

# Breast Cancer Risk Prediction System

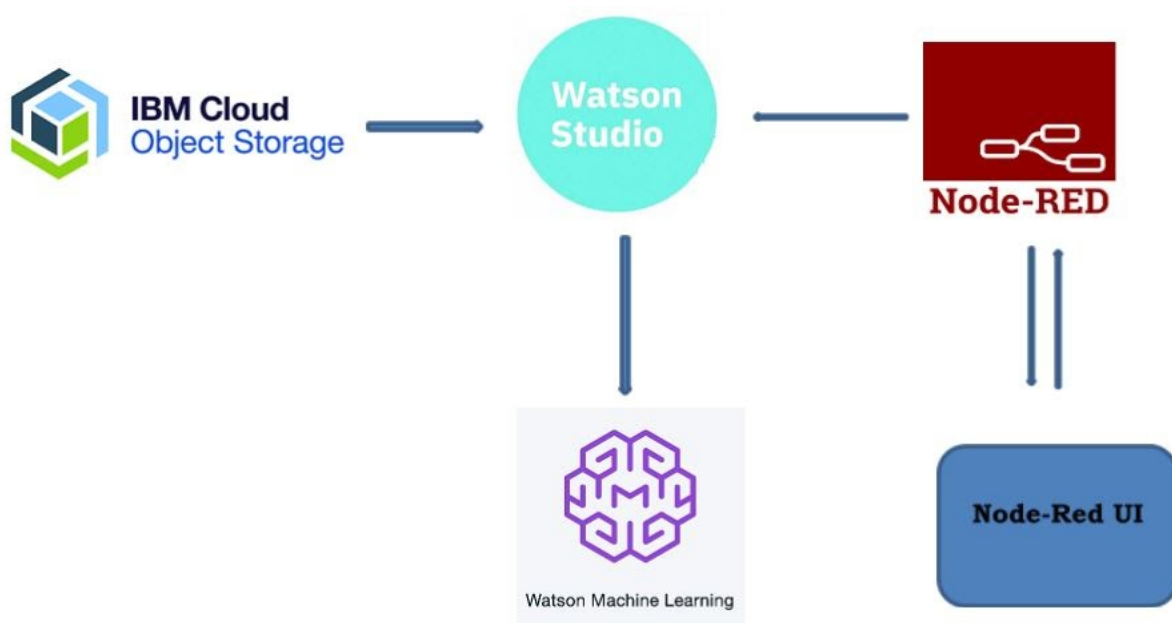
## Project Description

Breast cancer is one of the main causes of cancer death worldwide. Early diagnostics significantly increases the chances of correct treatment and survival, but this process is tedious and often leads to a disagreement between pathologists. Computer-aided diagnosis systems showed potential for improving the diagnostic accuracy. But early detection and prevention can significantly reduce the chances of death. It is important to detect breast cancer as early as possible.

## Solution:

Here we are developing a machine learning model where in the model gets trained by considering the parameters such as: Radius, Texture, Perimeter, Area, Smoothness, Concavity, Concaveness, Compactness here all these parameters are taken in mean, se and overall values are been taken. And the model is been trained using Auto AI service in IBM Watson cloud and that can be deployed in an application such as web or mobile applications.

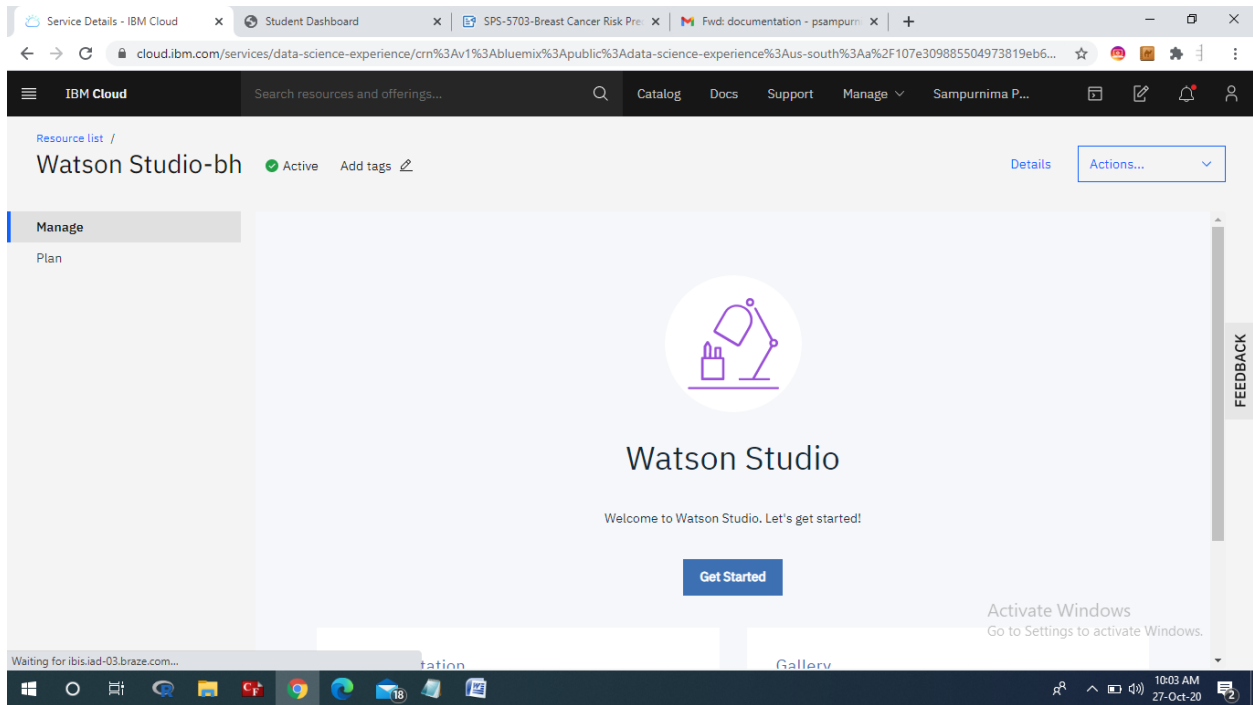
## Proposed Technical Architecture:



