Steps to setup Preventive Maintenance ML Application

1. Before installing the application, user must enable the following list of APIs in Google Cloud project. Go to to APIs & Service in google cloud console and enable the following APIs
    1. Compute engine
    2. Cloud Storage
    3. Cloud AutoML API
    4. AI Platform Training & Prediction API
    5. Google Cloud Storage JSON API
    6. Deployment manager API

Goto to APIs and Services in google cloud console,

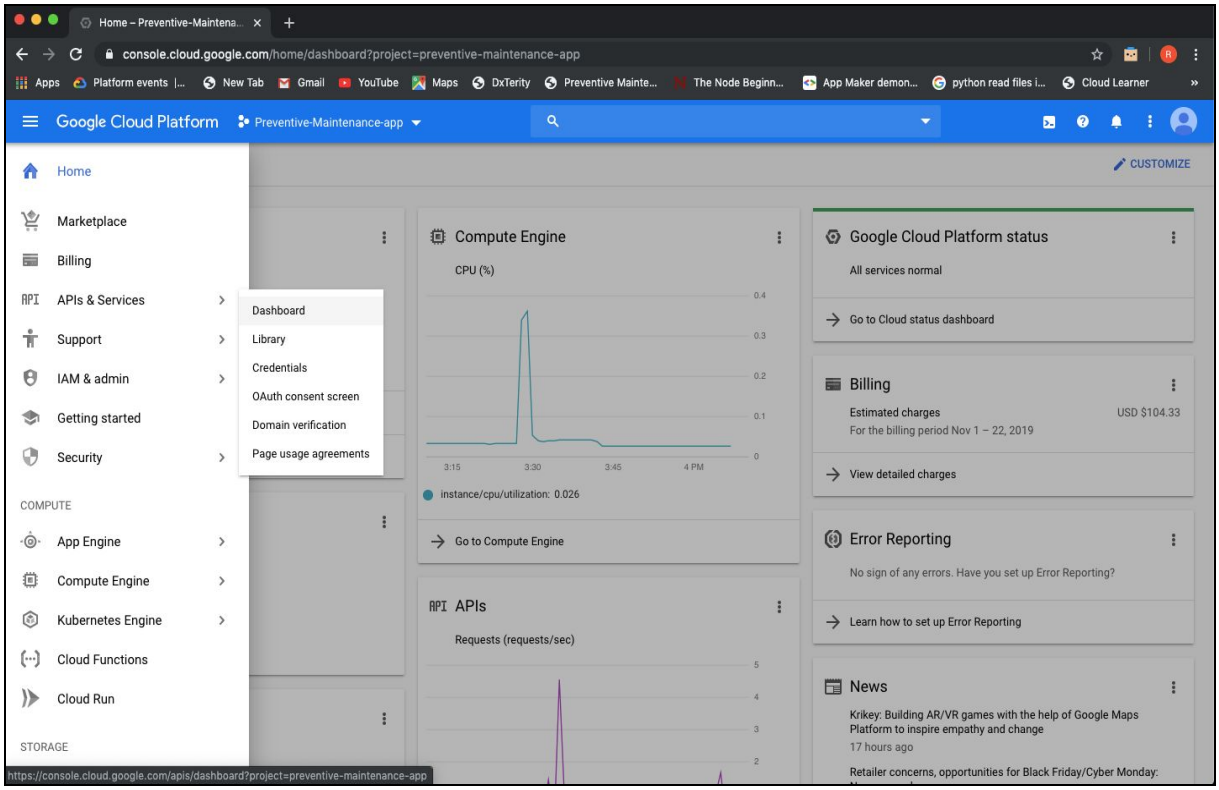


Fig: APIs & Services

Click on ENABLE APIS AND SERVICES,

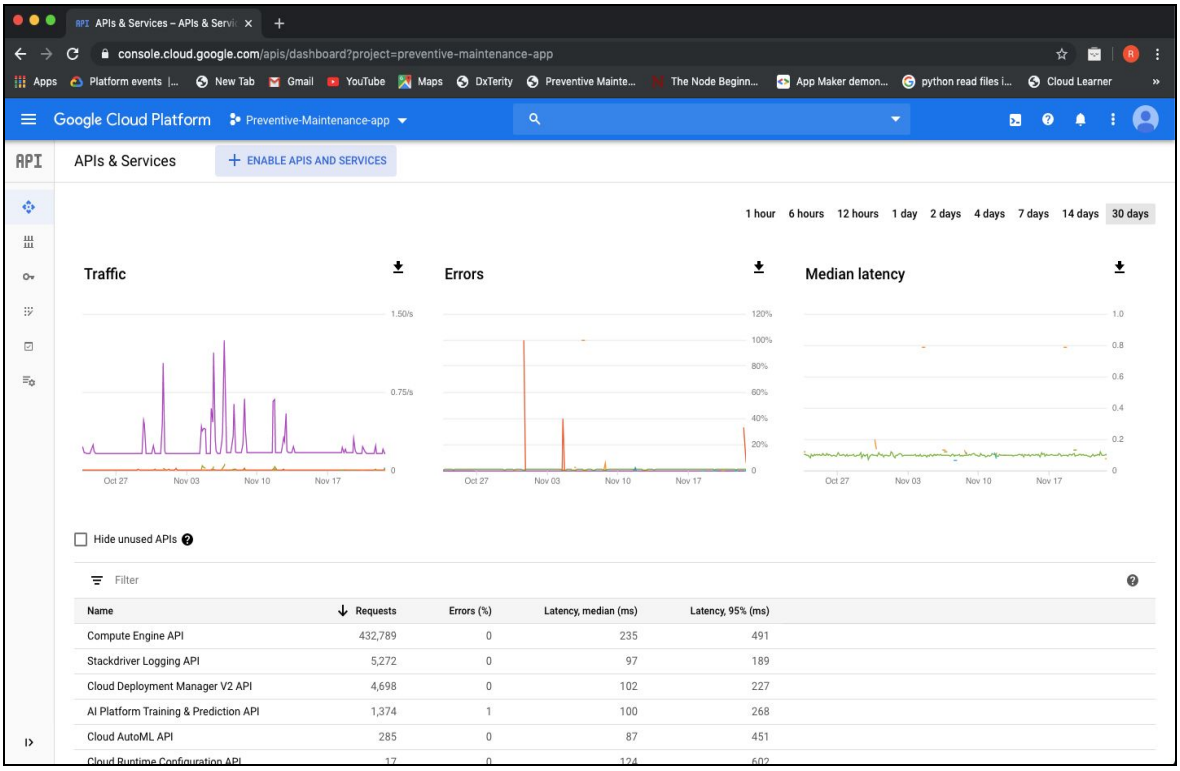


Fig: APIs & Services Dashboard

Search and Enable the following APIs in the API library

1. Compute engine
2. Cloud Storage
3. Cloud AutoML API
4. AI Platform Training & Prediction API
5. Google Cloud Storage JSON API

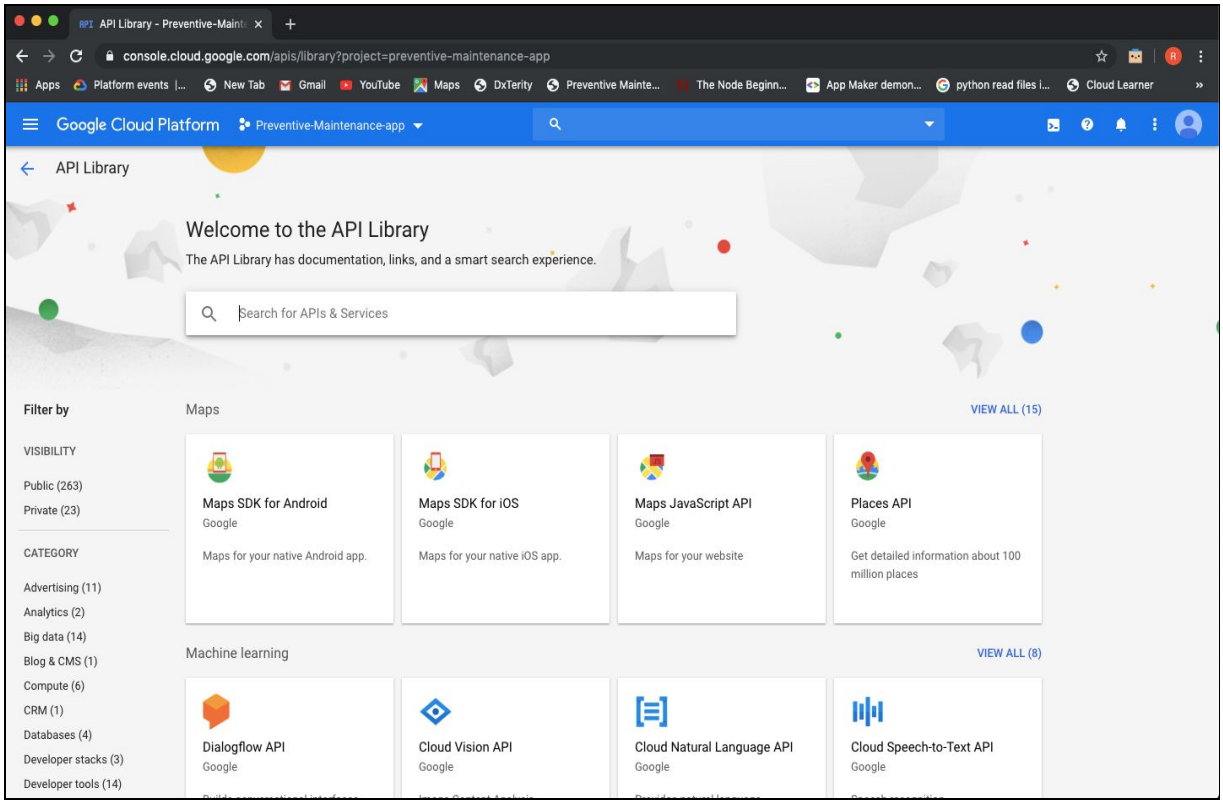
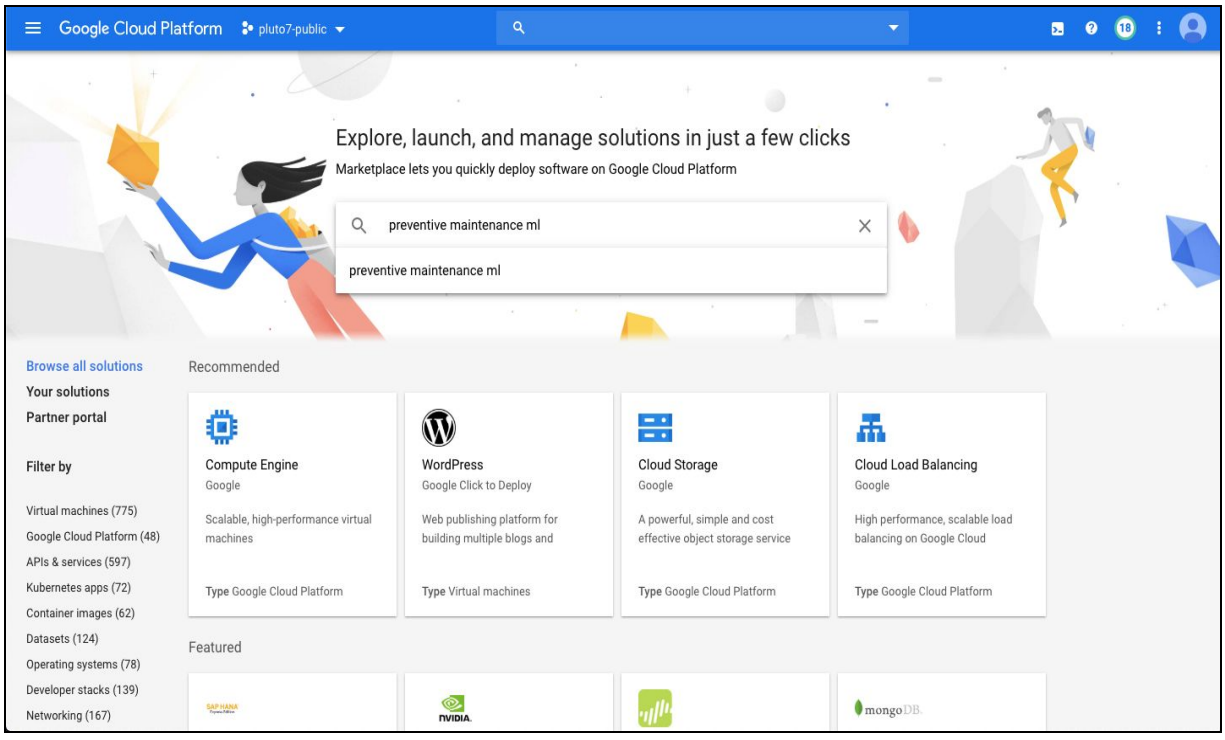


