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RESEARCH LABS

INNOVATION. AUTOMATION. ANALYTICS

PROJECT ON

Experiment Tracking and Model Management

(Sentiment Analysis Project)

Submitted by:

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About me

- Hi there! I am **Pandey Abhishek Nath Roy (IN1240134),** a fresher data enthusiast, currently learning various things to crack an opportunity to go further.
- Apart from this, I possess the problem solving ability and I am good at learning new things that makes me an ideal candidate to follow my dreams.

- I have previously worked as a data science intern at **"Innomatics Research Labs"** and right now, I am doing the internship to refine my skills at their highest level.

- Feel free to reach out! You can do so by following the below links:

  Github @vjabhi000985

  Linkedin

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OBJECTIVE OF THE PROJECT

- The objective of this task is to introduce you to MLflow for experiment tracking, model management, and reproducibility in machine learning projects for the **"Sentiment Analysis Project".**

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MLFLOW

- "MLflow" is an open source platform for managing the machine learning lifecycle.
- **What it does :-**
  - ❑ ***Tracks experiments:*** Logs parameters, metrics, and artifacts (models, code) during training runs.
  - ❑ ***Enables reproducibility:*** Compares experiments and facilitates replicating successful runs.
  - ❑ ***Model registry:*** Stores, versions, manages, and deploys trained models.
- **Benefits :-**
  - ❑ Improves Collaboration.
  - ❑ Streamline deployments and Automates workflows.

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Integration of MLflow into Projects

```
 # Install the required packages
$ pip3 install mlflow dagshub --quiet


import mlflow

mlflow.set_experiment("flipkart_review_sentiment_prediction")

# Start the experiment run
   with mlflow.start_run() as run:
         %time grid_search.fit(X_train, y_train)
```

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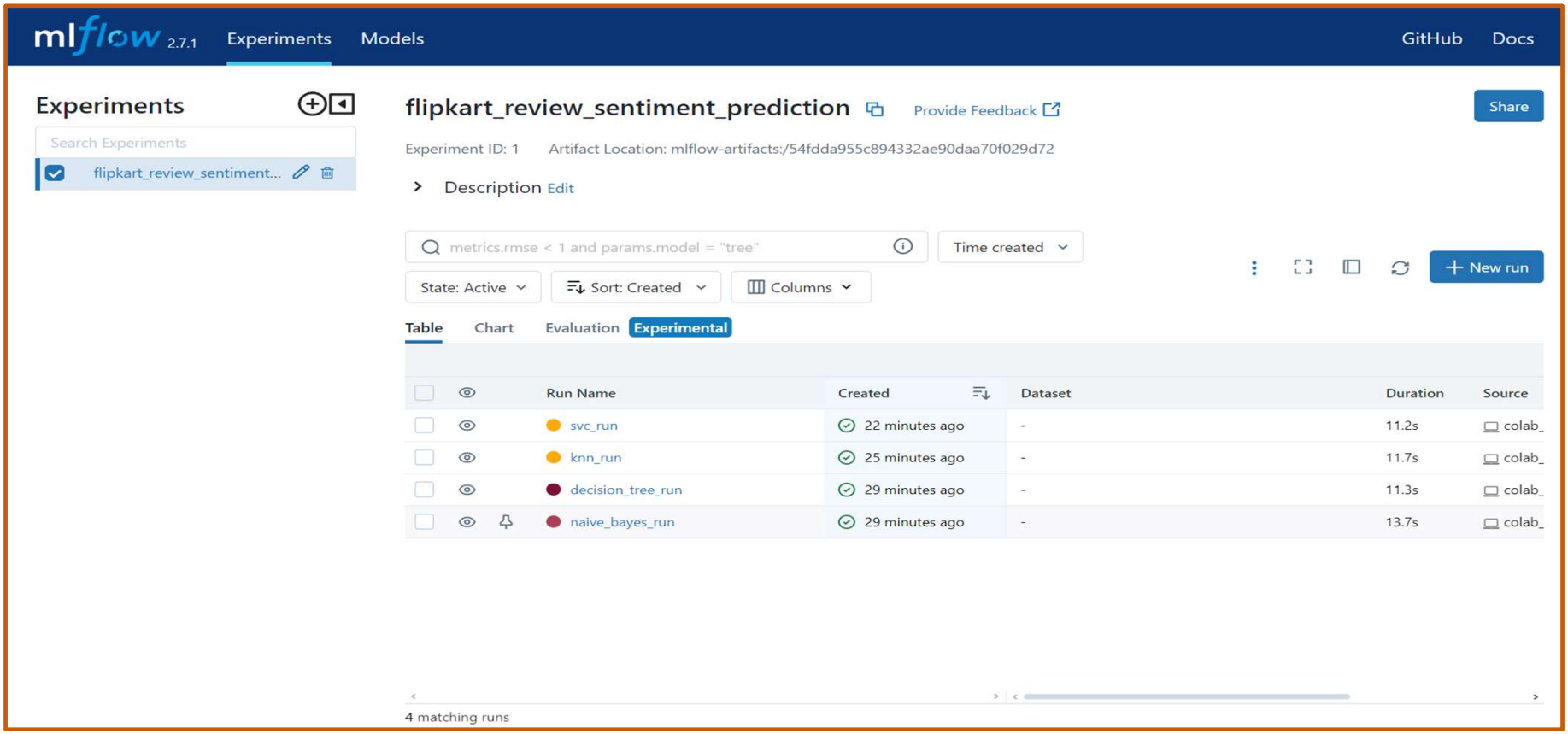
MLflow Dashboard



