

AutoAI using IBM Watson

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Abstract

Users are given the ability to automate the process of constructing and deploying machine learning models through the use of a tool called AutoAI. It automates the most time-consuming portions of the data science process, such as feature engineering, model selection, and hyperparameter tuning, by making use of a combination of artificial intelligence and machine learning approaches [4]. AutoAI is also capable of providing explanations for its suggestions and forecasts, which makes it much simpler for users to comprehend the thought process that underlies the model's outputs. This tool has the potential to drastically reduce the amount of time and resources required to develop efficient machine learning models, which makes it a useful asset for businesses as well as researchers who are trying to leverage the power of AI in their work.

Keywords: machine learning; IBM Watson; loan risk prediction

Introduction

The main aim work of the work was to use an AutoAI Tool for predicting whether it is a Risk or not for the bank to give out loan to a person based on his credit score, past record and other important features. The loan clearance process can be made much more accurate and quicker by using an AutoAI tool to predict loans. In the old way of doing things, banks and other financial institutions depend on a team of experts to look over loan applications and decide whether a person is creditworthy. This process can take a long time and be subjective, which can lead to mistakes and inconsistencies.

With an AutoAI tool, choices about whether to give a loan can be made more quickly and objectively. The tool can look at a lot of information, like a person's credit history, income, job, and other related factors, to figure out how likely it is that they will not pay back a loan.

AutoAI can also explain why it made a certain guess. This helps make the decision-making process more open and less biased. By automating a lot of the loan approval process, banks and other financial institutions can speed up operations, cut costs, and make the customer experience better overall.

The complete process for Risk analysis for providing the loan has been automated using:

- Watson Studio to assist in the generation of ML pipelines and the training of the model to improve predictions [1, 2].
- IBM Cloud [3] Functions to allow execution of the application code without servers and automatically scale it.

Materials and Methods

For performing the following experiment an IBM Account was needed.

The step-by-step method to perform prediction on our given dataset is described below:

Creating IBM Watson studio service

We first started creating a Watson studio instance and alongside we also created a cloud storage instance with it as shown in Figure 1 in order to store our data over the internet rather than storing our files locally on our systems. Then we created a new project as shown in Figure 2.

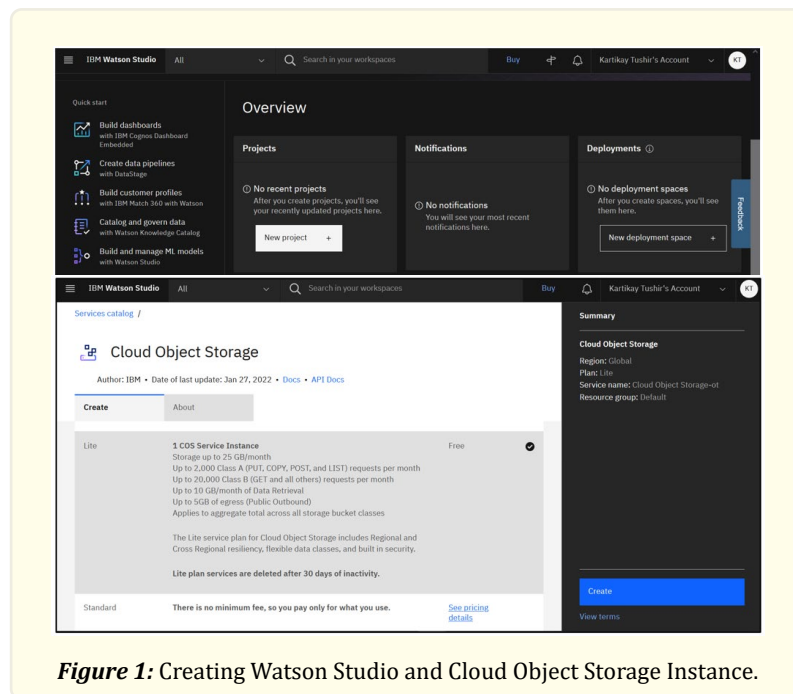


Figure 1: Creating Watson Studio and Cloud Object Storage Instance.