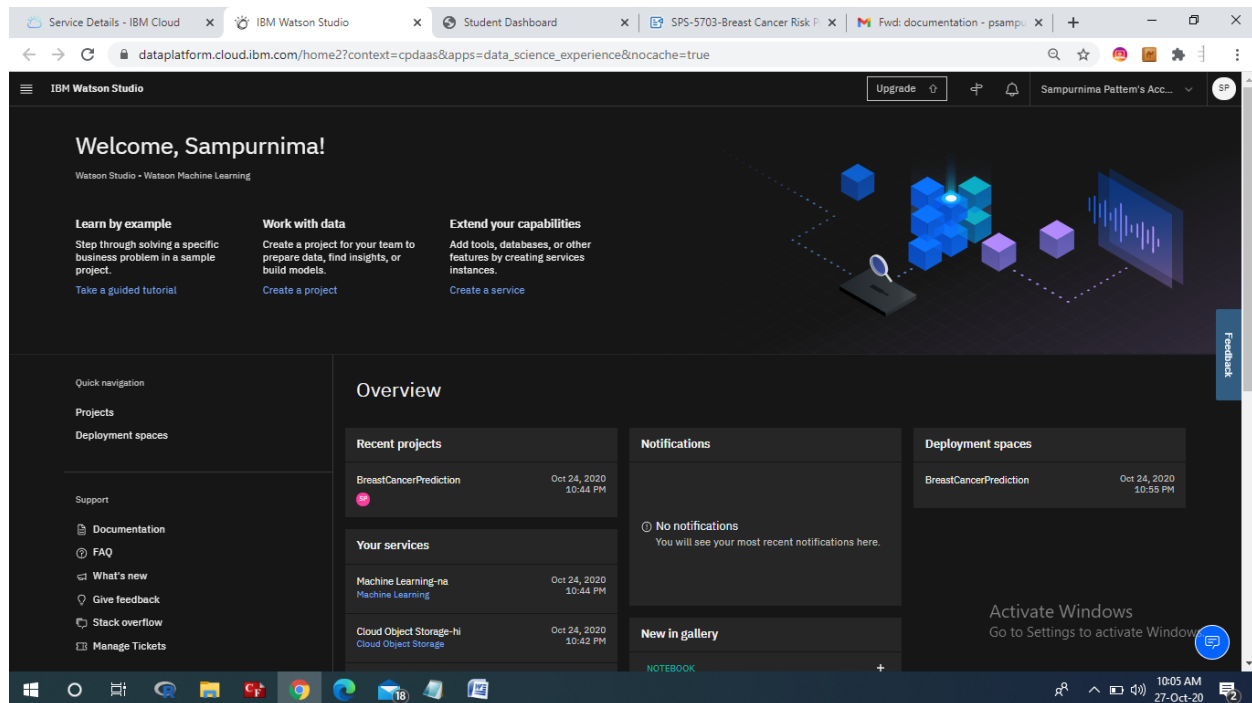
## Implementation:

To implement BreastCancer Risk Prediction using AutoAI we need to perform the following steps:

### 1.Open Watson Studio

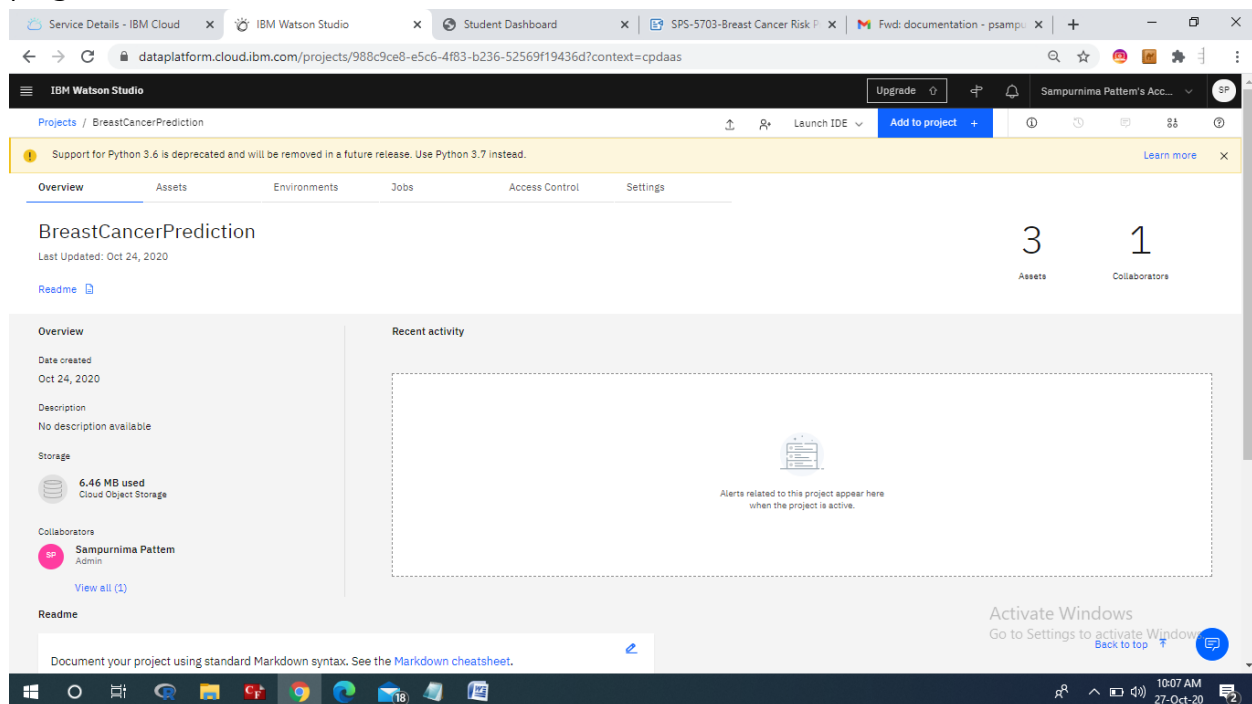


Once we clicked on GetStarted it will navigated to the following page



## 2.Create a Project

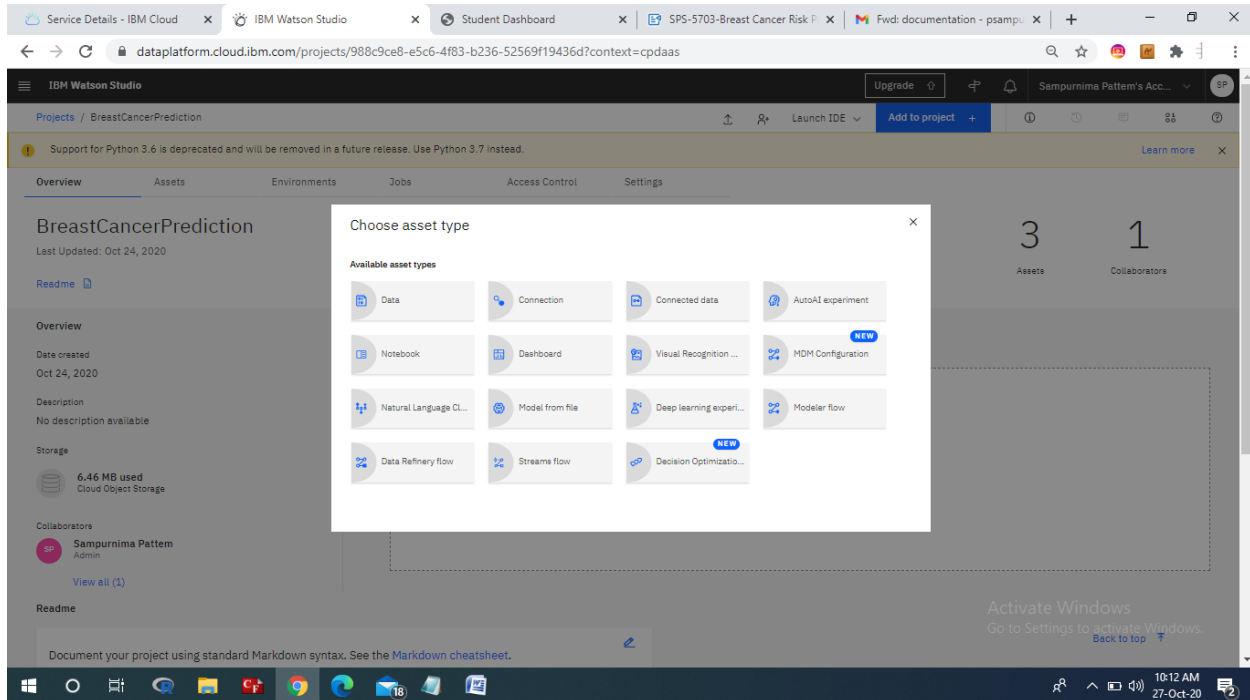
Now click on Project Option then it will be navigated to the following page.