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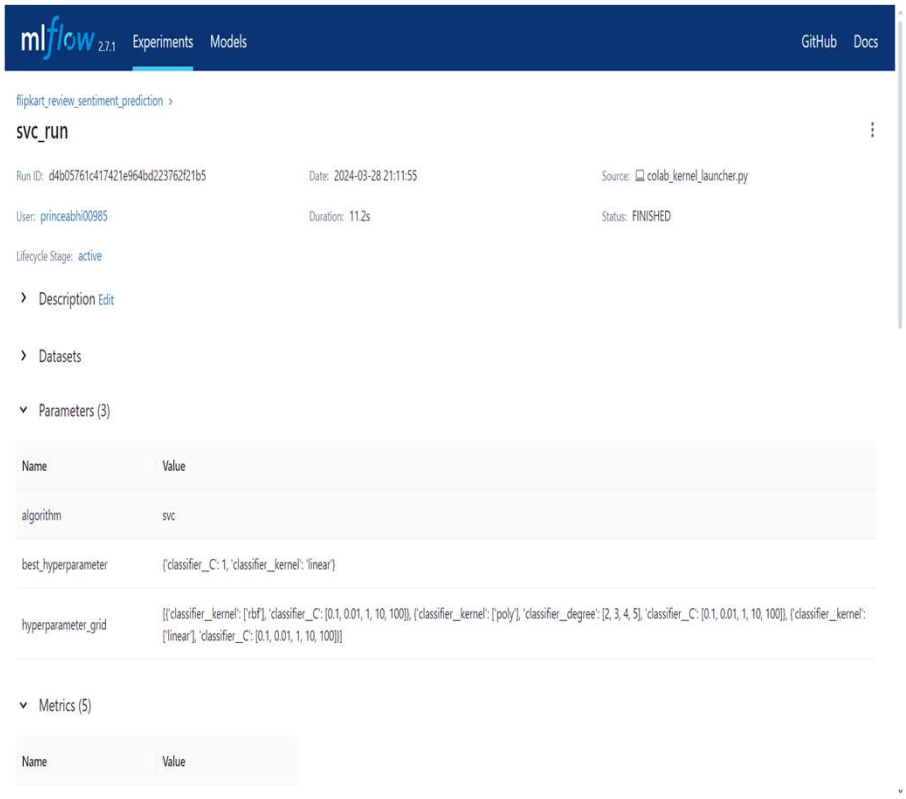
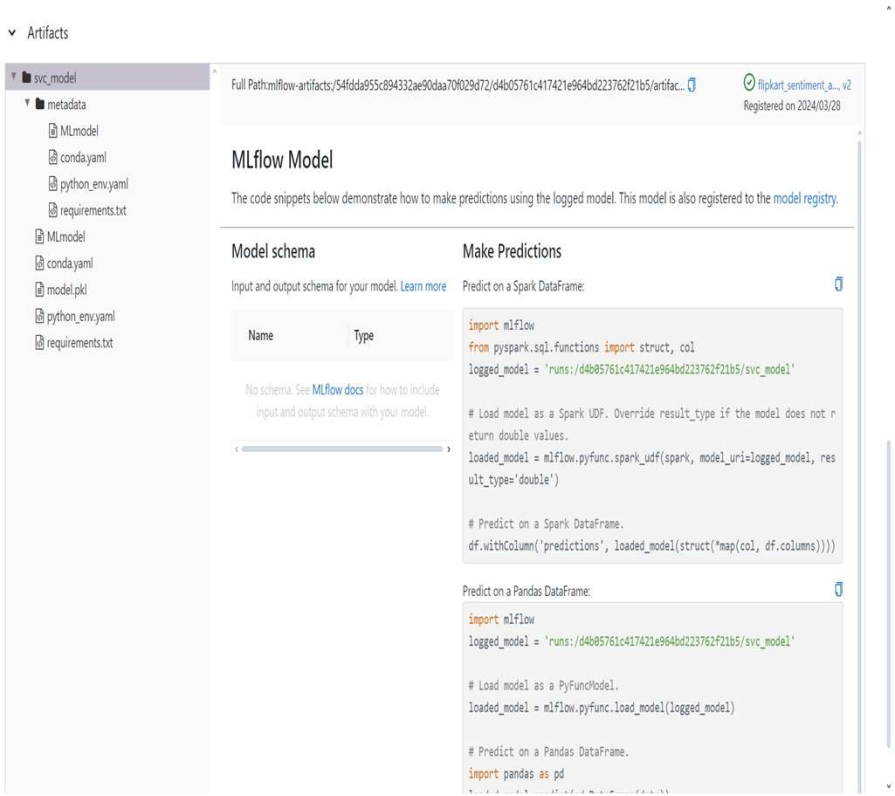
Demonstration of Parameters, Metrics and Artifacts





