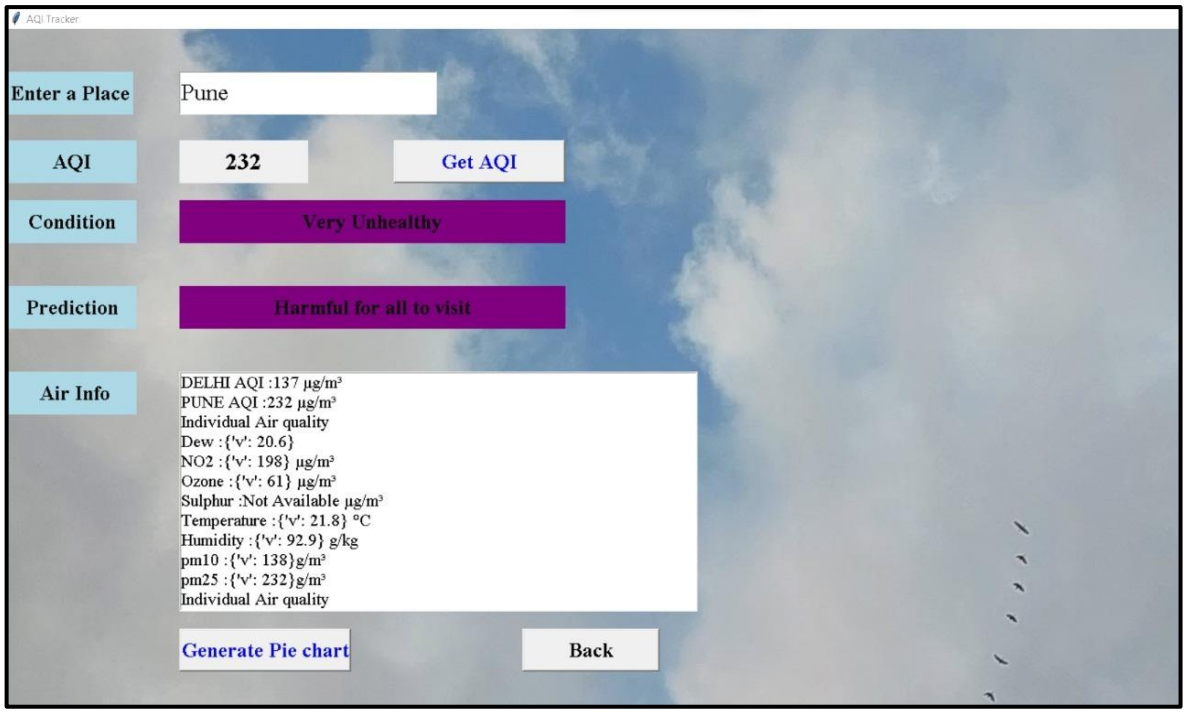


Output: Home Page

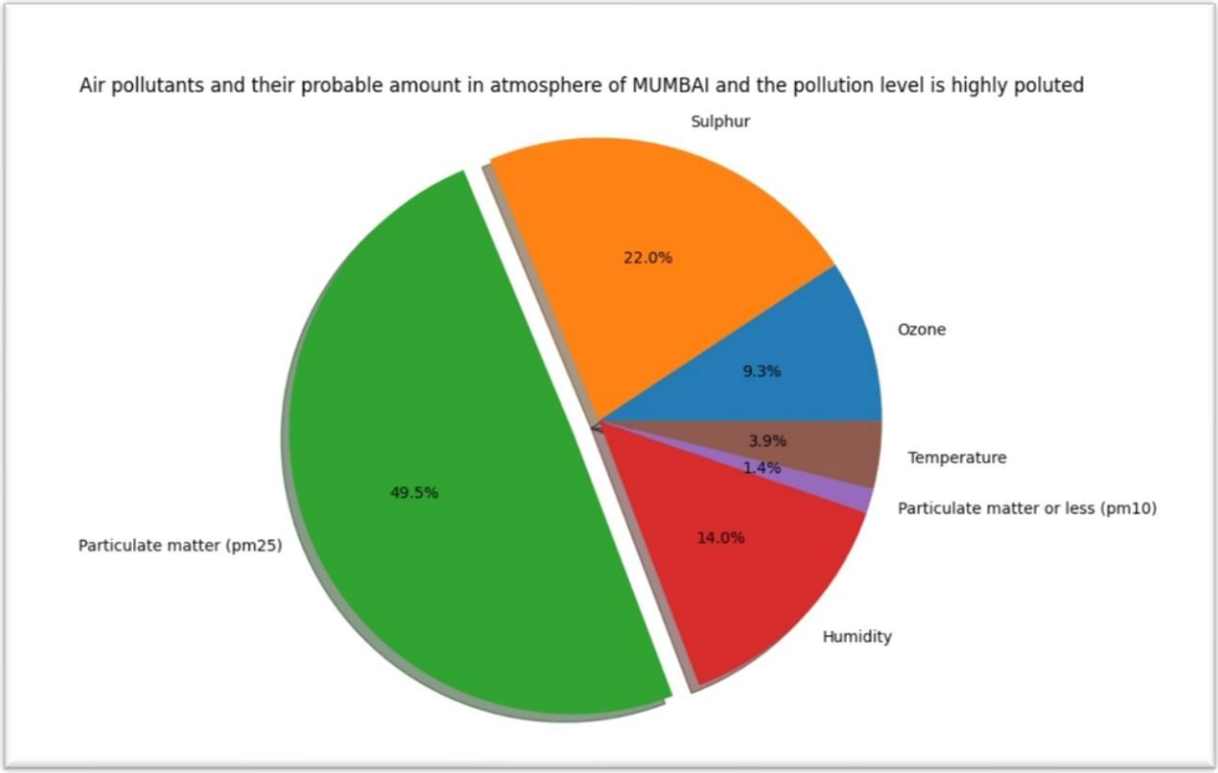
