

Configuration Manual

MSc Research Project
Artificial Intelligence

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MSc Project Submission Sheet
School of Computing



Student Name:Saurabh Sharma.....

Student ID:22168796.....

Programme:Artificial Intelligence..... **Year:** ...2024.....

Module:Thesis.....

Lecturer:

Submission Due Date: *
.....31st.....Jan.....2024.....

Project Title:Airfare price Optimization using Quantum Computing.....

Word Count:600..... **Page Count:**5.....

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.

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Signature:Saurabh.....Sharma.....

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Configuration Manual

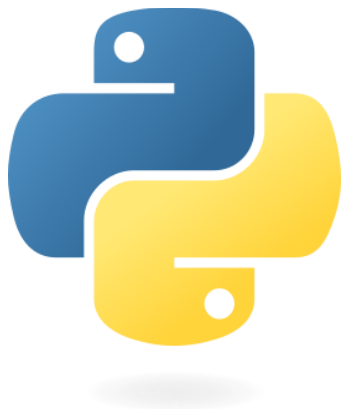
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The major goal of this project is to investigate the use of quantum computing techniques in improving airline pricing tactics. Traditional airline ticket pricing approaches entail complicated data analysis and simulations, with heuristic algorithms being used to explore large solution spaces. In contrast, quantum computing, with its capacity to analyze large datasets concurrently and use quantum parallelism, appears as a revolutionary technology with the potential to improve the efficiency and efficacy of flight pricing models.

1 Prerequisites

Ensure that the following software and libraries are installed on your system:

1. Python (version 3.6 or higher)
2. Jupyter Notebook (optional, for interactive exploration)
3. IBM Quantum Account required.
4. Link of Dataset and Presentation - [Thesis](#)



IBM Quantum Platform

2 System Setup

In the system I am using Windows 11 and RAM 8 GB is minimum required.

3 Installation

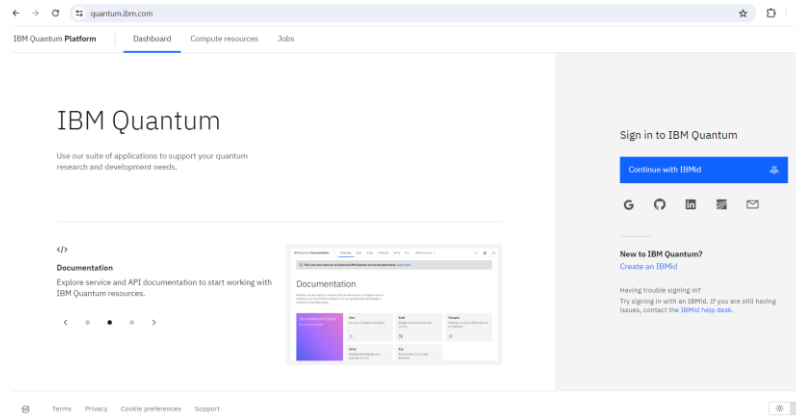
Pip will handle all dependencies automatically and you will always install the latest (and well-tested) version. The Code is written in Python 3.6.10.

1. Make sure you have Python installed on your system. You can download it from python.org.
2. Python Libraries:
 - pandas
 - numpy
 - seaborn
 - scikit-learn
 - XGBoost
 - datacleaner
 - fasteda
 - matplotlib
 - plotly
3. The code installs various Python packages, including Qiskit, datacleaner, qiskit-aer, qiskit-aqua, qiskit_algorithms, qiskit-machine-learning, and others.