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Demonstration of Parameters, Metrics and Artifacts using MLflow tracking API

Click on "Experiment Name" -> Run Name -> (scroll down for) -> Parameters, Metrics and Artifacts .

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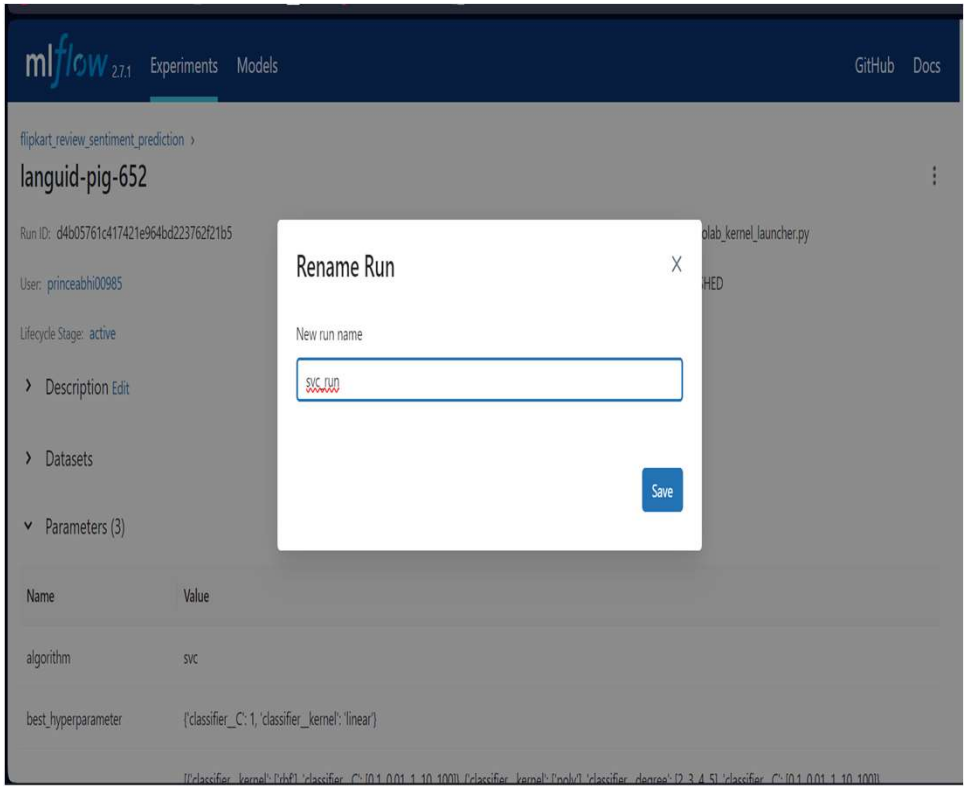
Customizing Mlflow with Run Names

Click on the run name -> Right corner : 3 dots -> Rename -> Give the name of run -> Save