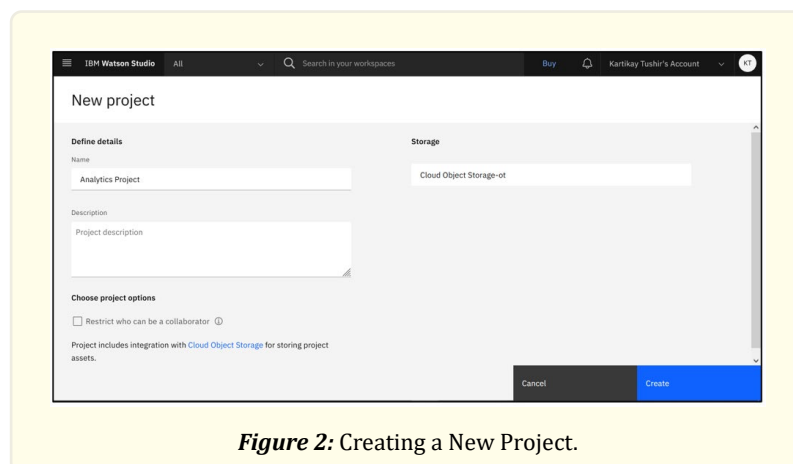


Figure 2: Creating a New Project.

Creating new Asset

Here we created a new asset where we selected AutoAI as our tool as shown in Figure 3, which will set up default values for the experiment based on the dataset we provided. We will then select the dataset we have stored locally on our system and add it to our project as shown in Figure 4.

The dataset used here was `german_credit_data`, which consists of Credit History of the individual along with all the major details from Income, Collateral, Employment History, Purpose of loan, Age, etc. With the help of all this data we then selected what we wanted to predict from our dataset as shown in Figure 5.

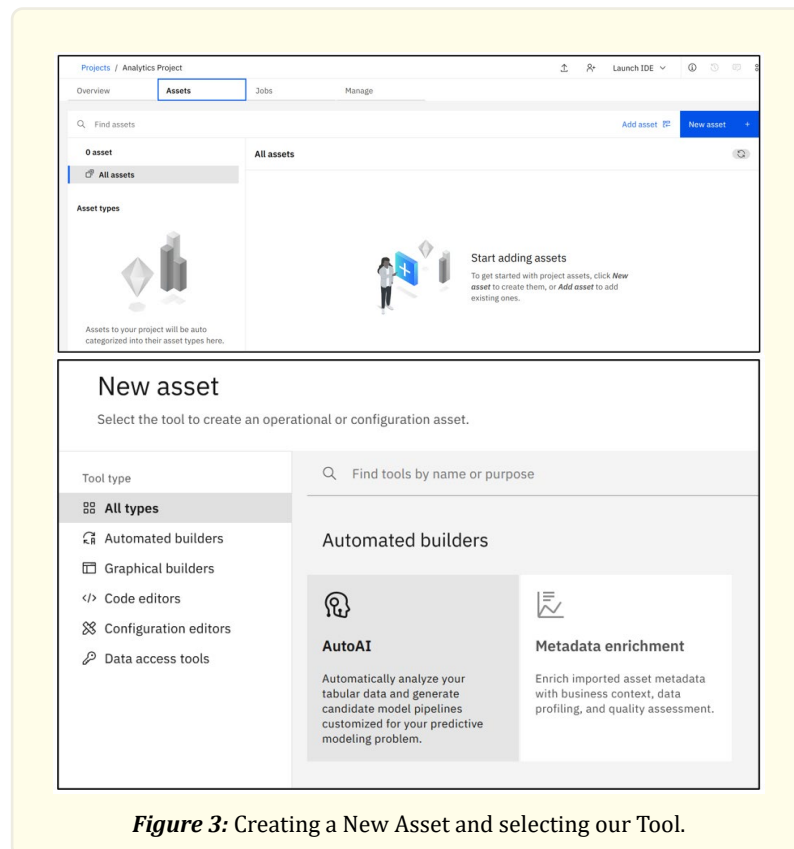


Figure 3: Creating a New Asset and selecting our Tool.

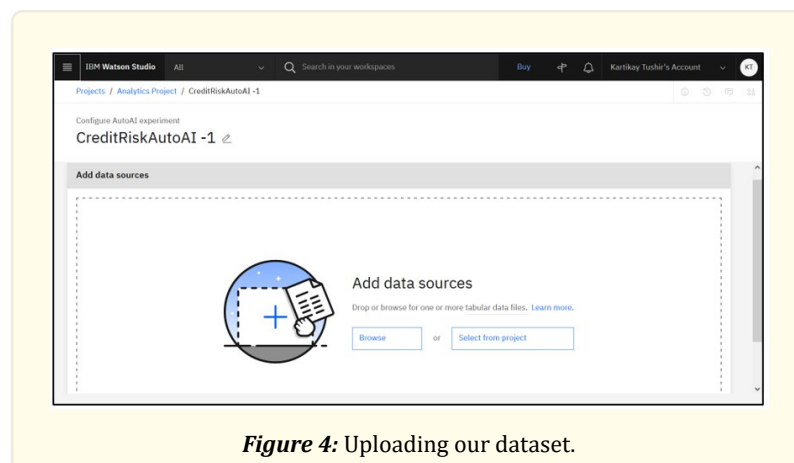


Figure 4: Uploading our dataset.