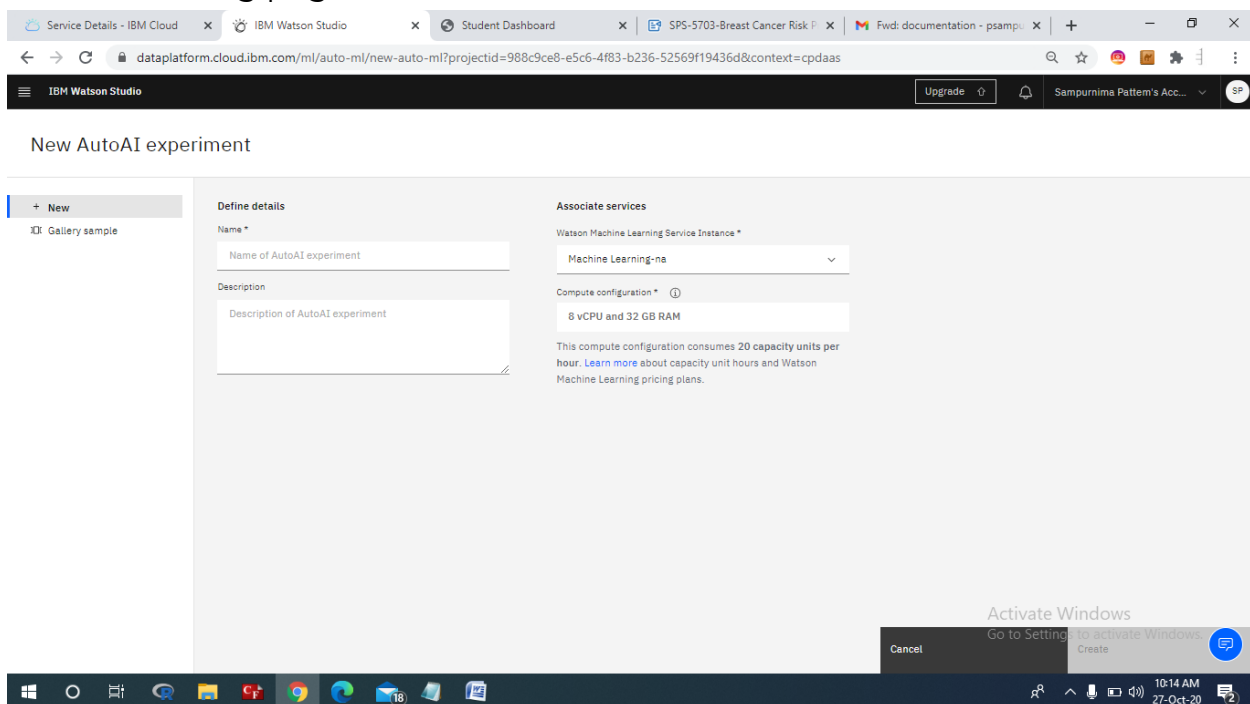
Now we need to click on "Add to Project" Option.

### 3.Add AutoAI Experiment

Once we click on "Add to Project" option then it will ask us to choose asset type as



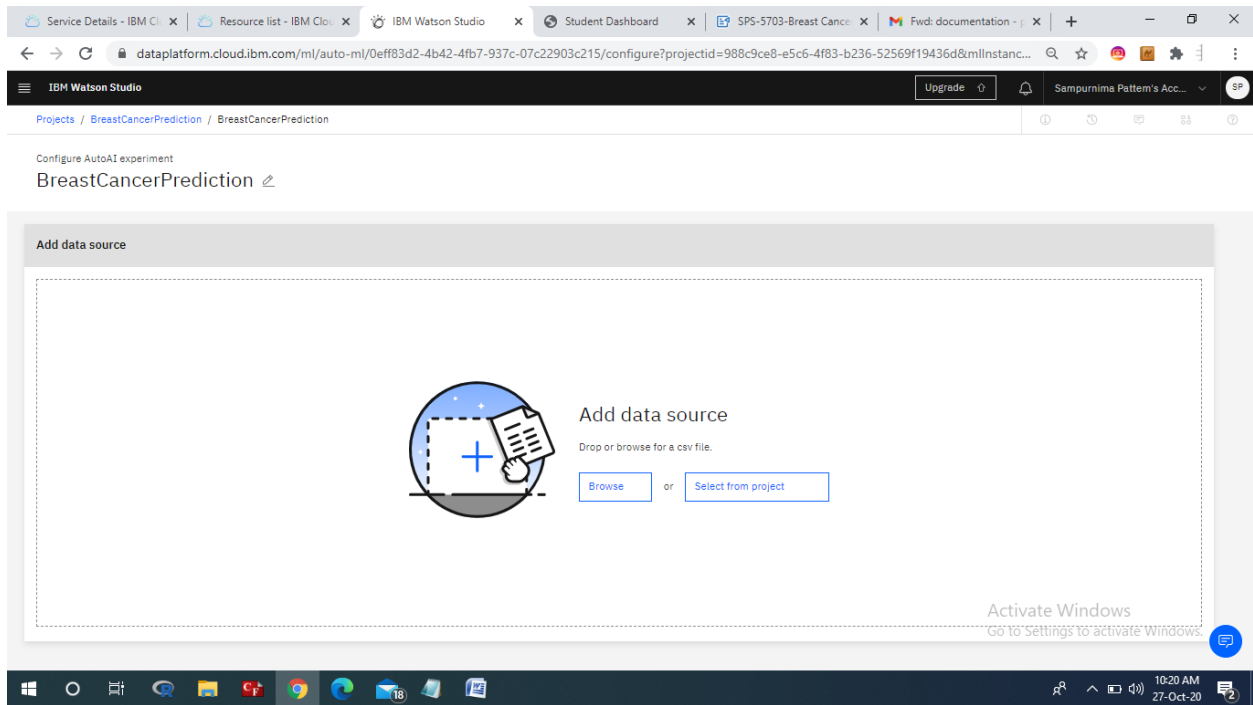
then select (or) choose "AutoAI experiment" then the page will be navigated to the following page



Here we need to mention the name of AutoAI experiment.