Fig: API library

2. After enabling all the APIs mentioned above, go to [google cloud market place] and search for Preventive Maintenance ML



After selecting Preventive Maintenance ML , it redirects to Preventive Maintenance ML solution home screen and below is the reference of that page. Next, click on **LAUNCH ON COMPUTE ENGINE** button.

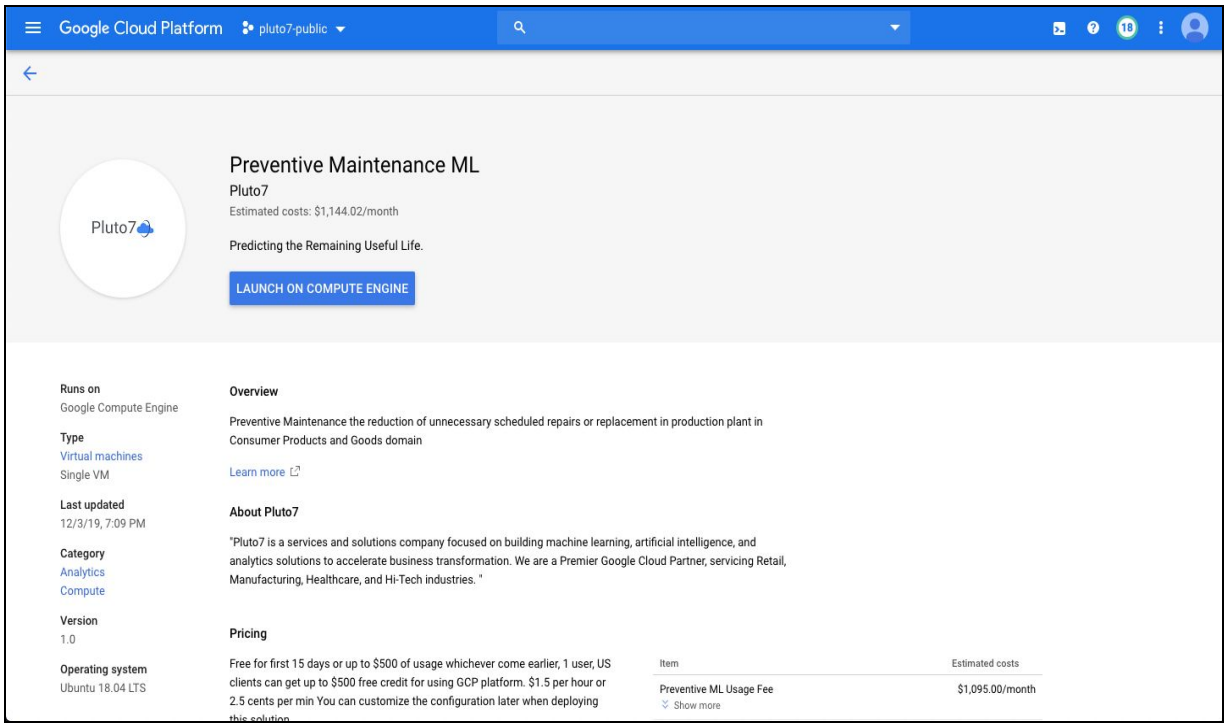


Fig: Preventive Maintenance ML home screen.

After clicking on LAUNCH ON COMPUTE ENGINE it redirects to the deployment page.

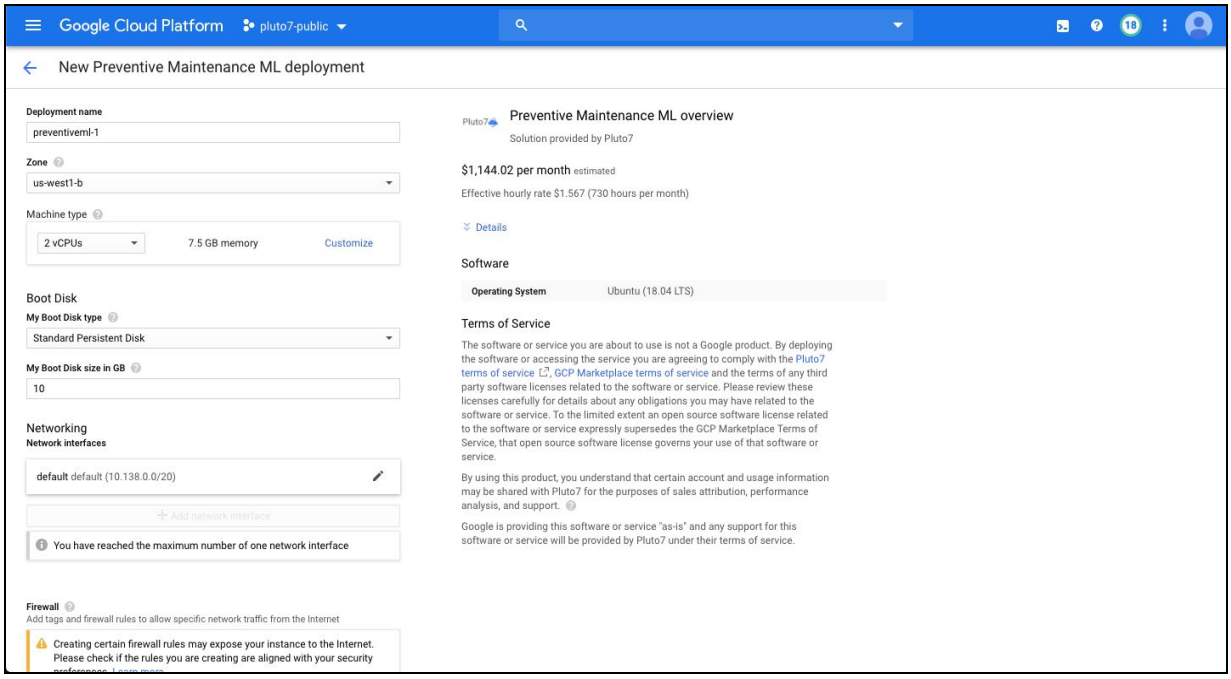


Fig: Deployment page 1.

In the deployment page scroll to the bottom of the page and to deploy the solution, click on the deploy button.