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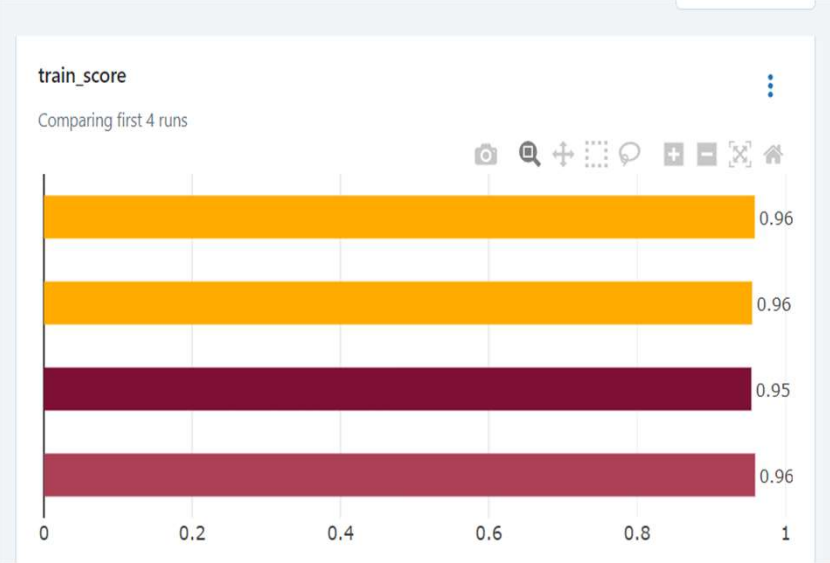
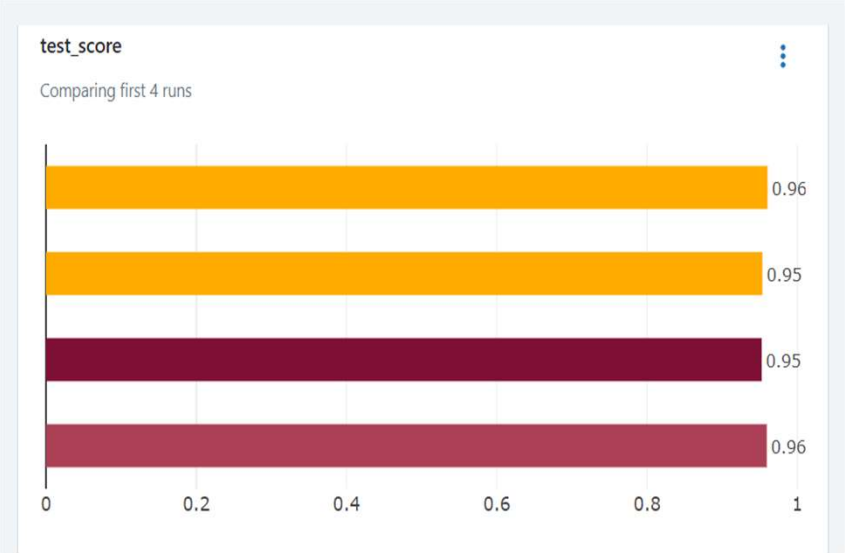
Metric Plots :





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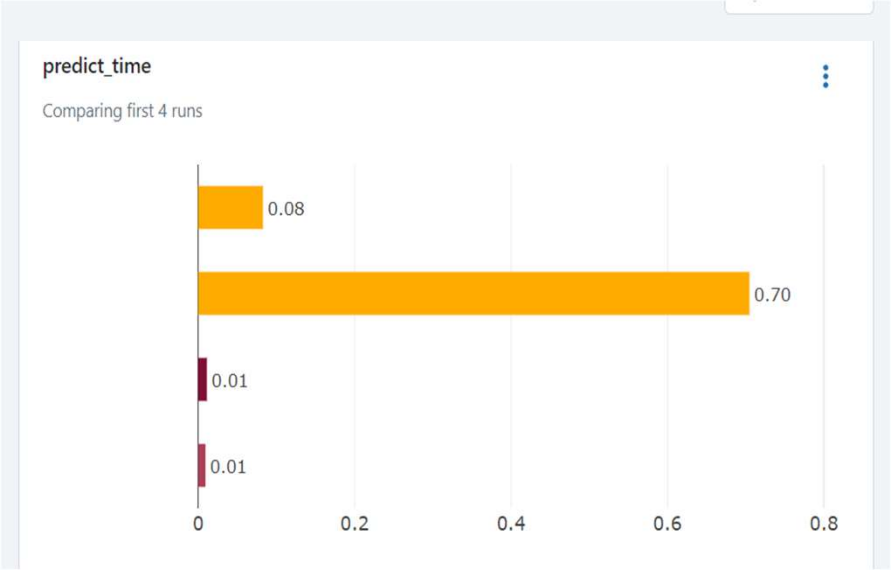
Metric Plots :



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Hyperparameter Plots Creation

Click on charts -> Add Section -> Name hyperparameter with model ->
Add Parallel coordinates chart -> give parameters and metrics of particular run ->
Click on the run-name's "+" : This will pop interactive chart.