Aqi Page:



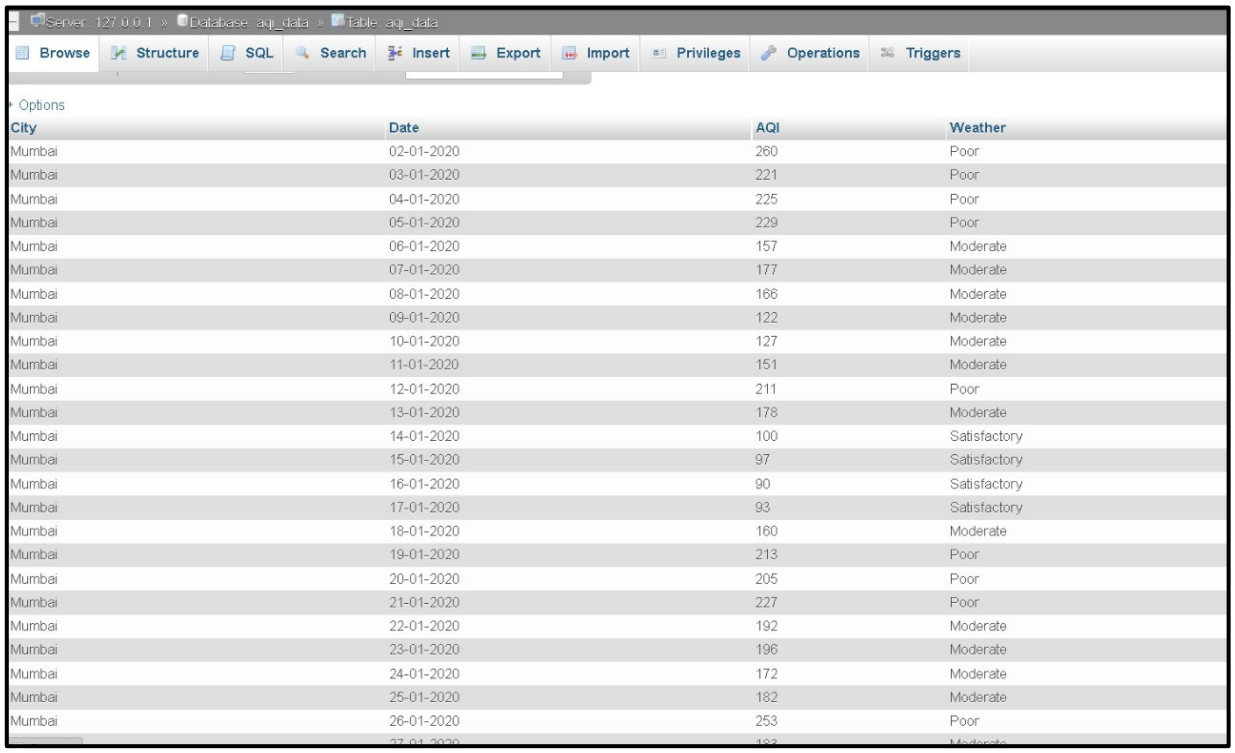
Aqi Page:



Pie Chart:



Database:



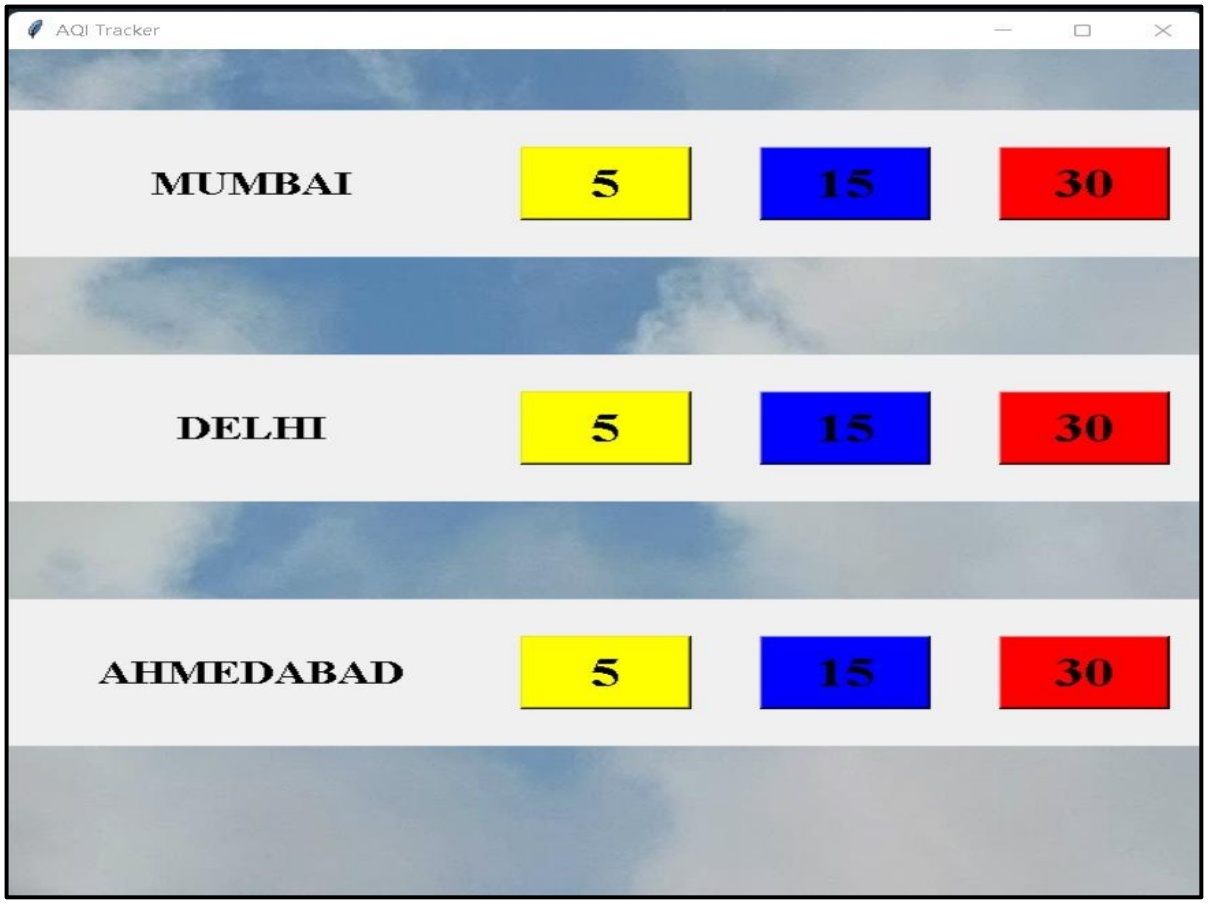
Server: 127.0.0.1 » Database: aqi_data » Table: aqi_data