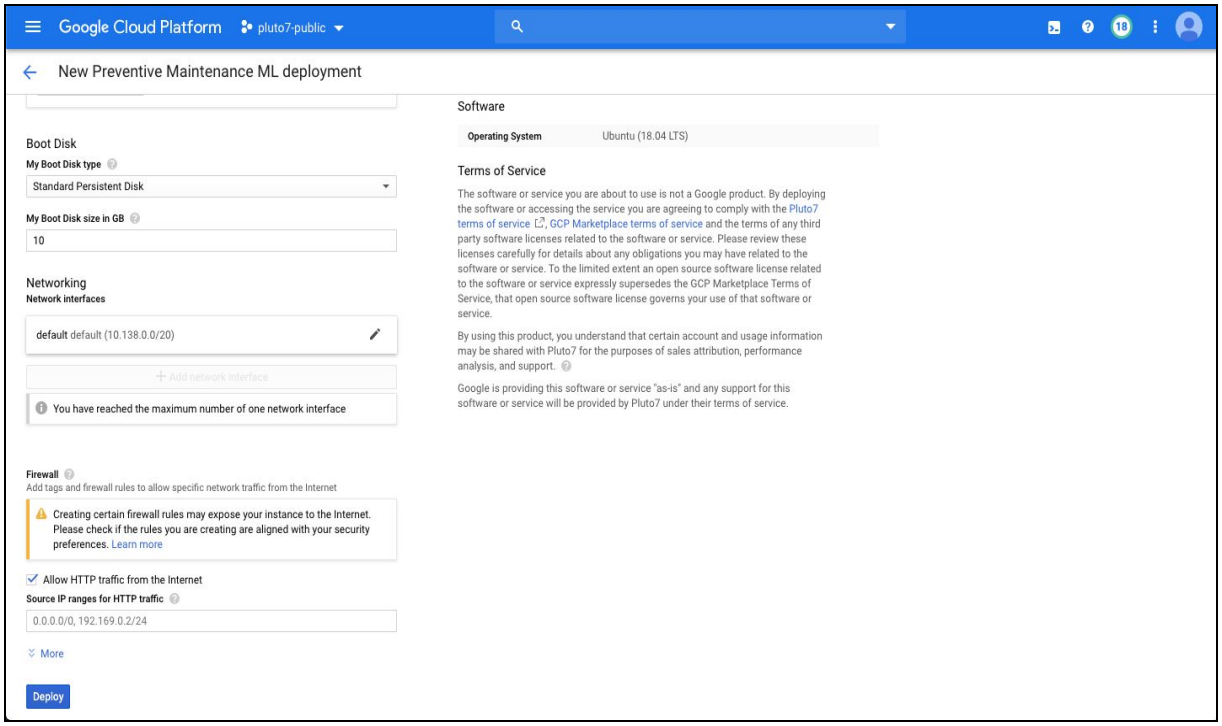


Fig: Deployment page 2.

Page will be redirected to deployment manager page, where it lists all the Google Cloud resources that will be deployed for Preventive Maintenance ML solution,

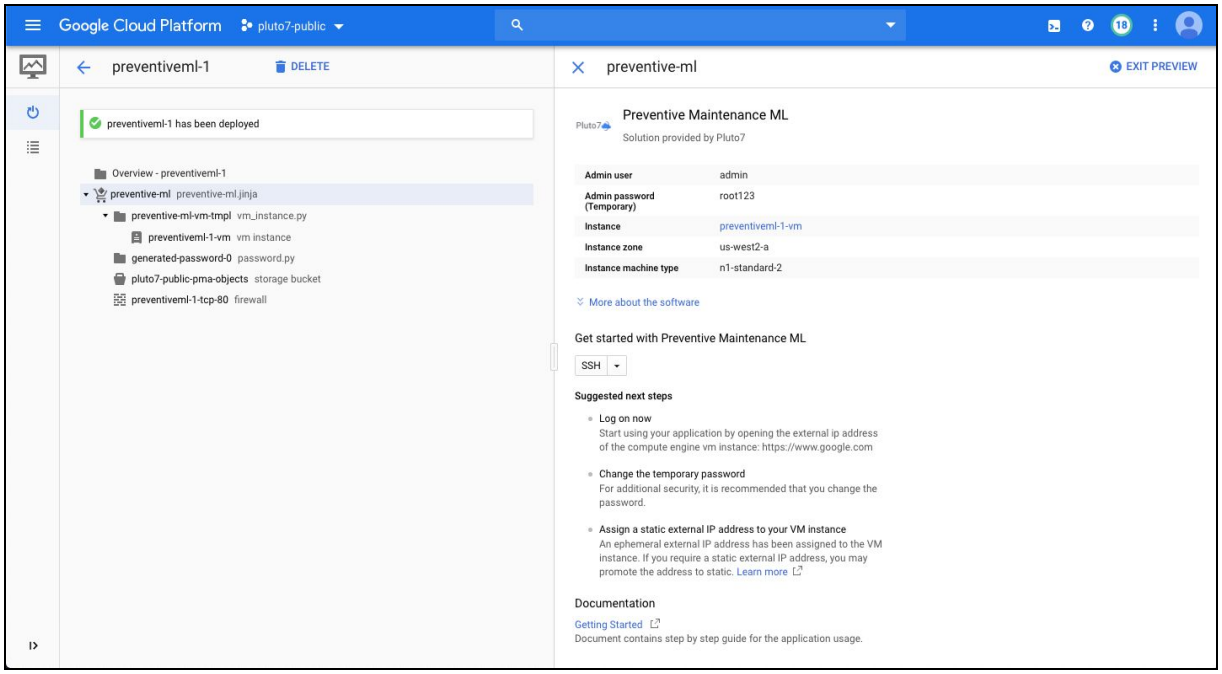
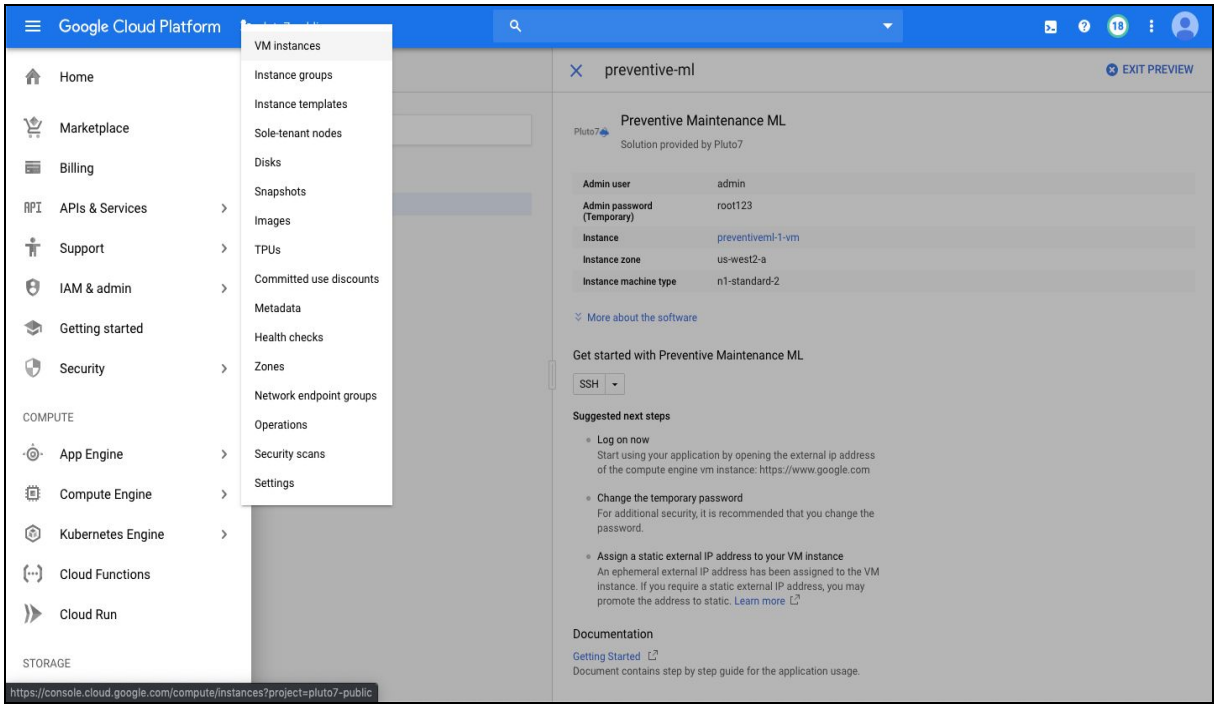
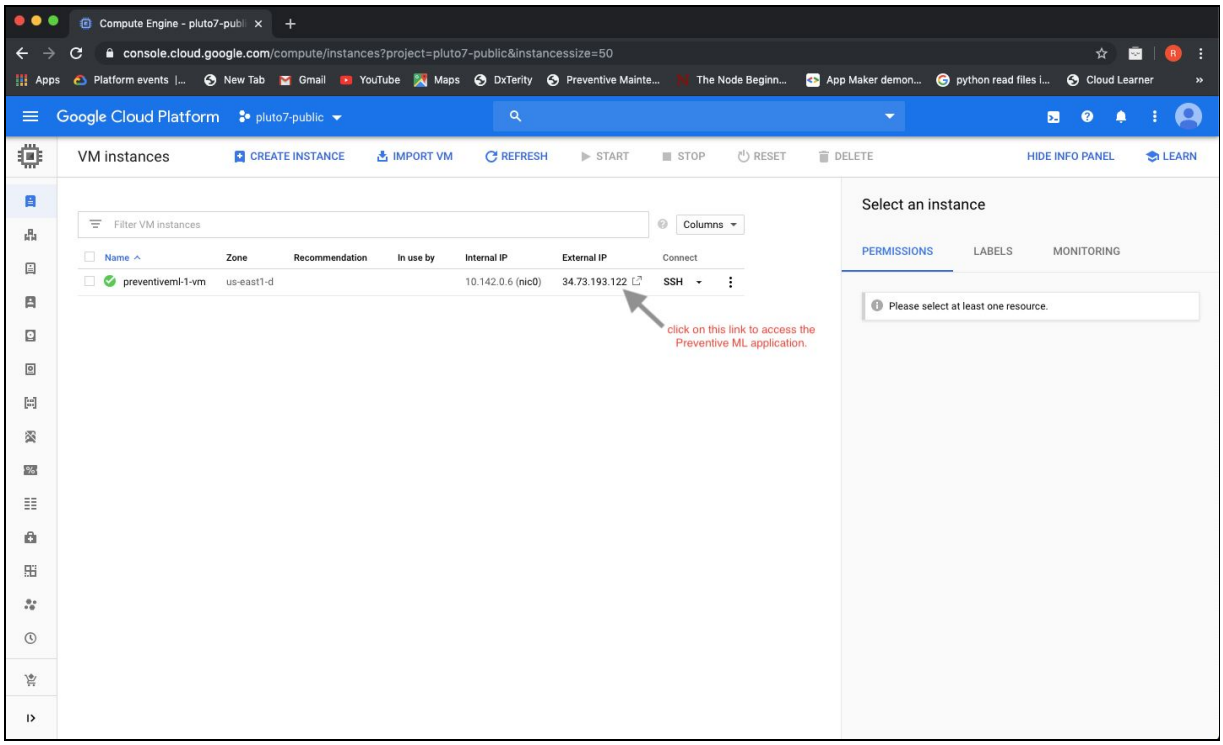


Fig: PML Deployment.