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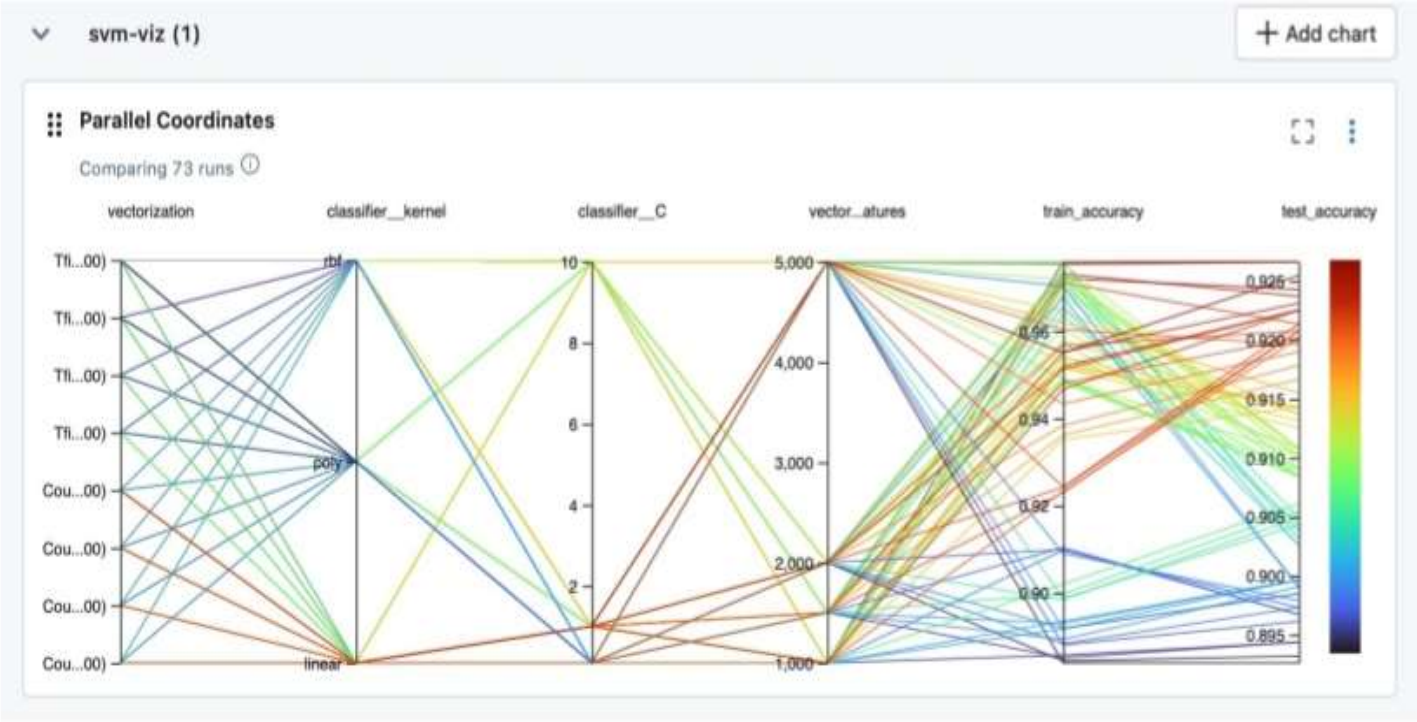
Hyperparameter Plots



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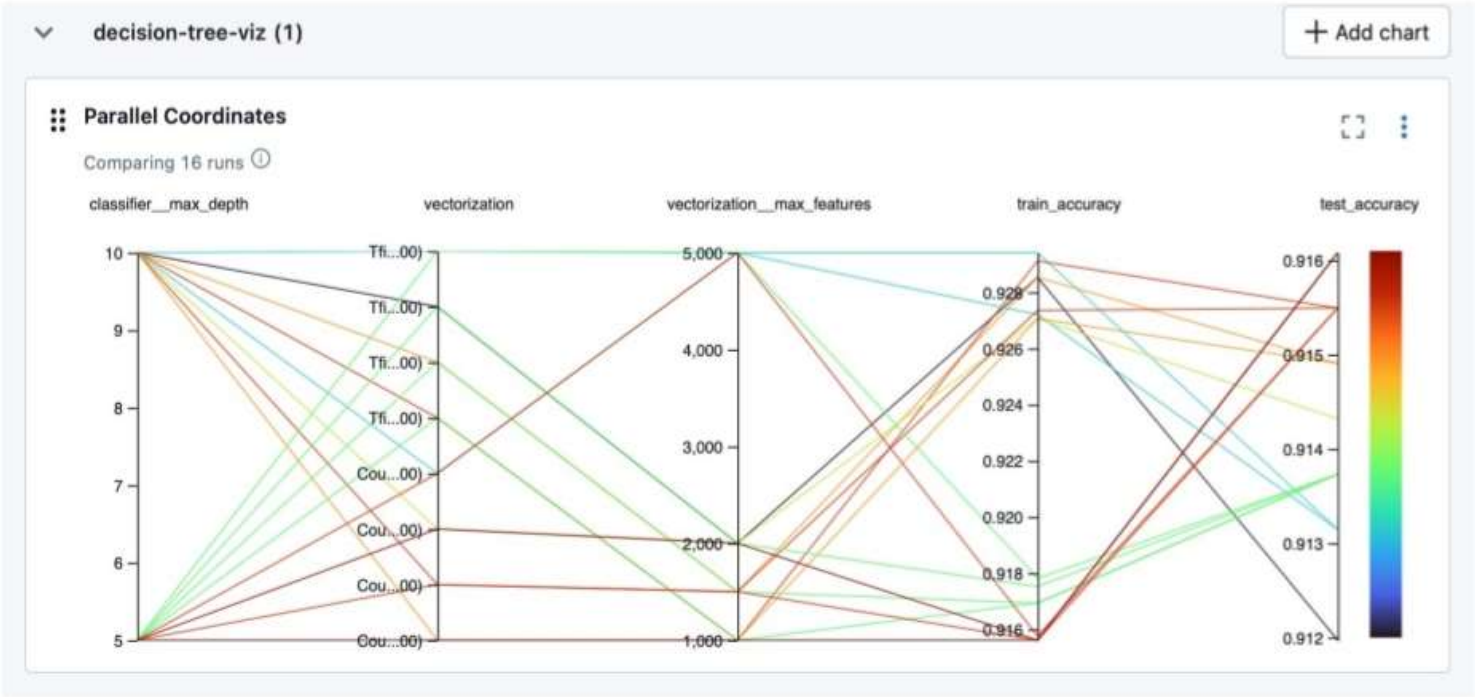
Hyperparameter Plots