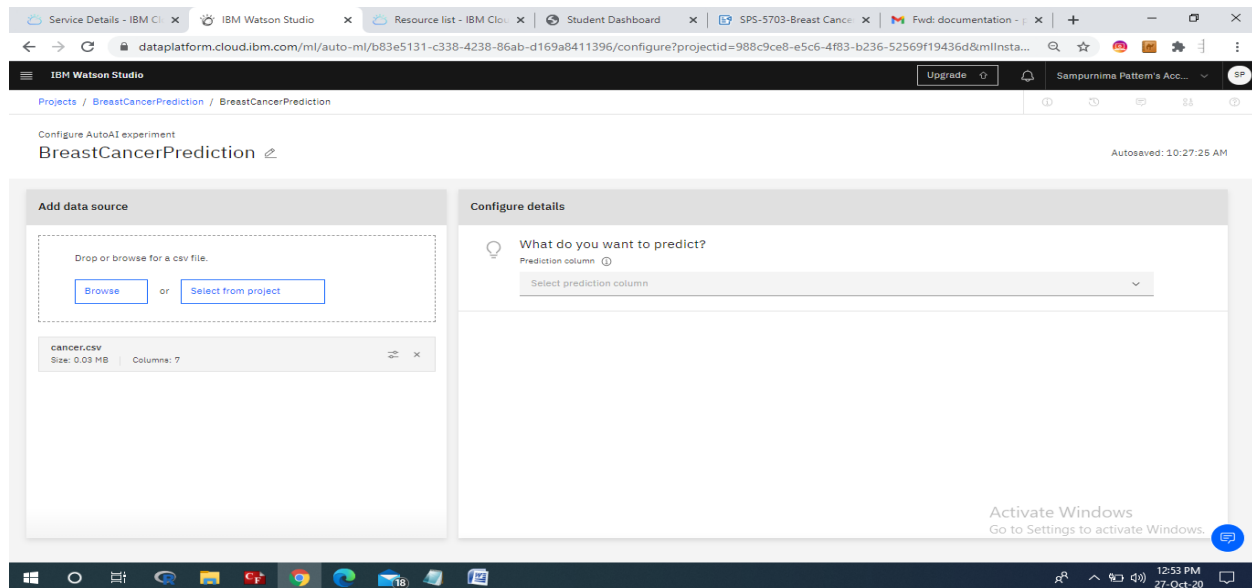
#### 4.Create a Machine Learning Instance and Associate ML to Project

In the above page we can create the machine Learning instance i.e "Machine Learning-na" and associated to our project.Then click on "create",then the page will be navigated to the following page



#### 5.Load the Dataset to the Cloud Object

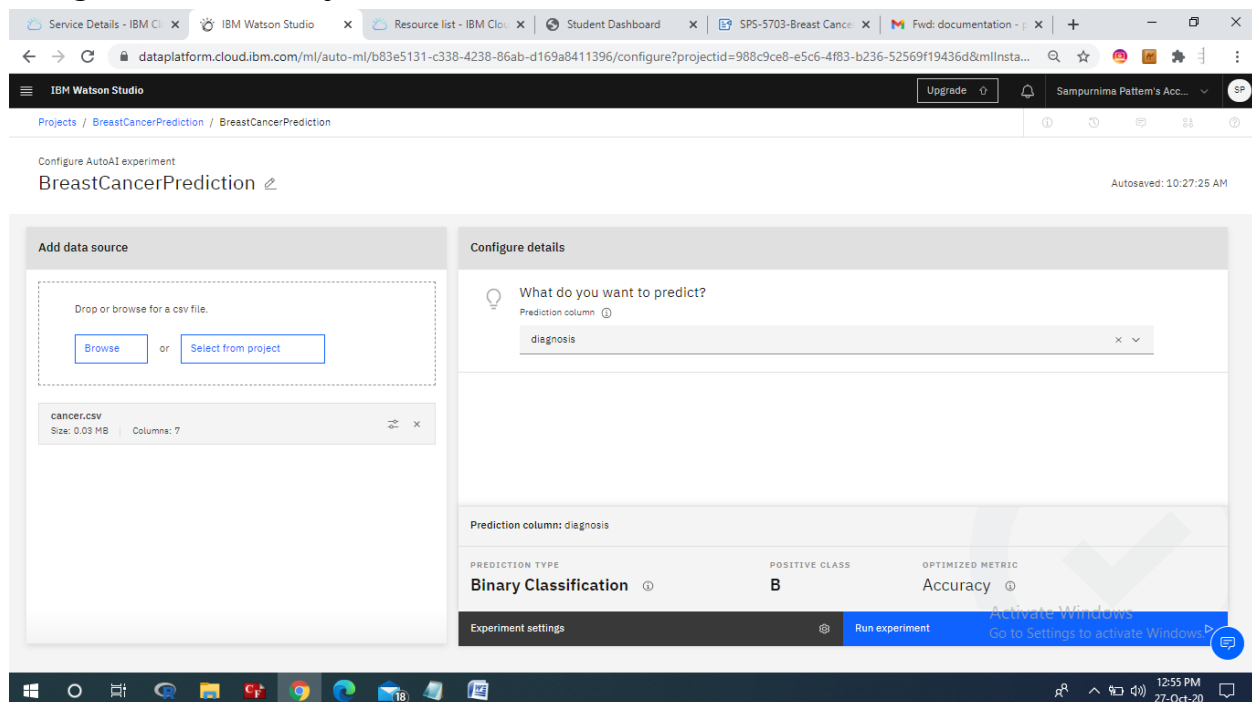
By clicking on "Browse" button, we can upload the data i.e "cancer.csv"



Then the page will be navigated to the following page.

## 6. Select the Predicted Parameter in the Dataset

Here we need to select the predicted value from uploaded data. I selected "diagnosis" from my data as shown below.