Browse | Structure | SQL | Search | Insert | Export | Import | Privileges | Operations | Triggers

Options

City	Date	AQI	Weather
Mumbai	02-01-2020	260	Poor
Mumbai	03-01-2020	221	Poor
Mumbai	04-01-2020	225	Poor
Mumbai	05-01-2020	229	Poor
Mumbai	06-01-2020	157	Moderate
Mumbai	07-01-2020	177	Moderate
Mumbai	08-01-2020	166	Moderate
Mumbai	09-01-2020	122	Moderate
Mumbai	10-01-2020	127	Moderate
Mumbai	11-01-2020	151	Moderate
Mumbai	12-01-2020	211	Poor
Mumbai	13-01-2020	178	Moderate
Mumbai	14-01-2020	100	Satisfactory
Mumbai	15-01-2020	97	Satisfactory
Mumbai	16-01-2020	90	Satisfactory
Mumbai	17-01-2020	93	Satisfactory
Mumbai	18-01-2020	160	Moderate
Mumbai	19-01-2020	213	Poor
Mumbai	20-01-2020	205	Poor
Mumbai	21-01-2020	227	Poor
Mumbai	22-01-2020	192	Moderate
Mumbai	23-01-2020	196	Moderate
Mumbai	24-01-2020	172	Moderate
Mumbai	25-01-2020	182	Moderate
Mumbai	26-01-2020	253	Poor

History Page:

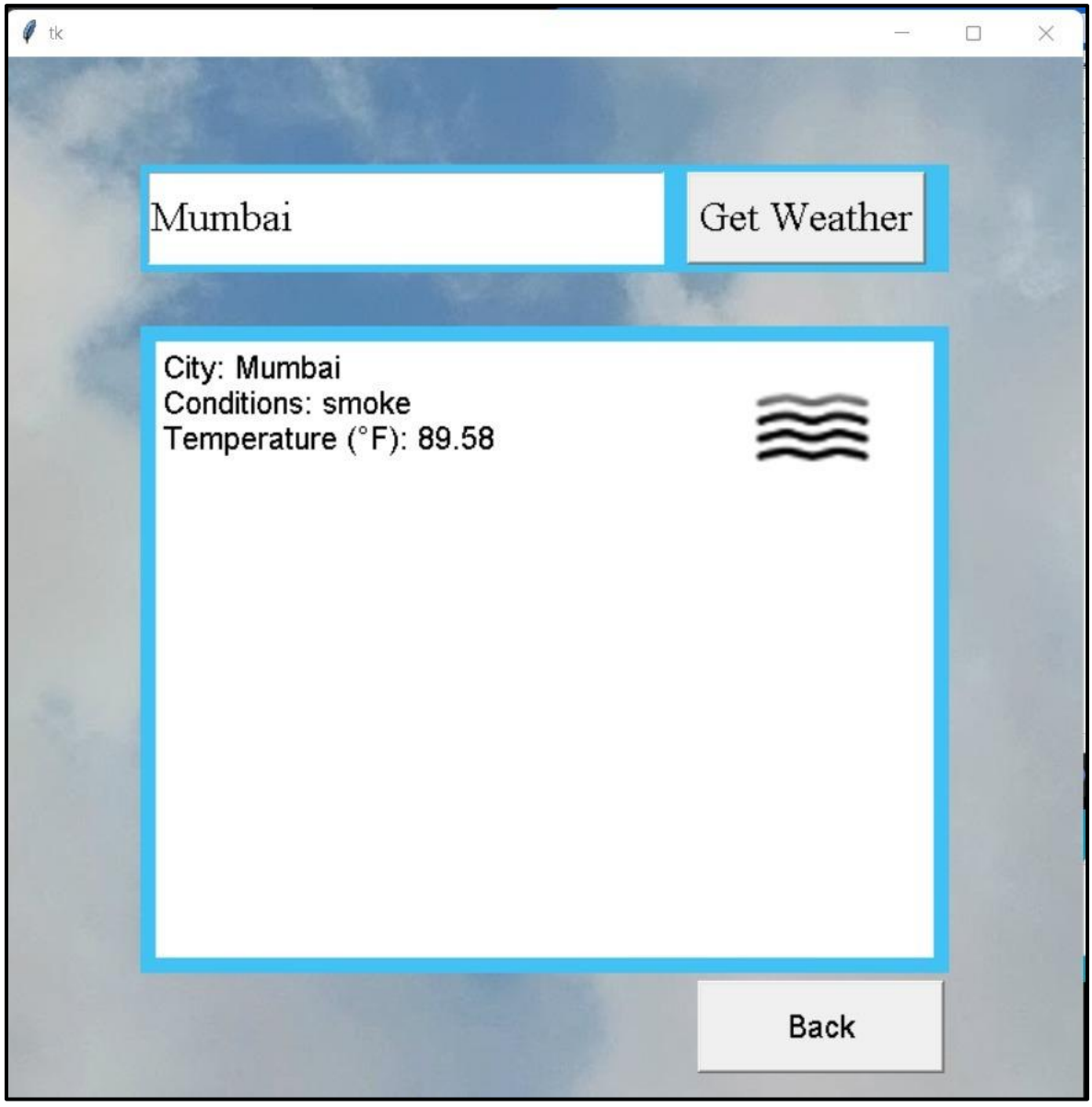


5 Days Data of Mumbai

5 days Data

Mumbai	02-01-2020	260	Poor
Mumbai	03-01-2020	221	Poor
Mumbai	04-01-2020	225	Poor
Mumbai	05-01-2020	229	Poor
Mumbai	06-01-2020	157	Moderate

Weather Page:



7. Project Scheduling

Serial Number	Group Member	Time Duration	Work to be done
1	**Vaishnavi Bhalerao**	1st,2nd week of march	Implementing 1st module/ functionality (Designing the AQI & database) Testing 1st module
2	**Mayuresh Kalkar**	3rd week of march	Implementing 2nd module/ functionality (Designing the weather api) Testing 2nd module
3	**Pallavi Tambe**	1st week of April	Implementing 3rd module/ functionality (Designing the pie chart & also help in GUI)
4	**Sahil Jadhav**	1st week of April	Report Writing

8.Conclusion

- In conclusion the project helps the public about environmental conditions. It is especially useful for people suffering from illnesses aggravated or caused by air pollution.
- We started off with a AQI level of 178 (Unhealthy) for the city of Beijing, this level was too high due to the fact that it is one of the most populated cities in the world without a "green culture".
- By analyzing the causes and control chart we implemented a solution for this process for which we were able lower the AQI to 98 which falls into the moderate level.
- We Improved the pie chart by deleting the out-of-control points and recalculating the control limits.
- Once the process was stable, we calculated the process capability analysis to understand the sigma level and observe the performance of the control chart.

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