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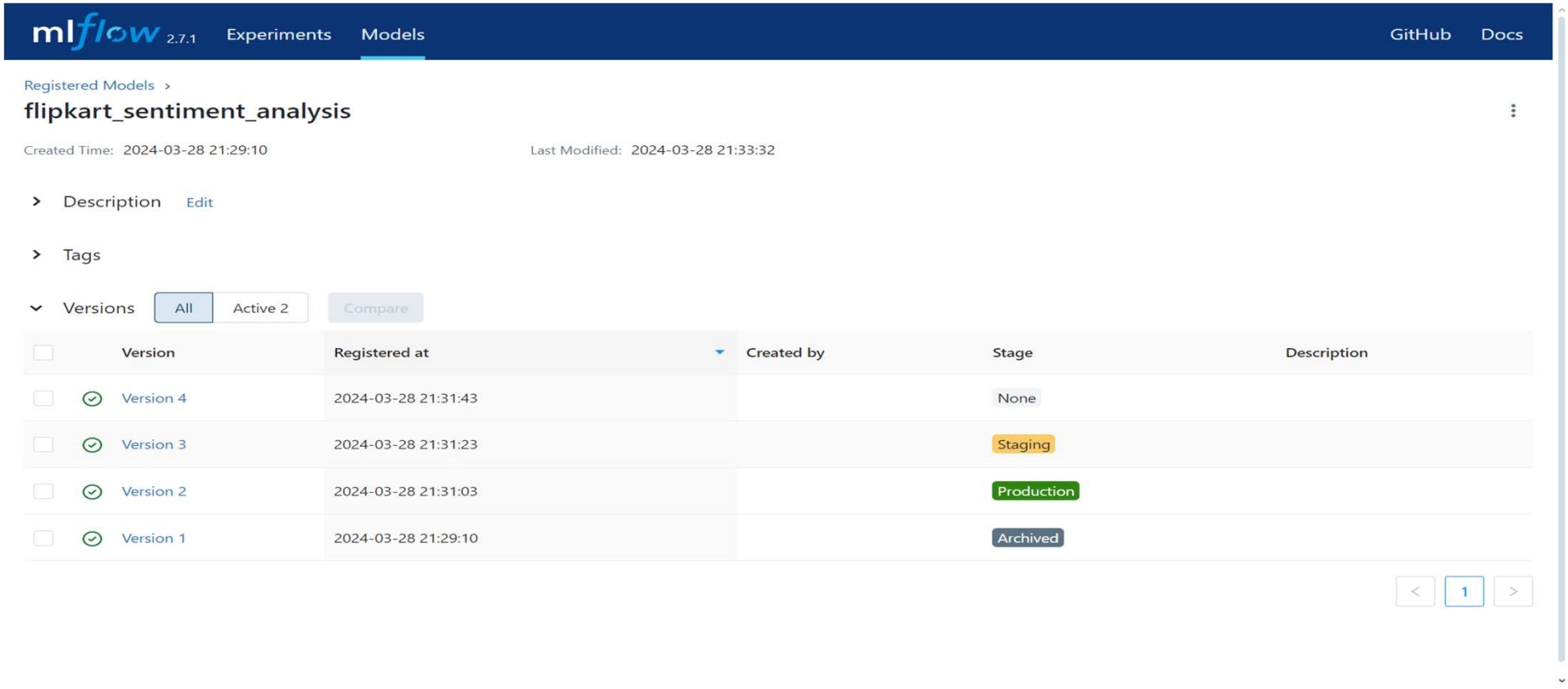
Registering the models



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Prefect

Prefect is a Python library that helps you build organized and efficient data pipelines, especially for machine learning. It allows you to:

- **Break down complex tasks:** Prefect lets you divide your data processing or machine learning workflow into smaller, reusable steps called tasks.
- **Manage task order:** It cleverly manages the order in which these tasks run, ensuring everything happens at the right time.
- **Keep an eye on progress:** Prefect monitors your workflows as they run, catching any errors and offering visualizations to help you troubleshoot.