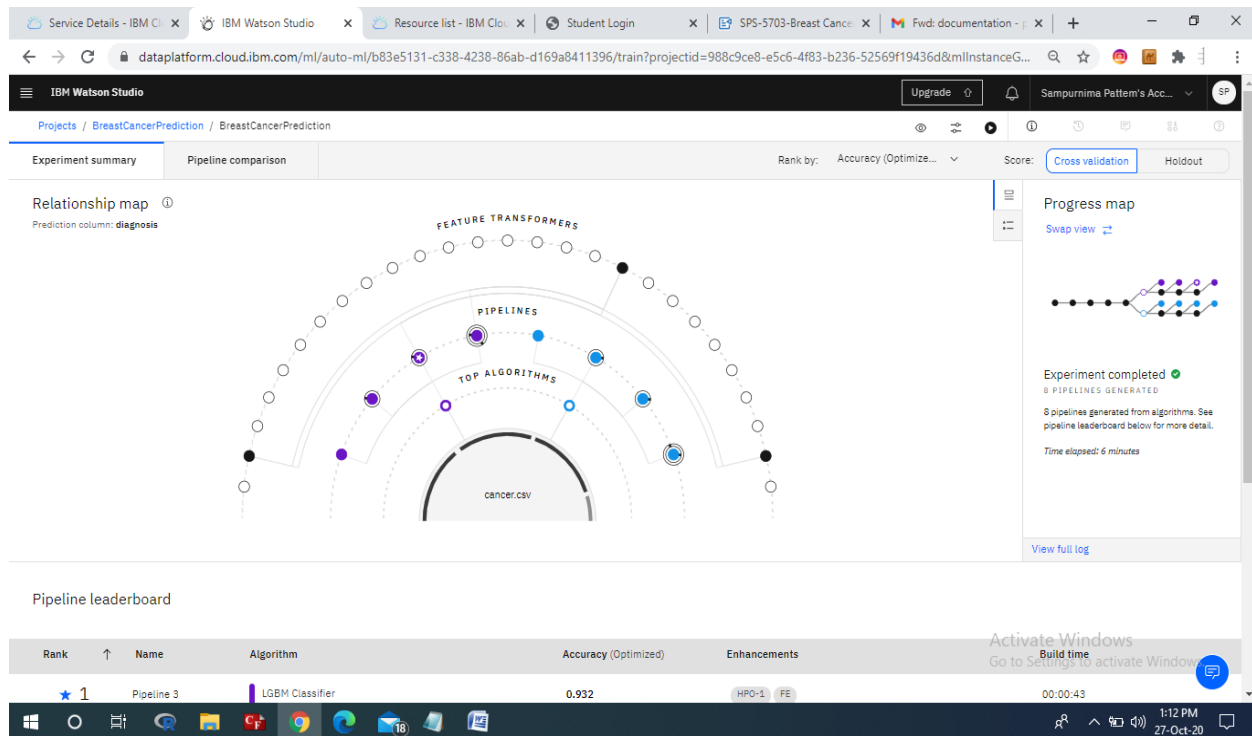


## 7. Train the Model

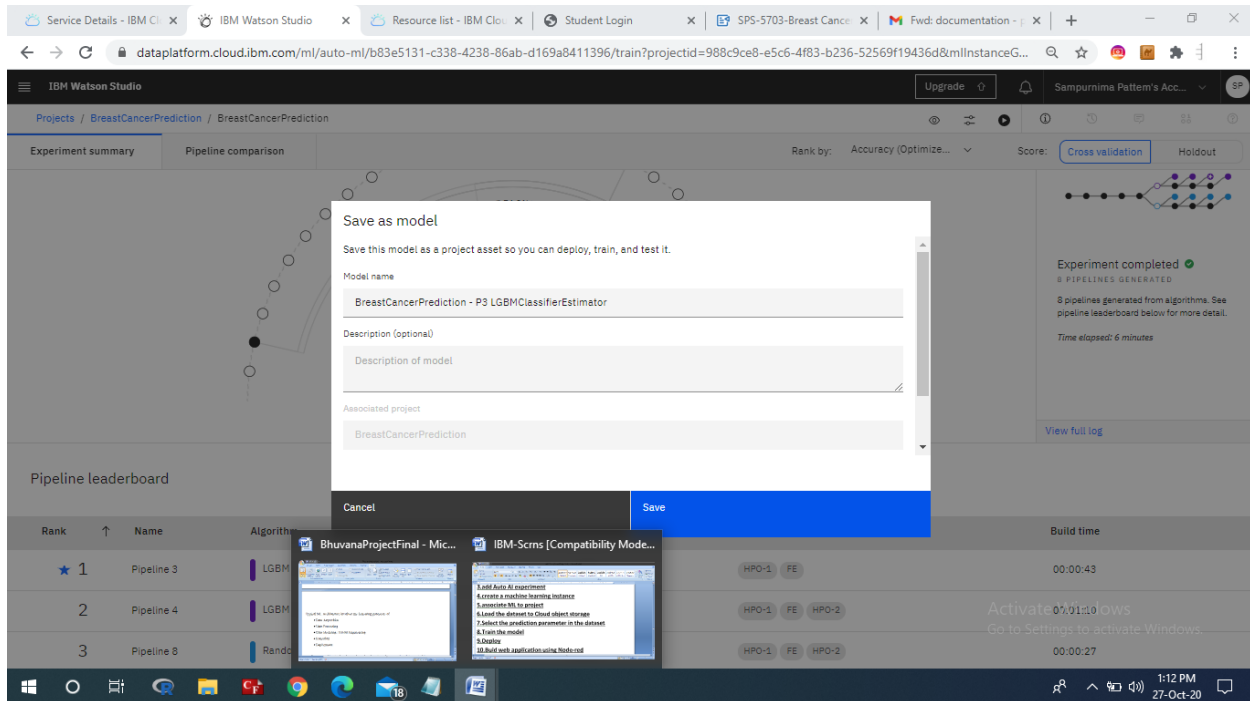
Here we can click on "Run experiment". Then the model will start to run. While running the model it will perform the operations like

- 1.Data Aquisition
- 2.Data Preprocessing
- 3.Data Modeling (or) Model Engineering
- 4.Execution

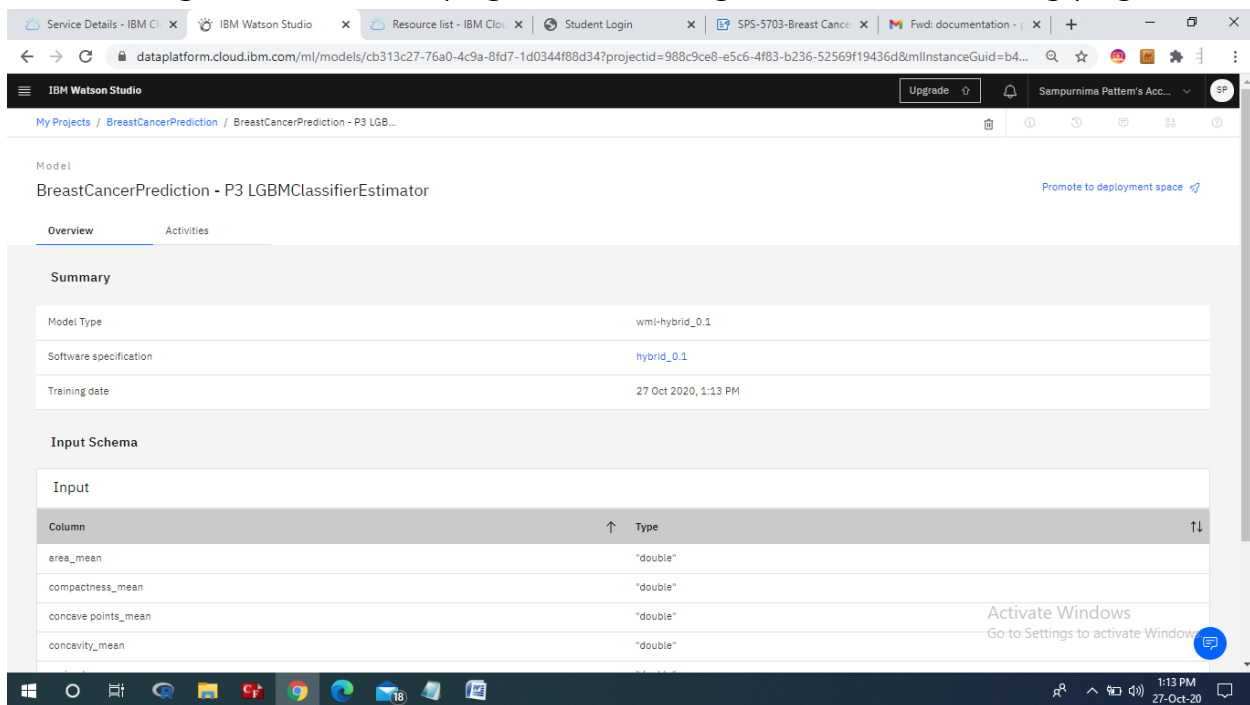
Finally model will be generated and we need to save that model