Next, go to compute engine VM instance section of Google Cloud Console,



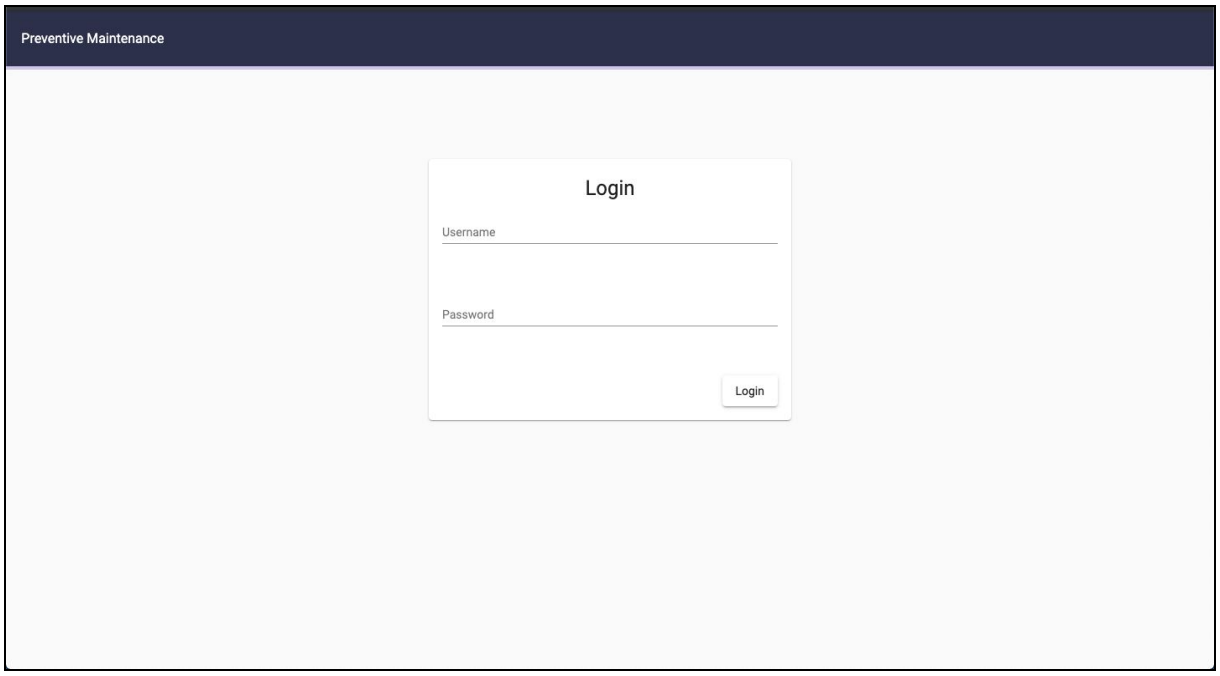
Next, in the Compute Engine the VM instances list shows an instance with name **preventiveml-1-vm.** Click on external IP of the VM to access the Preventive Maintenance ML application.



3. After enabling all the APIs listed above, open the external link of the VM instance in a web browser which opens a login page. The default login details are-

   User: **Admin**

   Password: **root123**



4. After successful login, app loads datasets page

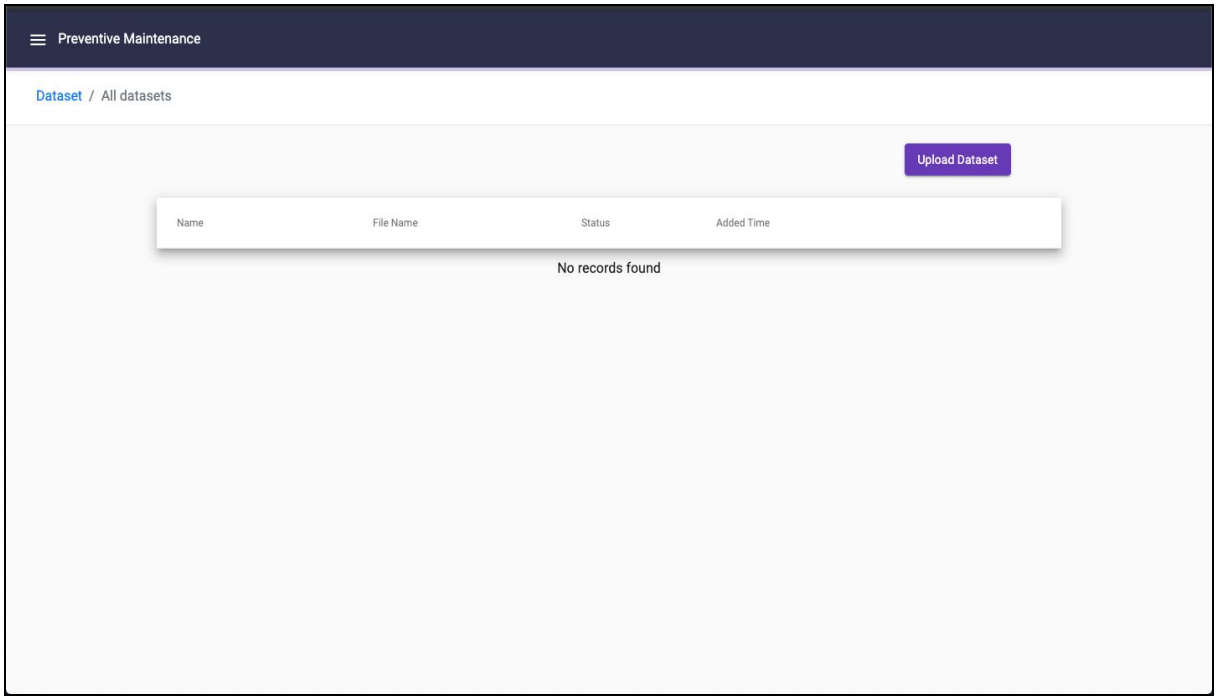


Fig 1.1: Dataset home page

5. Upload New Dataset. Sample dataset is available in the cloud storage bucket and bucket name can be identified as [GOOGLE_CLOUD_PROJECT_NAME]-pma-objects. Name of the file is `sample_dataset/sample-dataset.csv`. Name field in Upload Dataset is mandatory along with the csv file.
   Note: Dataset file size is limited to < 50MB currently.

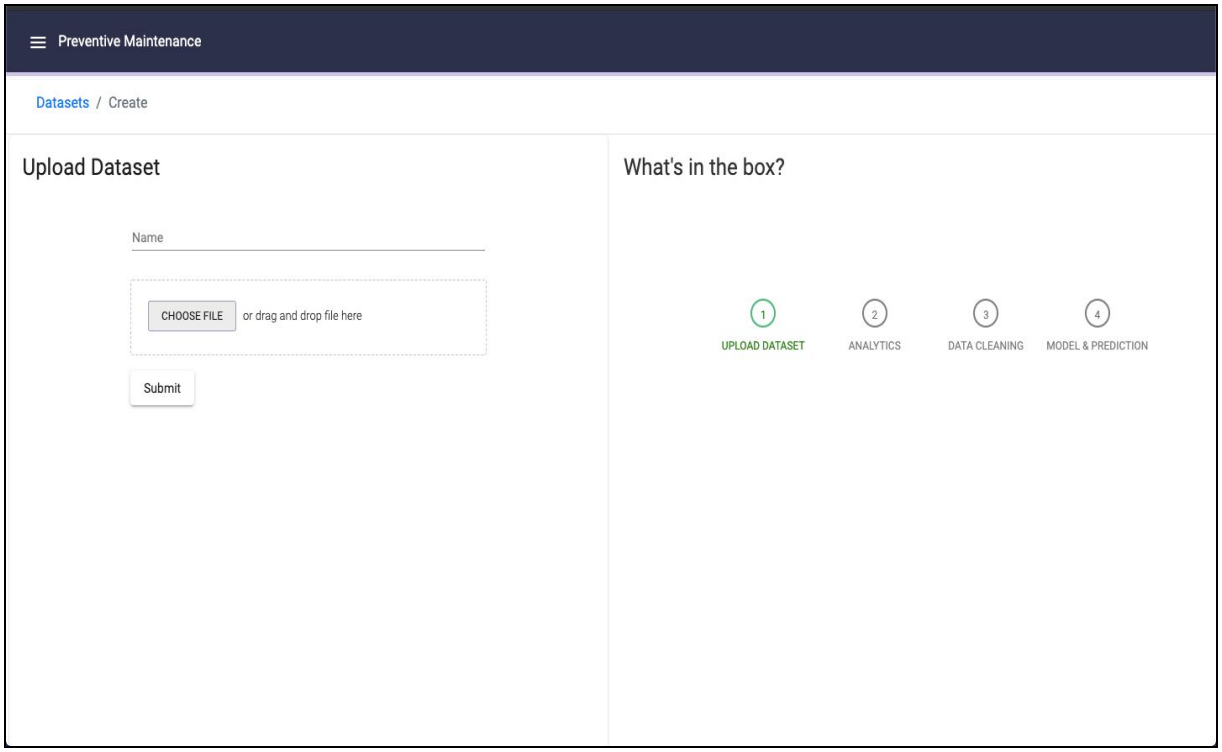


Fig 1.2: Upload Dataset

6. After uploading dataset, the app will redirect to datasets list page and select any one from the list to see sample set of the data. In the same page there is an option for attribute mapping. In fig 1.4 data step 2 is attribute mapping.