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Prefect : Benefits

- **Less code, more reuse:** By using modular tasks, you can write code once and use it in multiple workflows, saving time and effort.
- **Easier maintenance:** Clear organization with tasks makes your workflows easier to understand, modify, and debug later on.
- **Scales as you grow:** Prefect can handle large and complex workflows by allowing tasks to be run on multiple machines.

Prefect : Installation and First run

- **Run the following commands to install the prefect and to run it.**
  - ❑ **$ pip install prefect**
  - ❑ **$ prefect server start**

```
PS C:\Users\vjavi\Desktop\my_flask_projects\MLflow_Prefect_Orchestration> prefect server start


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Configure Prefect to communicate with the server with:

    prefect config set PREFECT_API_URL=http://127.0.0.1:4200/api
```

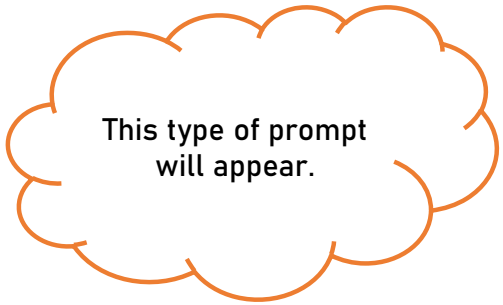

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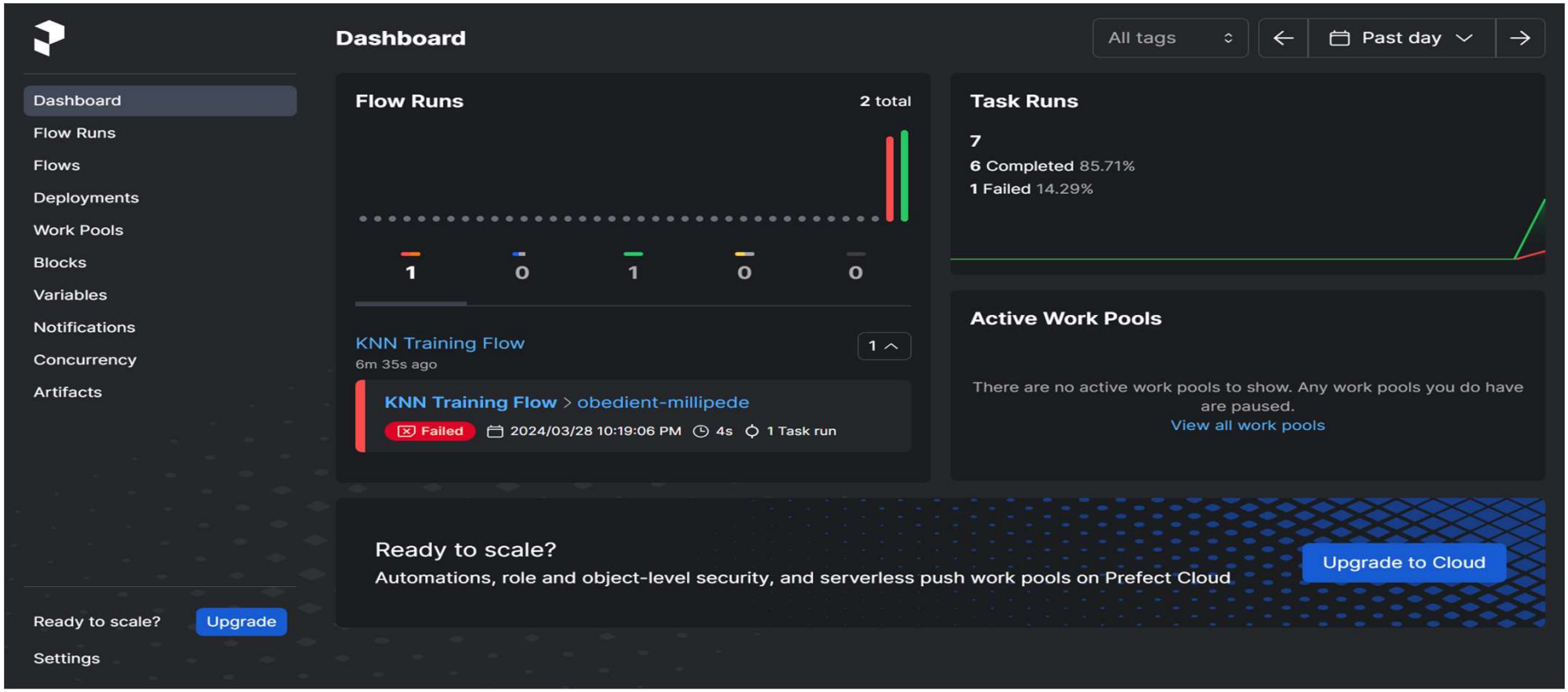
Prefect Dashboard



