High Level Design (HLD)

Bike Rental Prediction

Document Version Control

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Abstract

Bike sharing systems are a new generation of traditional bike rentals where the whole process from membership, rental and return back has become automatic. Through these systems, users are able to easily rent a bike from a particular position and return back at another position. Currently, there are about over 500 bike-sharing programs around the world which is composed of over 500 thousand bicycles. Today, there exists great interest in these systems due to their important role in traffic, environmental and health issues. Apart from interesting real-world applications of bike sharing systems, the characteristics of data being generated by these systems make them attractive for the research.

This work helps to provide an end-to-end regression task that take input data from the user and predict the total count of rental bike that will be ranted in a given day.

Introduction:

Why this High-Level-Design Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

The HLD Will:

* Present all of the design aspects and define them in detail
* Describe the user interface being implemented
* Describe the hardware and software interfaces
* Describe the performance requirements
* Include design features and the architecture of the project
* Include design features and the architecture of the project
* List and describe the non-functional attributes like:
* Security
* Reliability
* Maintainability
* Portability
* Reusability
* Application comp
* Resource utilization

Scope:

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly technical terms which should be understandable to the administrators of the system.

General Description

Product Perspective:

The Bike rental prediction solution is a Machine Learning based model while predict the number of total bike count would be for the respective day.

Problem Statement:

The goal here is to build an end-to-end regression task. Here the user will provide the data and the result will be given by the best performing hyper tuned Machine Learning model. The user will also get privileges to choose the deployment options.

Proposed Solution:

The solution is to train a Machine Learning model’s using the bike rental dataset and the get best performing model.

Then use the best performing model for the prediction of future data.

Data Requirements:

The model is trained upon certain features to the data must contain must have following features: instance, date, season, year, months, hour, holiday, weekday, workingday, weather, temperature, atemp, humidity, and windspeed.

Tools Used:

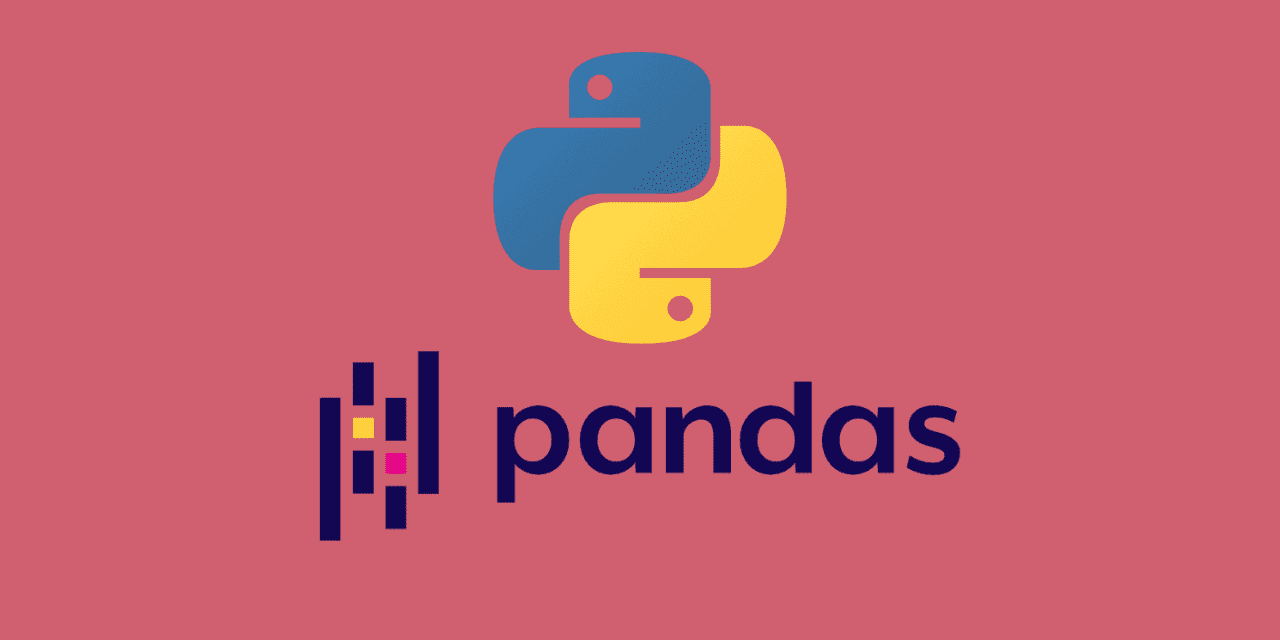












Design Details

Process Flow

Background pattern

Description automatically generated with low confidence

Model Training and Evaluation

Diagram

Description automatically generated

Deployment Process

Diagram

Description automatically generated

Event Log

The system should log all the event so the user can know what is running internally.

Error handling

Should errors be encountered, an explanation will be displayed as to what went wrong? An error will be defined as anything that falls outside the normal and intended usage.

Performance

The bike count Machine learning model is used to count the total number of rental bikes to be booked in a given day. Model retraining is important as the accuracy of model can be increased by having more data.

Reusability

The code is written in a such way the reusability will not be an issue.

Application Compatibility

The different components for this project will be using Python as an interface between them. Each component will have its own task to perform, and it is the job of the Python to ensure proper transfer of information.

Deployment

Text

Description automatically generated

Conclusion

The machine learning model will predict the number of bike will be rented in a given day whilst providing some information to the model.