## Saving the Model



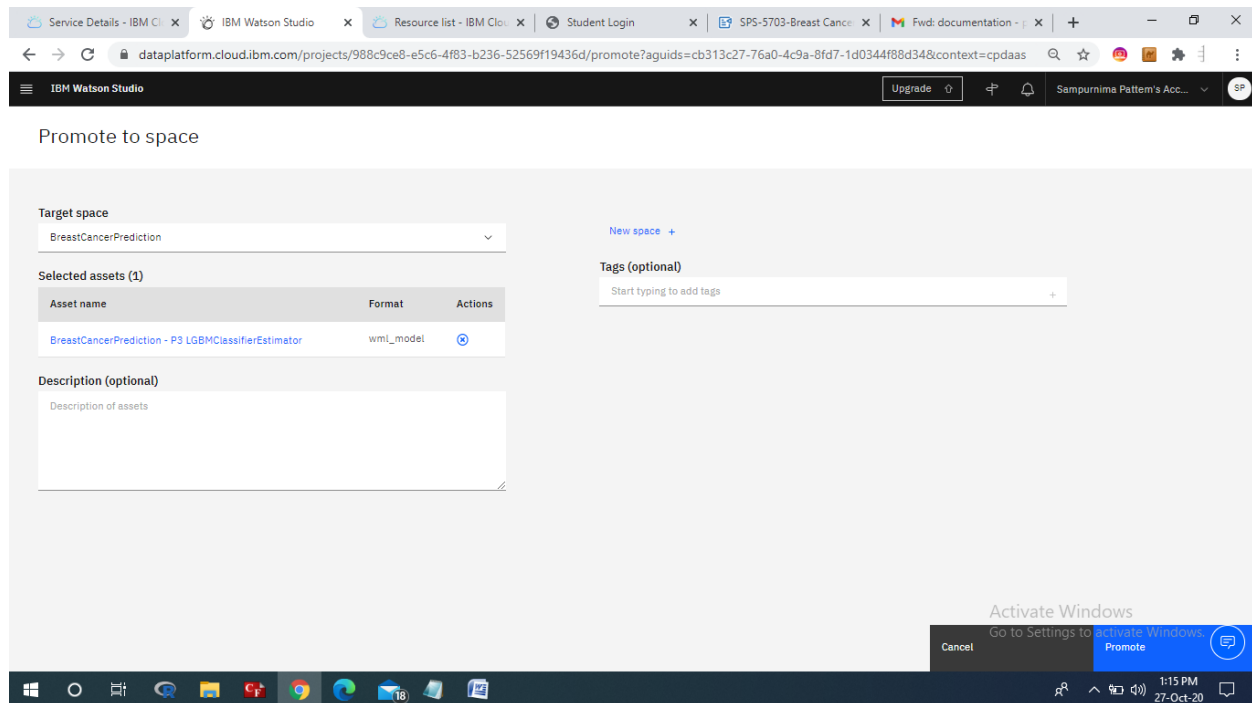
After saving the model the page will be navigated to the following page



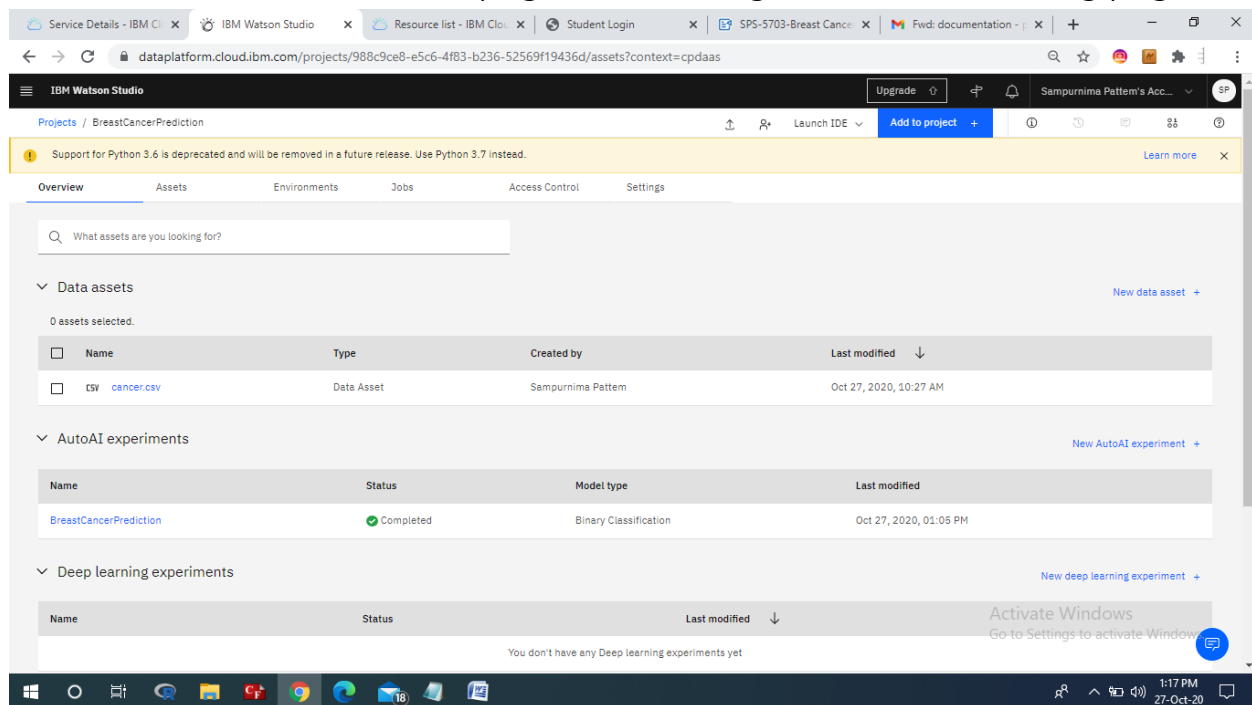
## 8. Deploy the Model

Now we need to click on "Promote to deployment space" then the following page will be displayed.





Now click on "Promote".Then page will be navigated to the following page



After Promoting the model we need to select "Go to Deployment Space", then the page will be navigated to the following page

Service Details - IBM Cl... IBM Watson Studio Resource list - IBM Cl... Student Login SPS-5703-Breast Canc... Fwd: documentation - p... + -

dataplatfom.cloud.ibm.com/ml-runtime/spaces/1783e3b8-615d-49e7-8f79-6bb3138bdc04/assets?context=cpdaas

IBM Watson Studio Upgrade Sampurnima Pattern's Acc... SP

Deployments / BreastCancerPrediction Add to space +

### BreastCancerPrediction

Assets Deployments Jobs Access control Settings

What assets are you looking for?