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Building a Prefect workflow

- ✓ **Import Prefect Models *(step 1).***
- ✓ **Define Prefect Tasks *(step 2).***
- ✓ **Define Prefect Flow *(step 3).***
- ✓ **Run Prefect Workflow *(step 4).***

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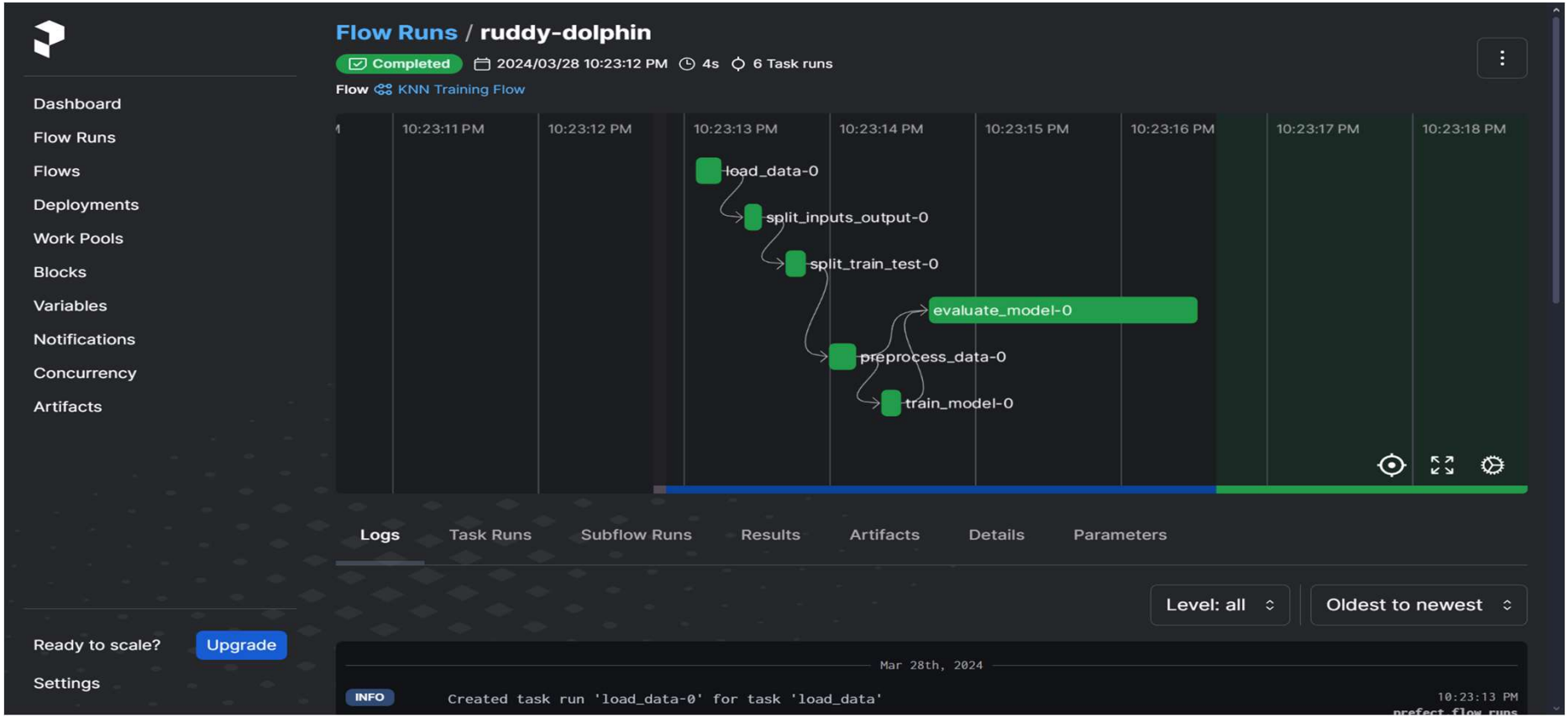
Prefect workflow



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THANK YOU

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