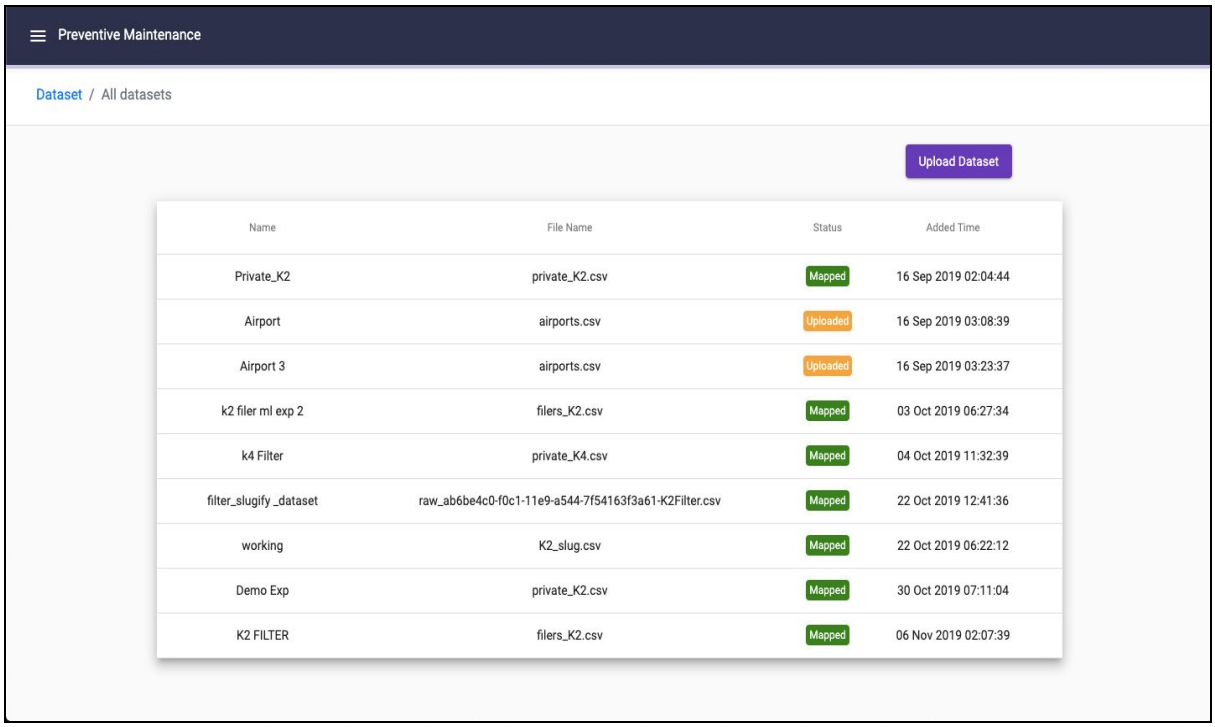


Fig 1.3: List of Datasets

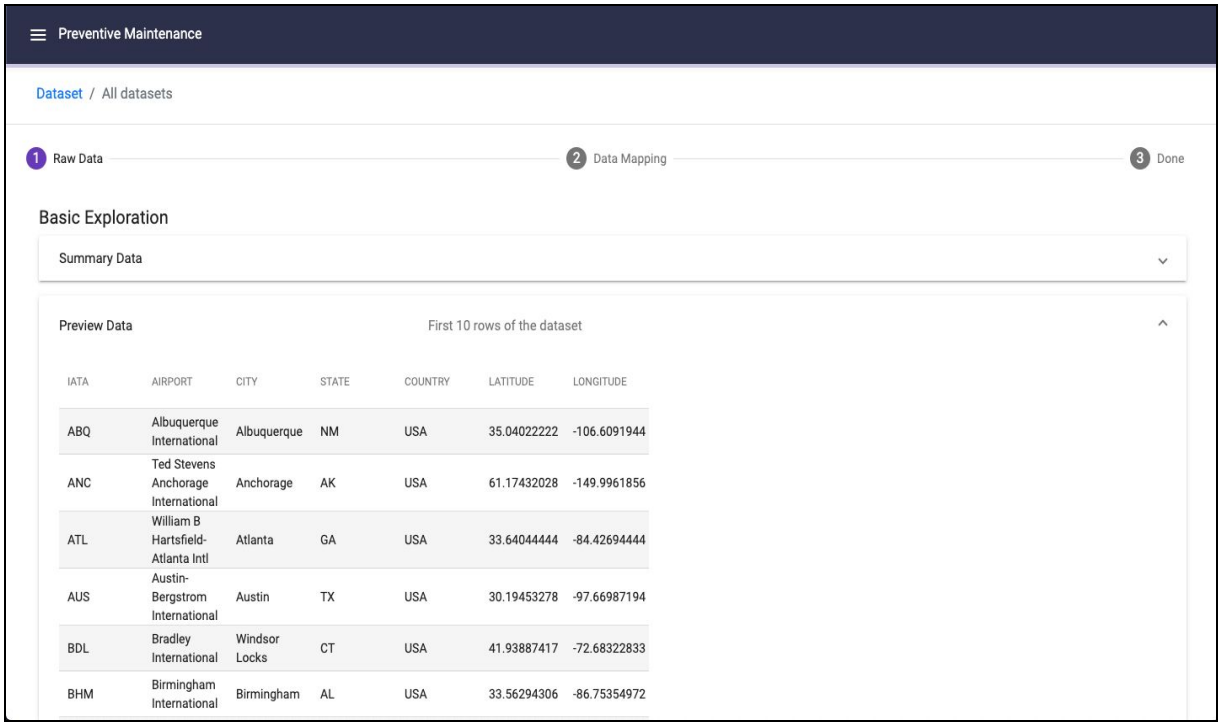


Fig 1.4: Sample data of uploaded dataset.

7. After attribute mapping is completed for the dataset, go to data experiments page and create a data experiment for the mapped dataset.

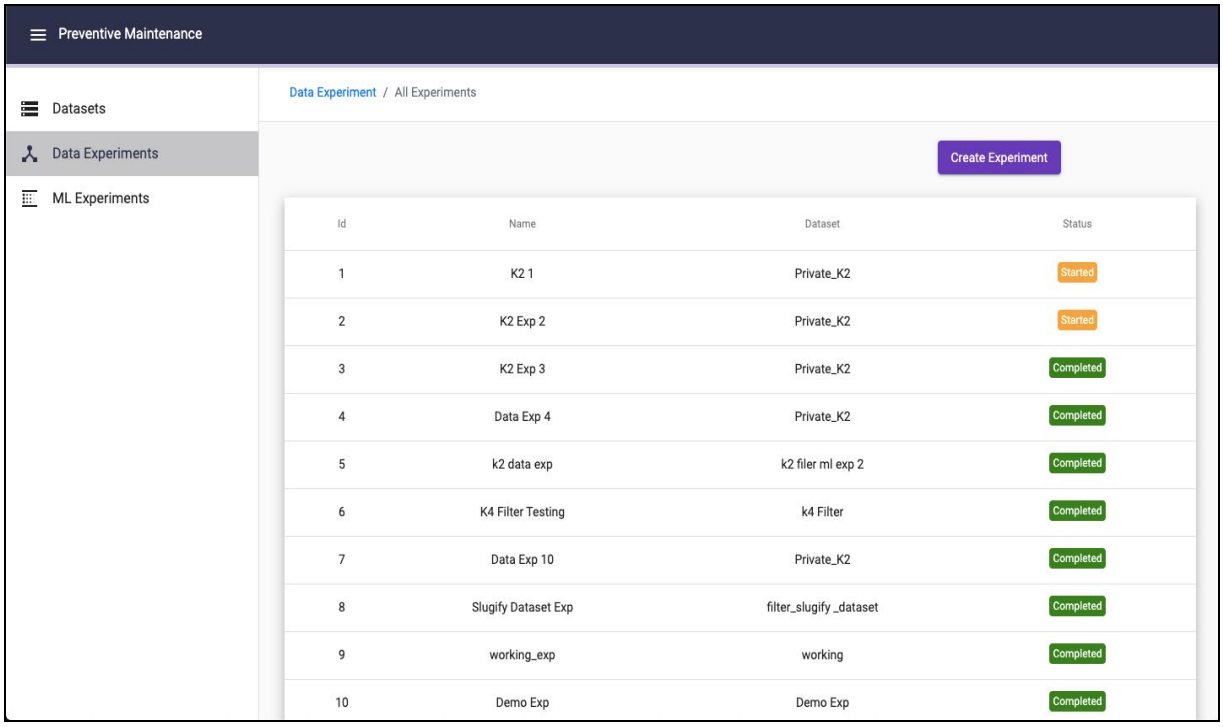


Fig 1.5: List of all data experiments.

In Create Data Experiment give a name for the experiment and choose a mapped dataset. Then click create.

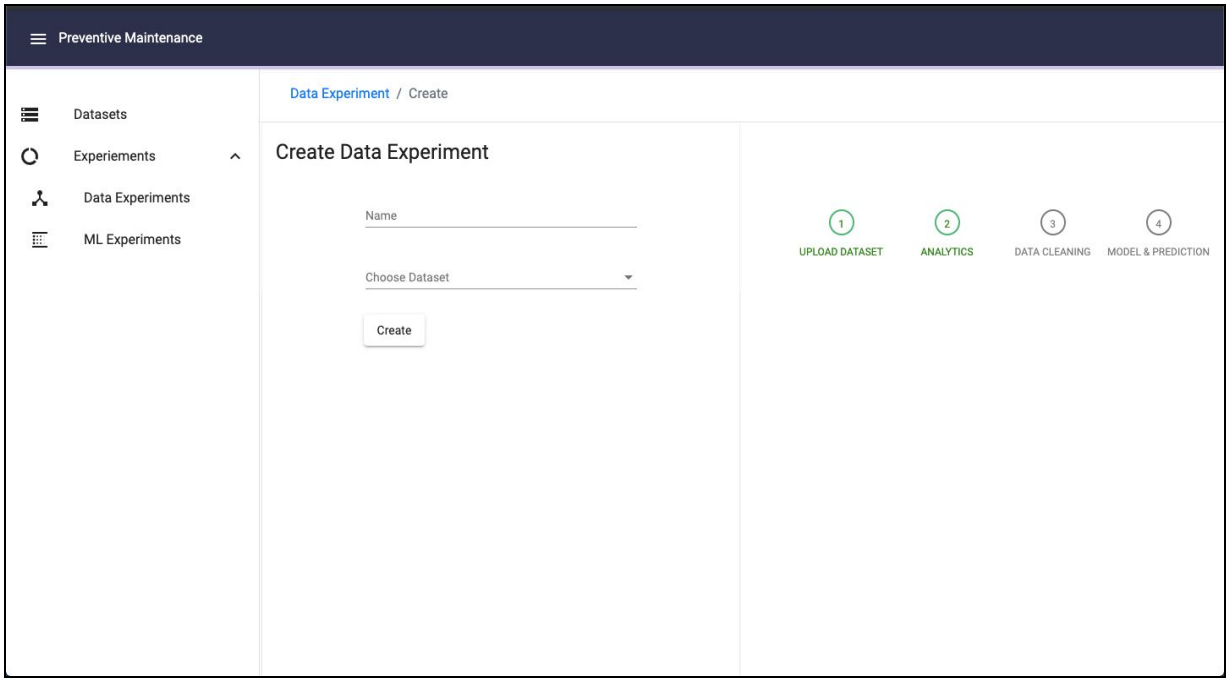


Fig 1.6: Create a new data experiment.