Models (3) Import model +

Name	Type	Software specification	Last modified
BreastCancerPrediction - P3 LGBMClassifierE...	wmi-hybrid_0.1	hybrid_0.1	Oct 27, 2020 1:20 PM
BreastCancerPrediction - P3 LGBMClassifierE...	wmi-hybrid_0.1	hybrid_0.1	Oct 27, 2020 1:16 PM
BreastCancerPrediction - P3 LGBMClassifierE...	wmi-hybrid_0.1	hybrid_0.1	Oct 24, 2020 10:54 PM

Drop files here or browse for files to upload.

Stay on the page until upload completes. Incomplete uploads are cancelled.

Activate Windows  
Go to Settings to activate Windows.

1:23 PM 27-Oct-20

Then click on any Model ,the page will be navigated to the following page.

Service Details - IBM Cl... IBM Watson Studio Resource list - IBM Cl... Student Login SPS-5703-Breast Canc... Fwd: documentation - p... + -

dataplatfom.cloud.ibm.com/ml-runtime/models/92ee218a-6214-4ab1-b0e9-460025ae8401?context=cpdaas&space\_id=1783e3b8-615d-49e7-8f79-6bb313...

IBM Watson Studio Upgrade Sampurnima Pattern's Acc... SP

Deployments / BreastCancerPrediction / BreastCancerPrediction - P3 LGB...

### BreastCancerPrediction - P3 LGBMClassifierEstimator

Create deployment +

Deployments Schema

You don't have any deployments yet  
Create your first deployment for this model. [Learn more](#)

BreastCancerPrediction - P3 LGBMClassifierEstimator  
Last modified at Oct 27, 2020 1:23 PM

Created  
Oct 27, 2020 1:20 PM

Type  
wmi-hybrid\_0.1

Model ID  
92ee218a-6214-4ab1-b0e9-4600...

Software specification  
[hybrid\\_0.1](#)

Hybrid pipeline software specifications  
[autosai-kb\\_3.1-py3.7](#)

Description  
No description provided.

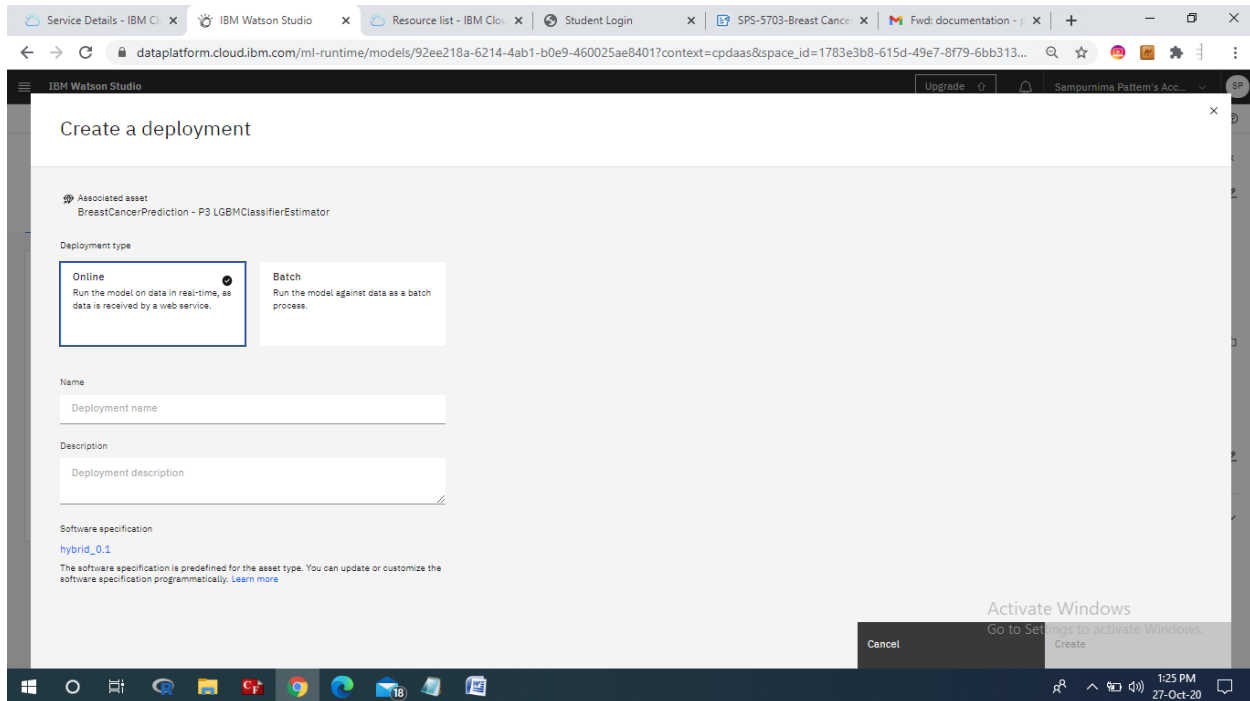
Source asset details

Connecting...

Activate Windows  
Go to Settings to activate Windows.

1:24 PM 27-Oct-20

Then click on "create deployment",that will be take us to the following page.



There we find 2 deployment types.

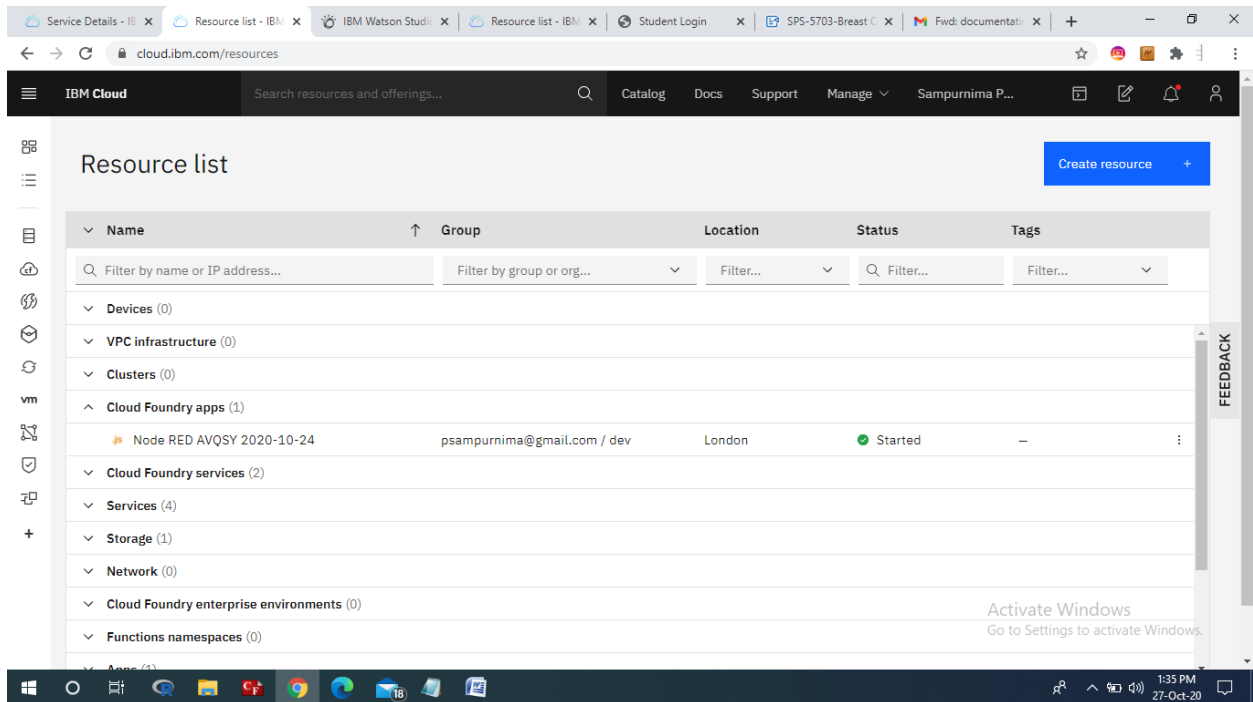
1. Online Deployment type
2. Batch Deployment type