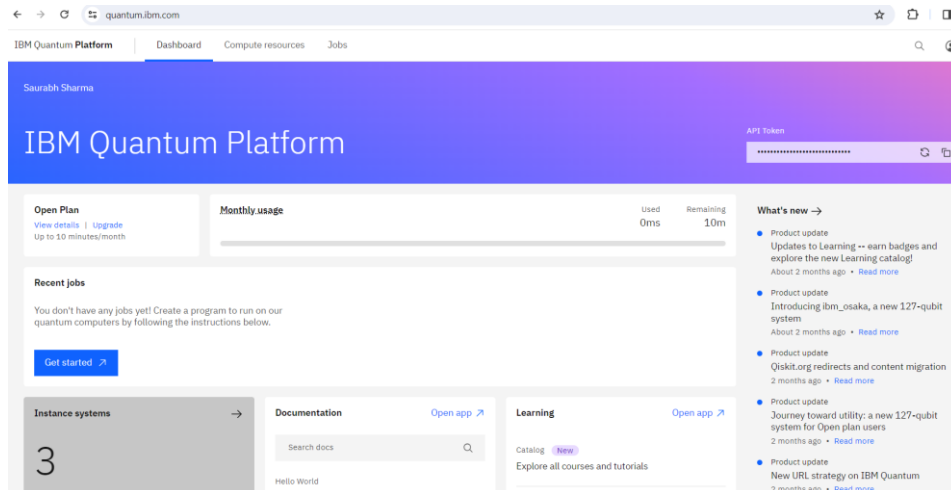


IBM Quantum Computer Login Setup

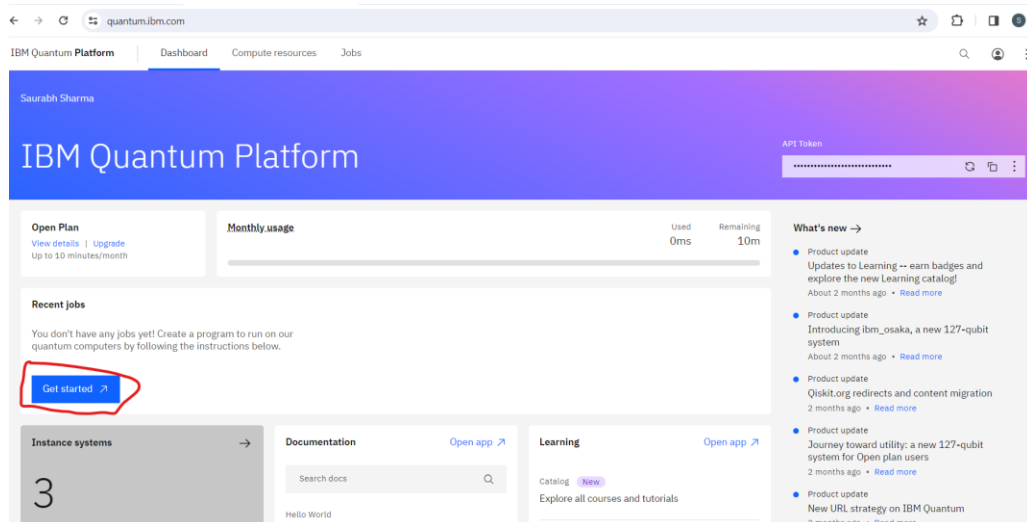
Step 1.



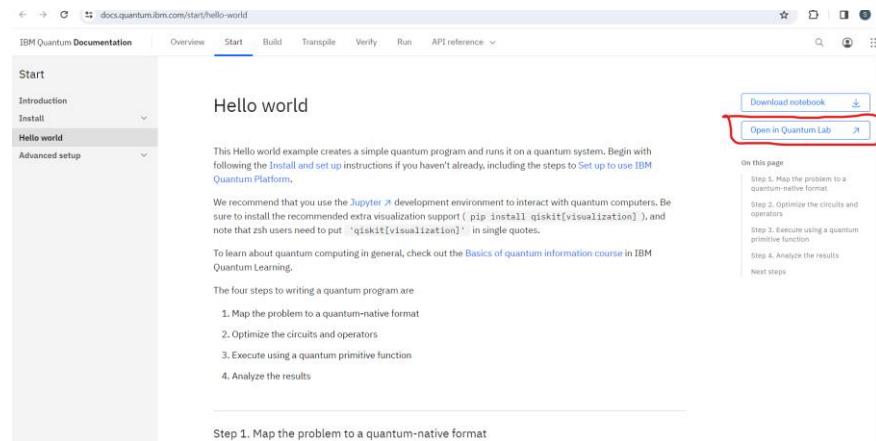
Step 2.