8. In data experiments list page click on any of the list item to see the transformations applied on the dataset.

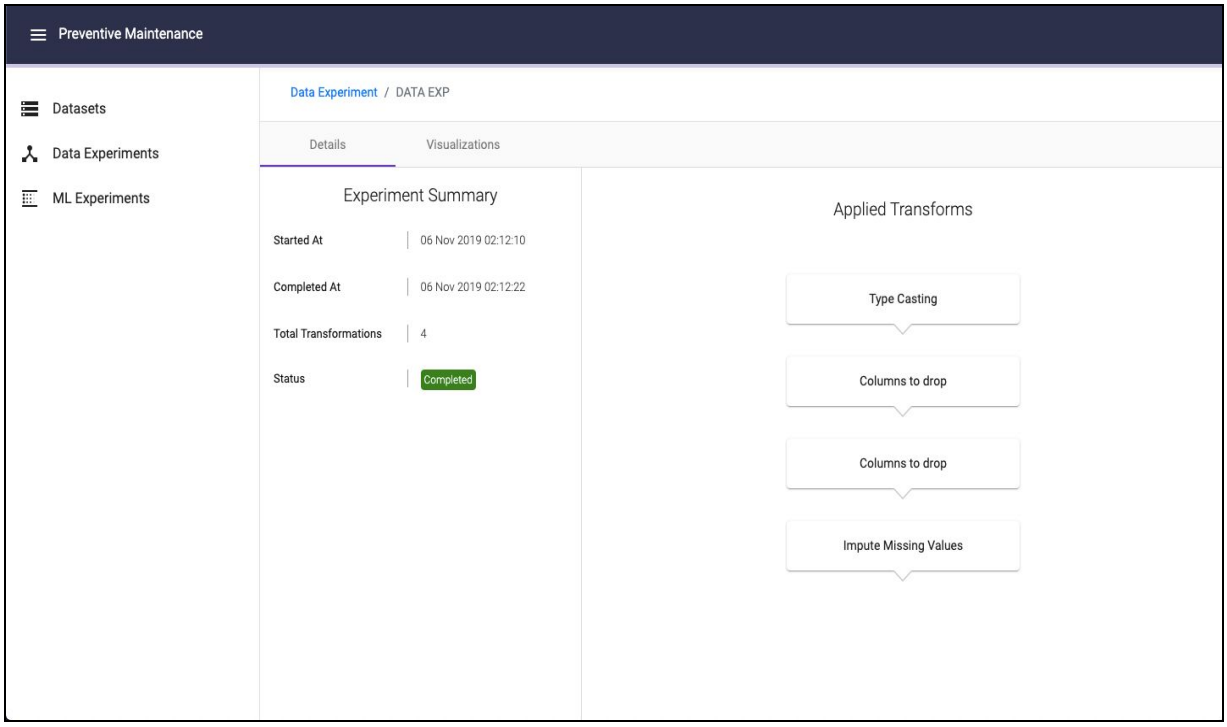


Fig 1.7: Data experiment details and transformations.

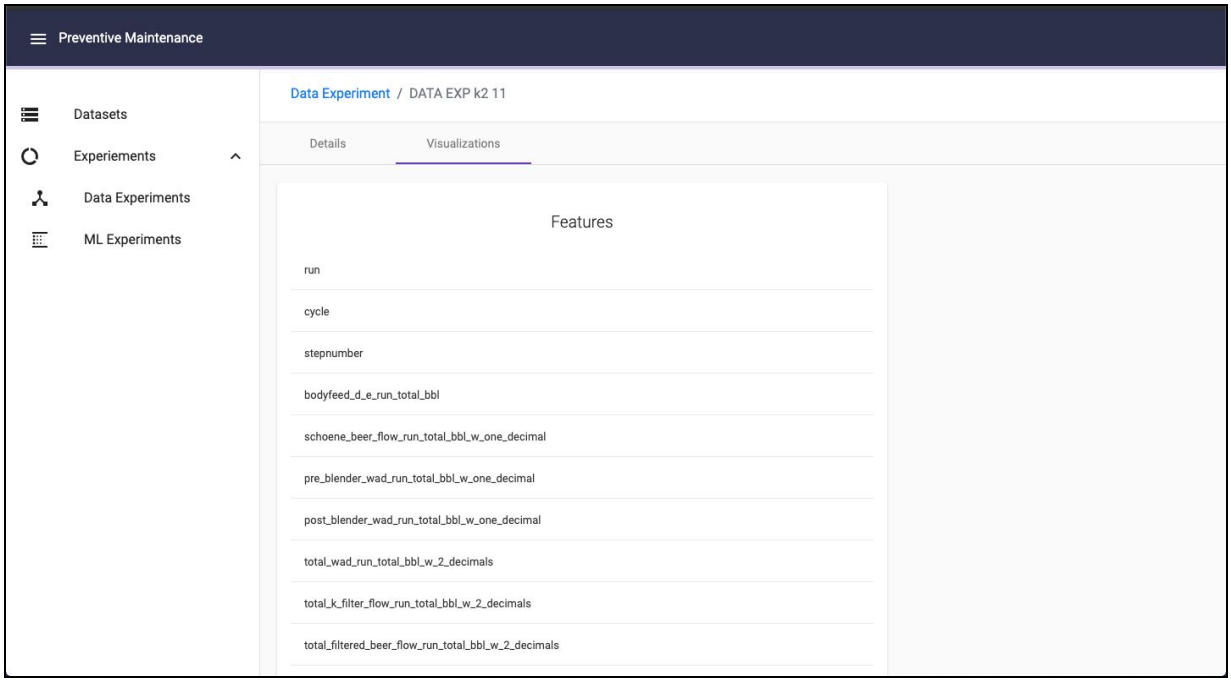


Fig 1.8: Lists of all features of dataset.

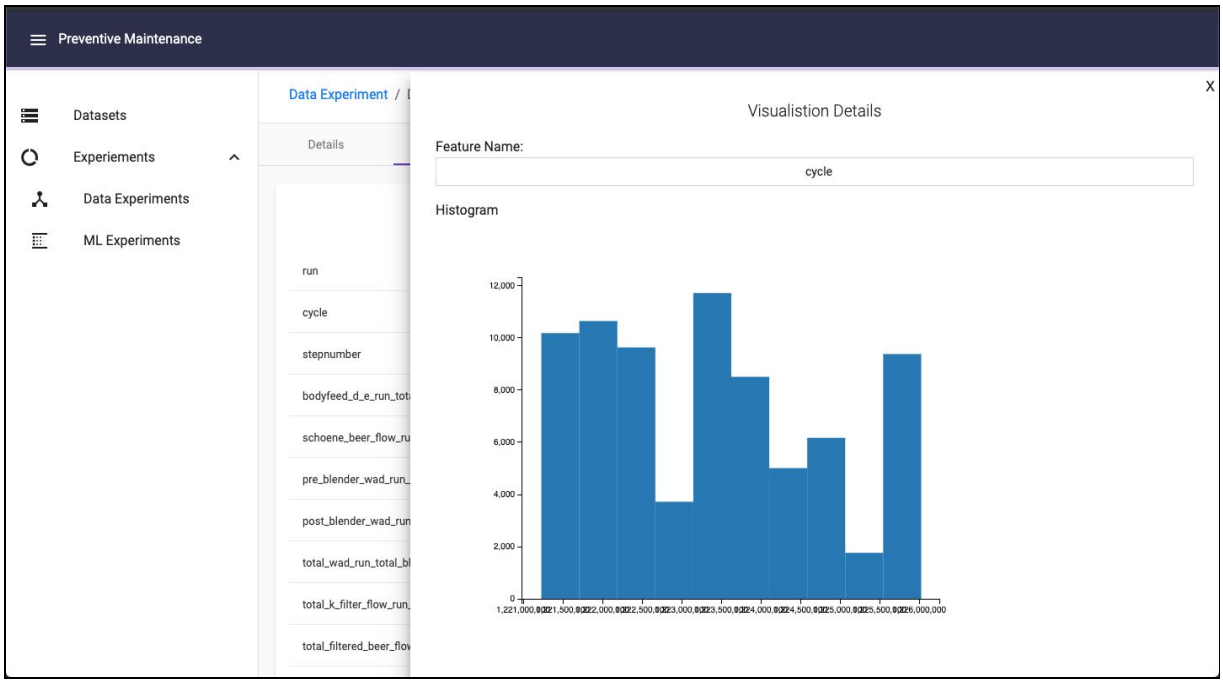


Fig 1.9: Data distribution.

9. After data experiment is completed, go to MI Experiments. Click on create experiment present on top right side of the page.

In create ml experiment zoo type indicates custom model developed by pluto7 and AutoML which represents google cloud AutoML Table.