We can select the Online Deployment type and mention the name of deployment then click on "Create". Then the page will be navigated to the following page i.e

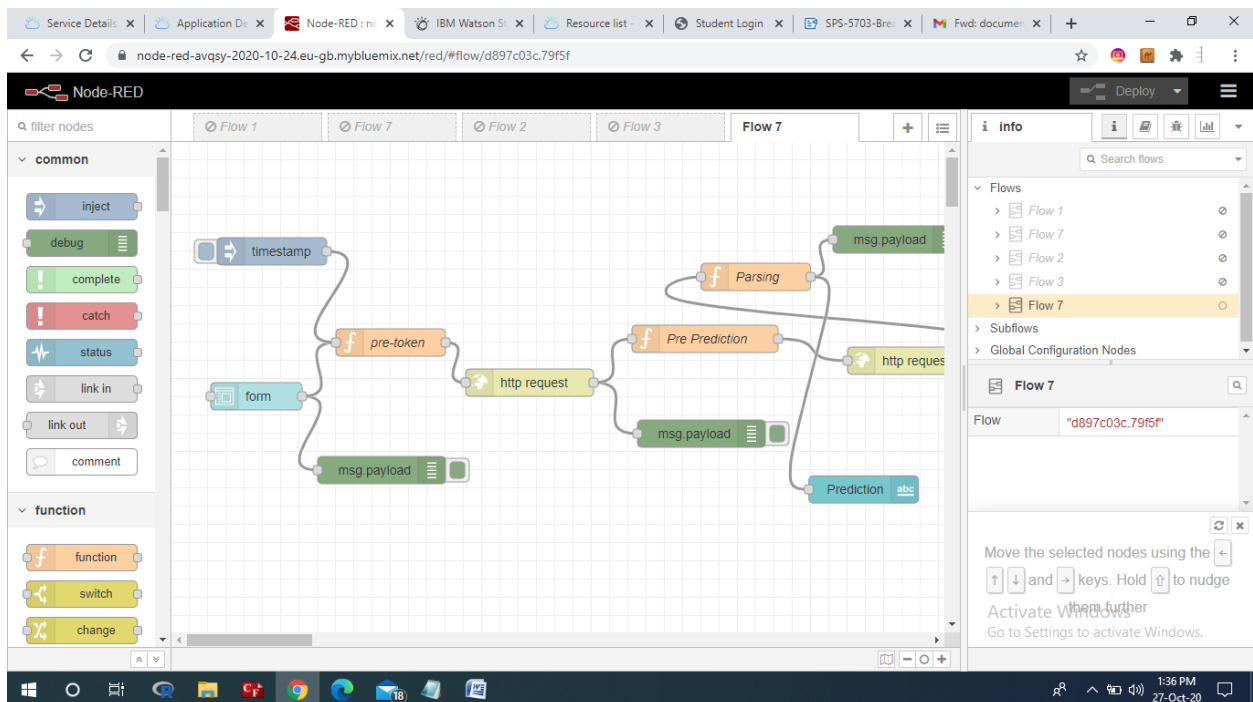


## 9.Build Web-Application using Node-Red

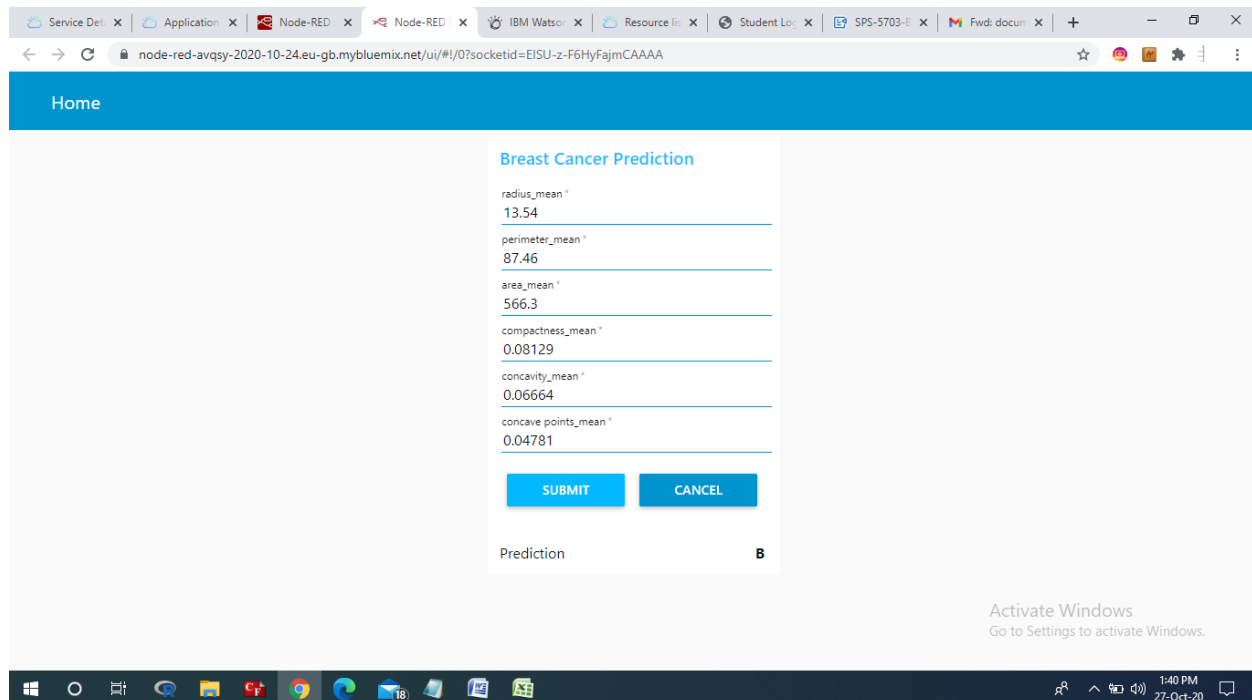
Open the Node-Red from Cloud Foundry apps



If we click on Node-Red then we get the following window



After deploying the code the following output is generated



## Conclusion

Evaluation of classification is done on parameters such as radius\_mean, perimeter\_mean, area\_mean, compactness\_mean, concavity\_mean, concave points\_mean is done on machine learning models such as logistic regression, nearest neighbors, Gaussian naive bayes, decision trees, and random forests. Apparently, random forests outperform all other models when mean scores of different metrics is considered. But, when a close observation is made in the respective metric scores with respect to different hyper-parameters, logistic regression performs on par with random forests. So, logistic regression model is chosen as better model among the lot owing to its simplicity and cost-effectiveness.