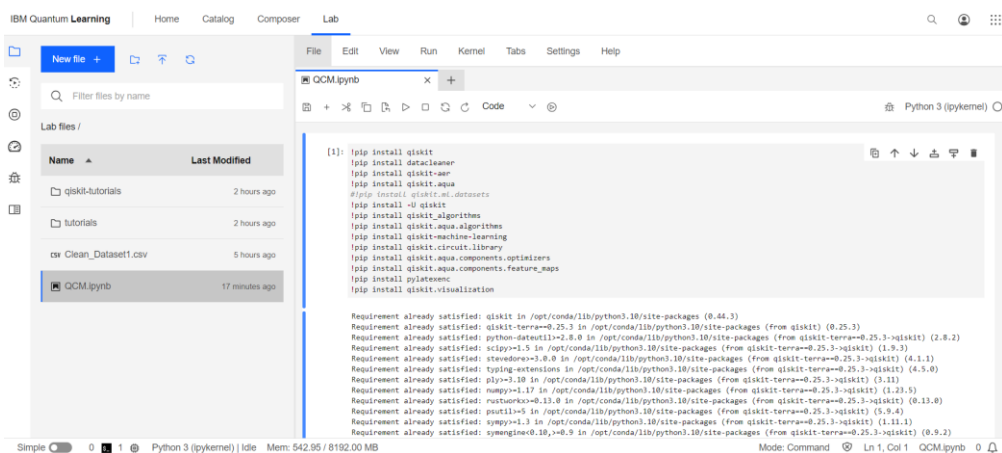
Step 3.



Step 4.



Step 5.



4 Configurations Code

Input Data:

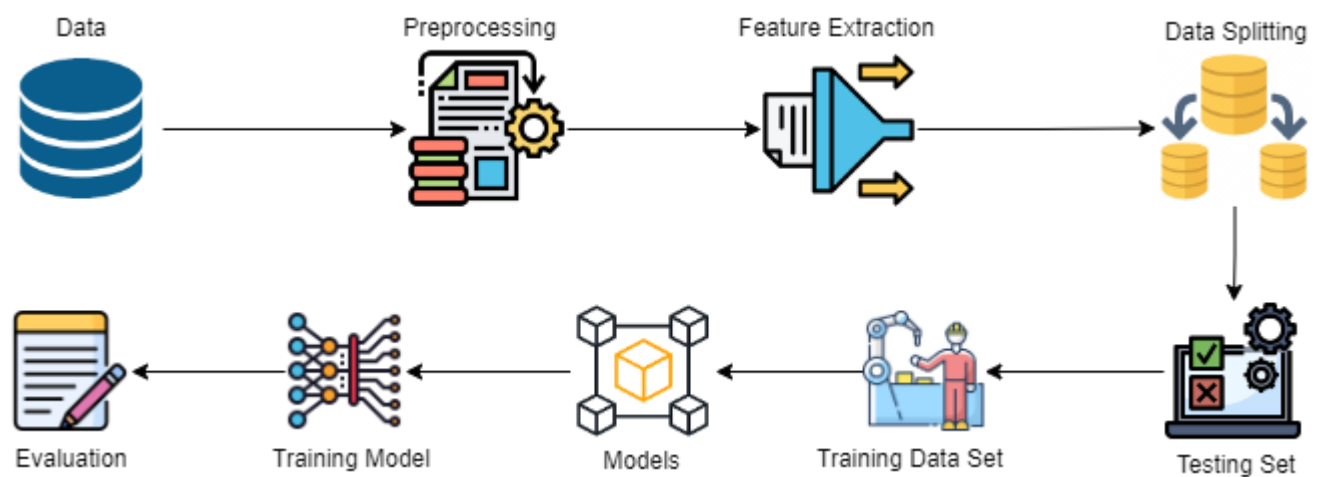
Ensure that you have a dataset (e.g., a CSV file) with the required information. Replace '`/content/drive/MyDrive/Airline/Clean_Dataset1.csv`' with the actual path to your dataset.