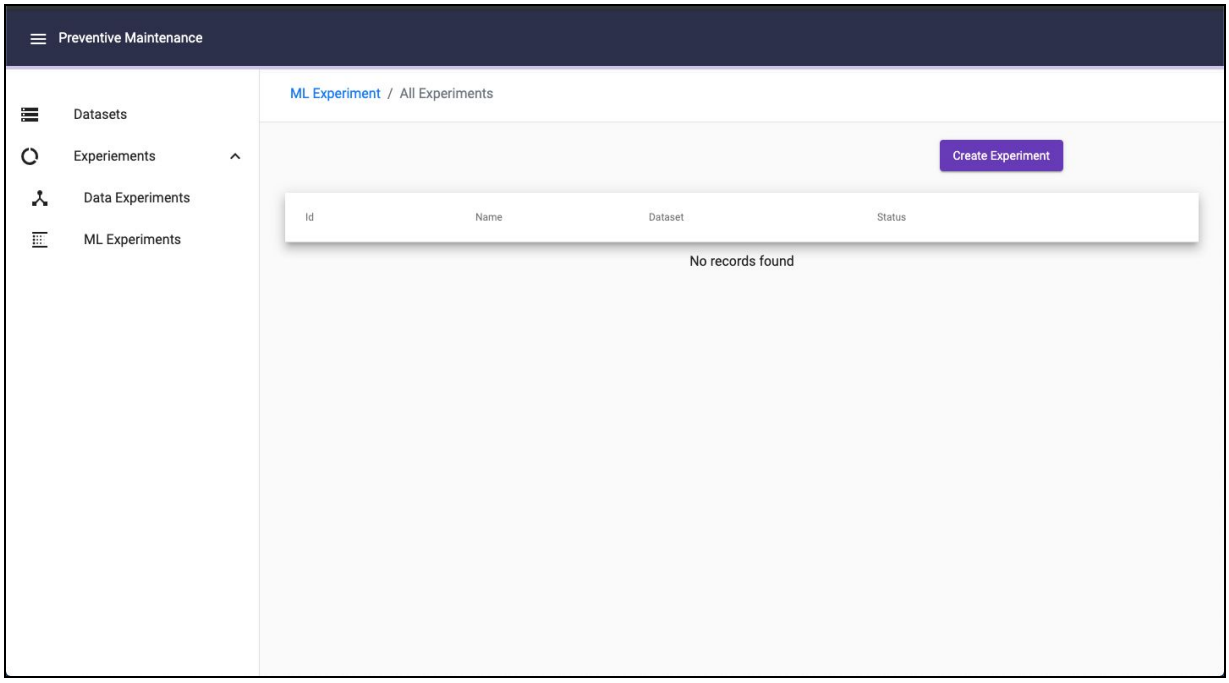


Fig 1.9: List of all ML Experiments.

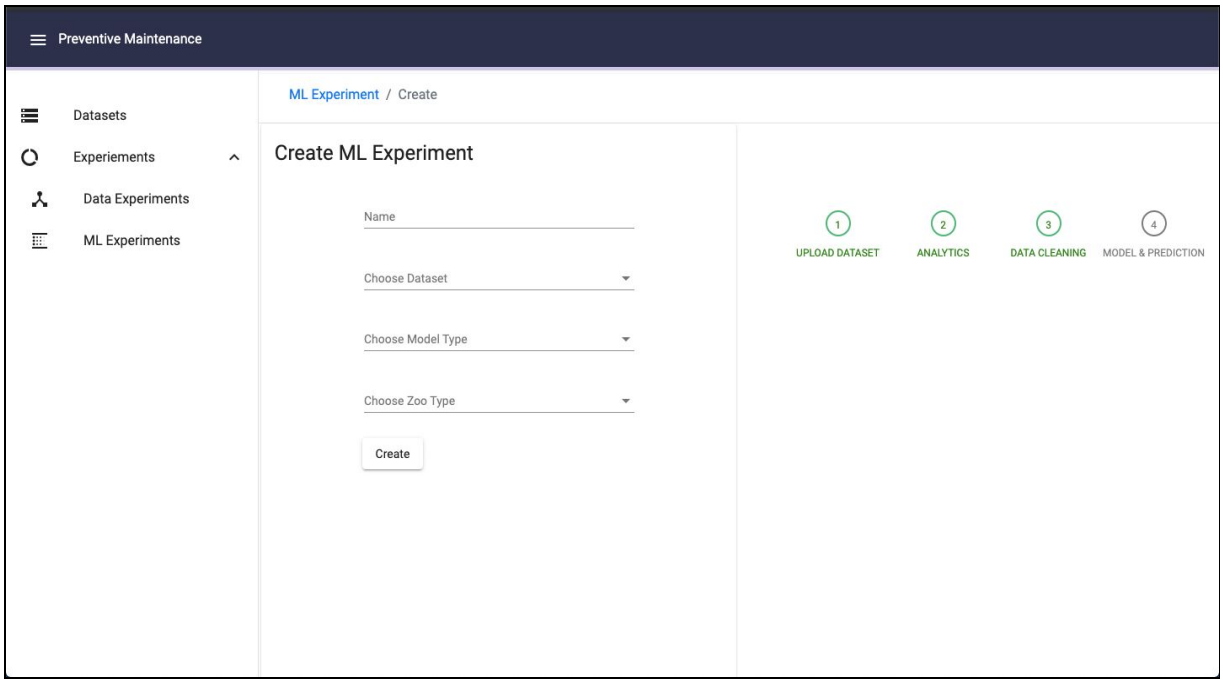


Fig 2.1: Create ML Experiment.

10. In ML Experiments list page click on any of the list item to see the model output.

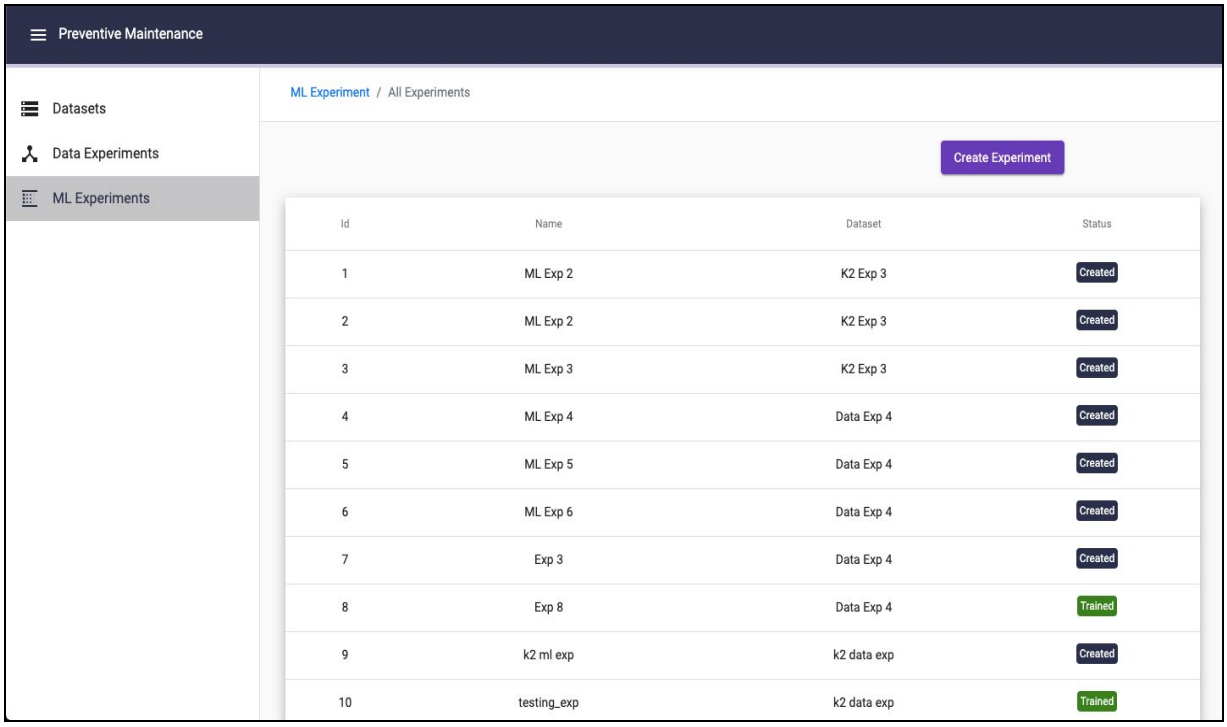


Fig 2.2: ML Experiment details.

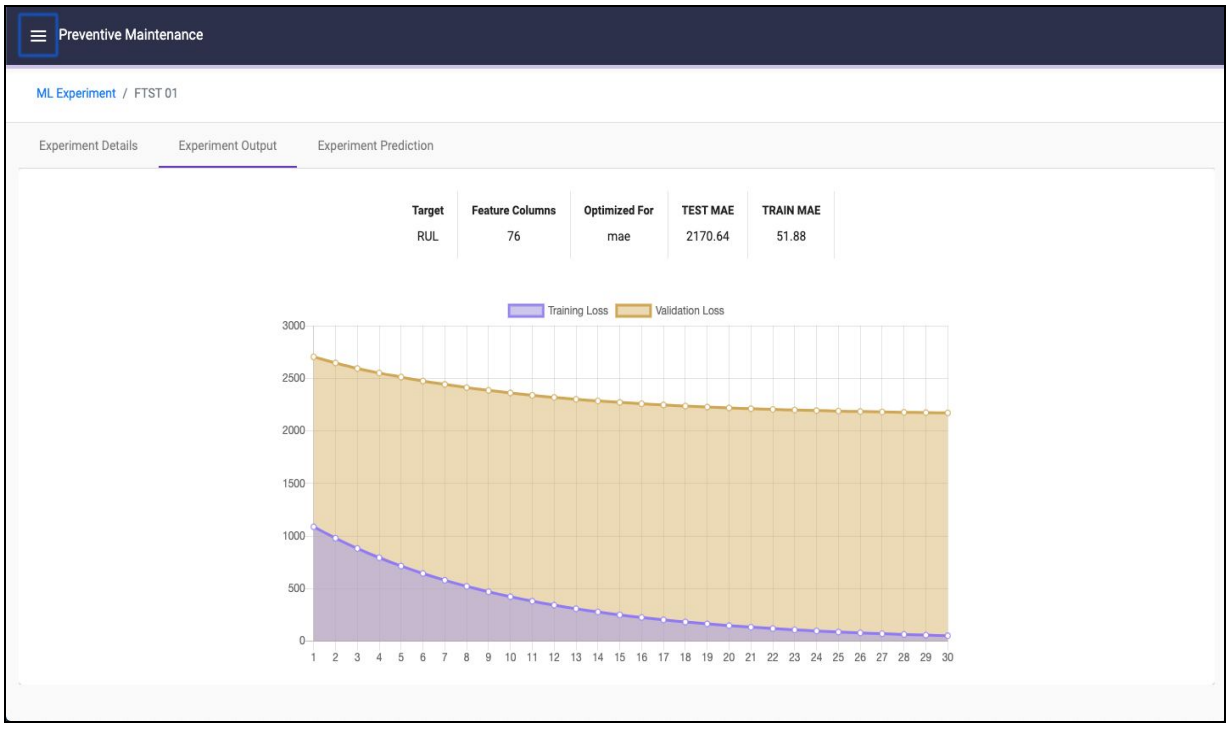


Fig 2.3: Model performance over the time period.

Once model is **trained** successfully then predictions can be generated for the model. To create a new prediction click on create prediction button and give a name for the prediction and upload the dataset. Sample dataset is available in the cloud storage bucket and bucket name can be identified as [GOOGLE_CLOUD_PROJECT_NAME]-pma-objects. Name of the file is `sample_dataset/prediction-test-dataset.csv`. Name field in Upload Dataset is mandatory along with the csv file.

Note: Dataset file size is limited to < 50MB currently.

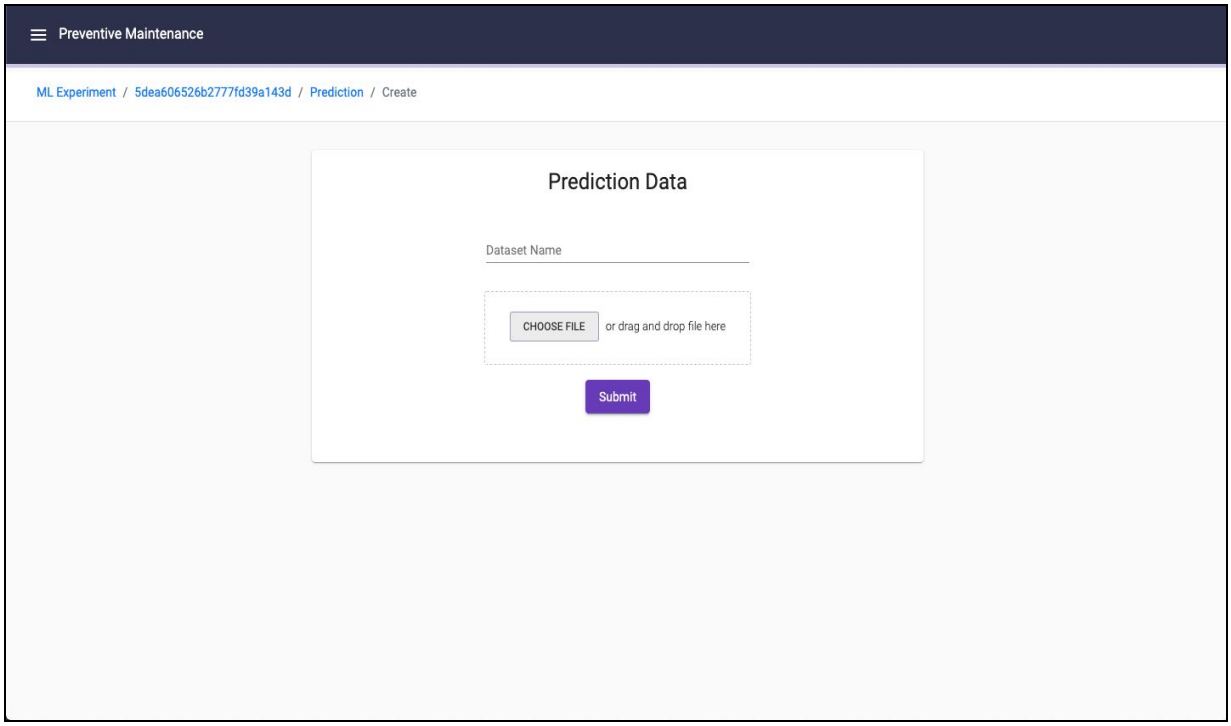


Fig 2.5: Create new prediction.

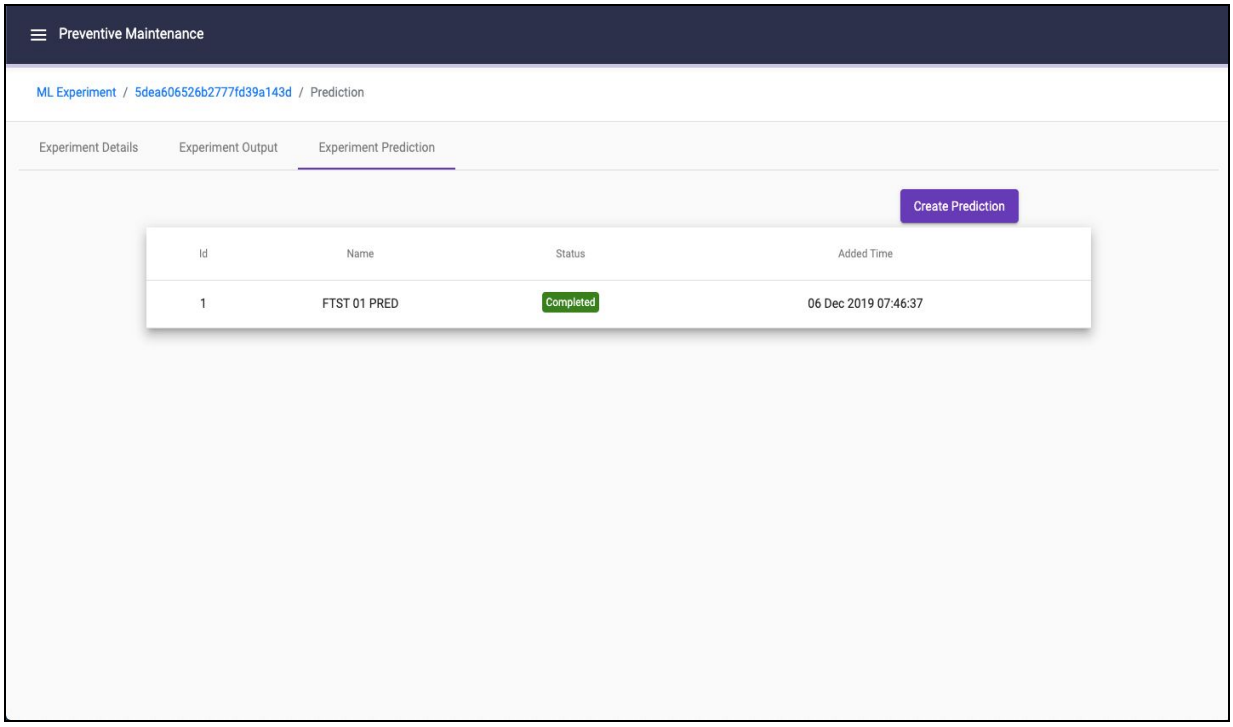


Fig 2.5: Model Predictions.

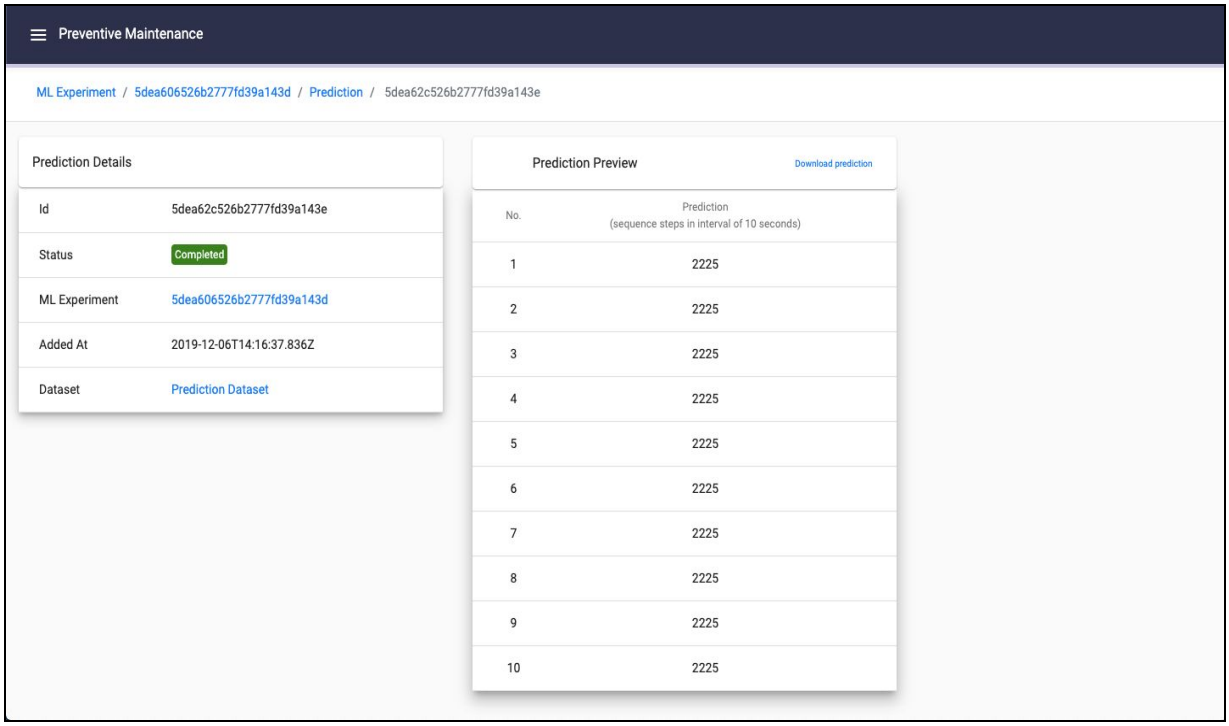


Fig 2.5: Prediction output.

Contact Information:

For any queries please mail us at contact@pluto7.com.

Know more:

1. Preventive maintenance.
2. Ab Inbev customer success story and google cloud Case Study.