	Distance	airline	flight	source_city	departure_time	stops	arrival_time	destination_city	class	duration	days_left	price
0	1165	SpiceJet	SG-8709	Delhi	Evening	zero	Night	Mumbai	Economy	2.17	1	5953
1	1165	SpiceJet	SG-8157	Delhi	Early_Morning	zero	Morning	Mumbai	Economy	2.33	1	5953
2	1165	AirAsia	I5-764	Delhi	Early_Morning	zero	Early_Morning	Mumbai	Economy	2.17	1	5956
3	1165	Vistara	UK-995	Delhi	Morning	zero	Afternoon	Mumbai	Economy	2.25	1	5955
4	1165	Vistara	UK-963	Delhi	Morning	zero	Morning	Mumbai	Economy	2.33	1	5955

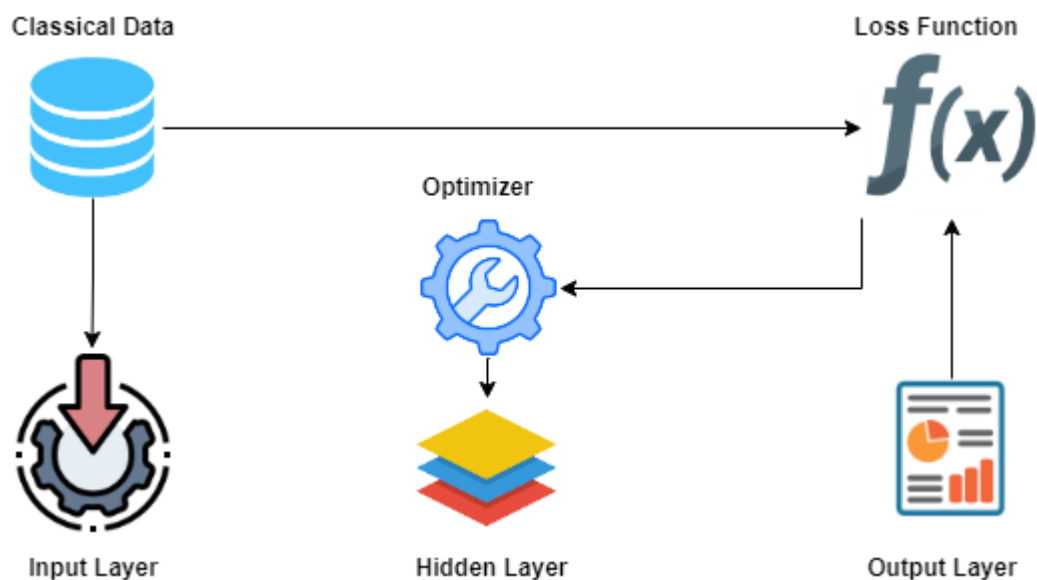
5 Preprocessing Steps

The dataset must be preprocessed before it can be used to create the model. The preprocessing phases include the following important procedures:

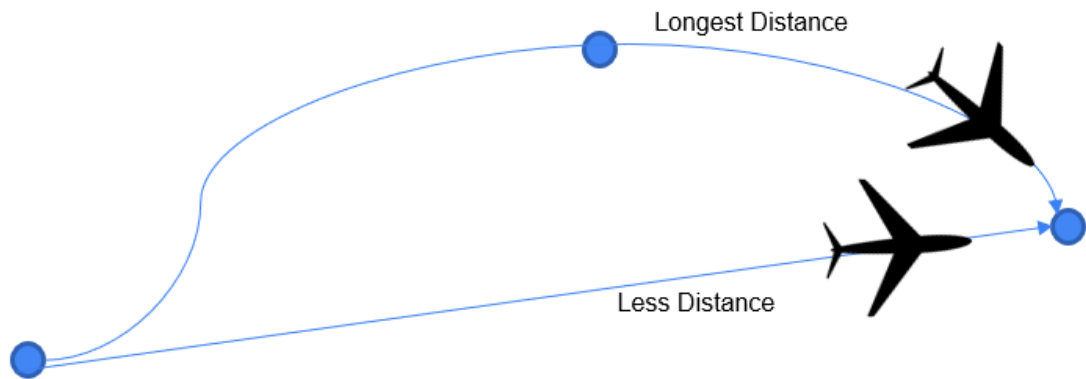
1. Importing the essential libraries to help with data manipulation.
2. The training and test datasets are loaded into pandas dataframes for easier processing.



3. Combining the training and test datasets into a single dataframe for thorough data analysis.



4. Cleaning and altering the data to remove missing values and extraneous columns, as well as converting text values to numeric values.
5. Encoding categorical variables into numerical representations to ensure model fit



Run each cell in your Jupyter Notebook or execute the code in your Python environment.