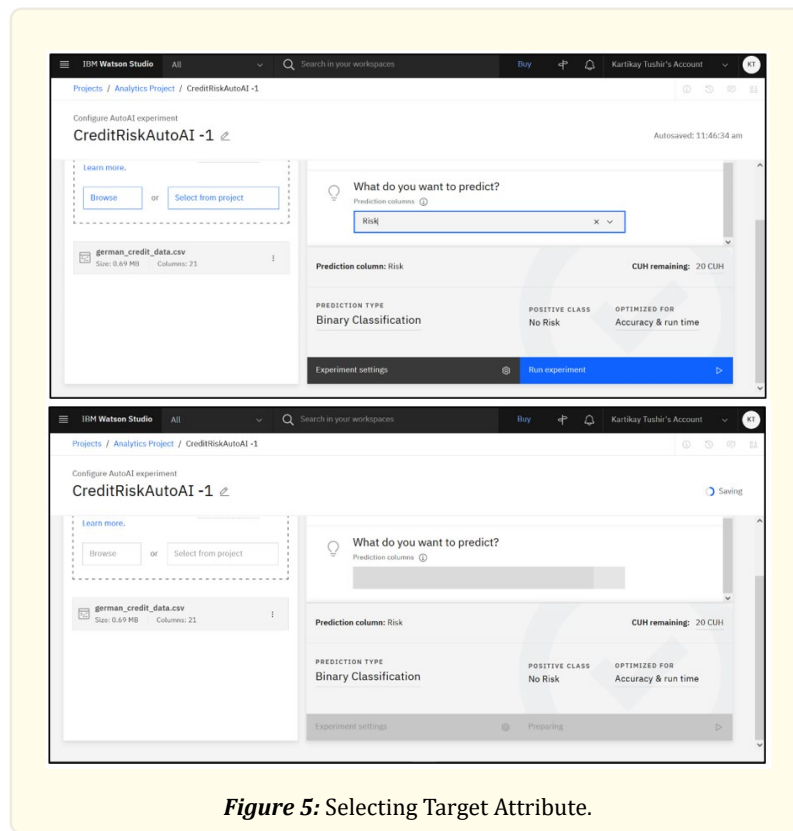
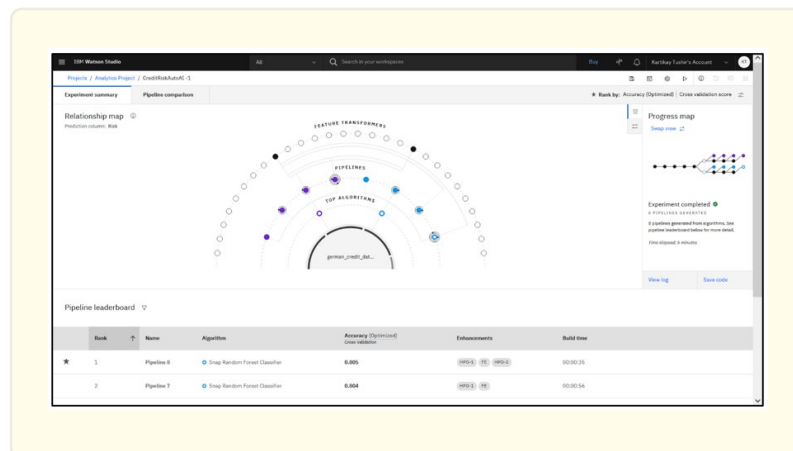


Figure 5: Selecting Target Attribute.

Creating and running an AutoAI experiment

Finally, we then moved towards our Machine Learning portion. We created a new project as depicted in Figure 2. We then selected our target attribute as shown in Figure 5. After selecting all the required parameters our AutoAI tool automatically prepares our data for modelling and chooses the best fit algorithm as shown in Figure 5. Once the model is trained we can see the Relationship map as shown in Figure 6, accordingly Model Performances with their accuracy rate are depicted in Figure 7.



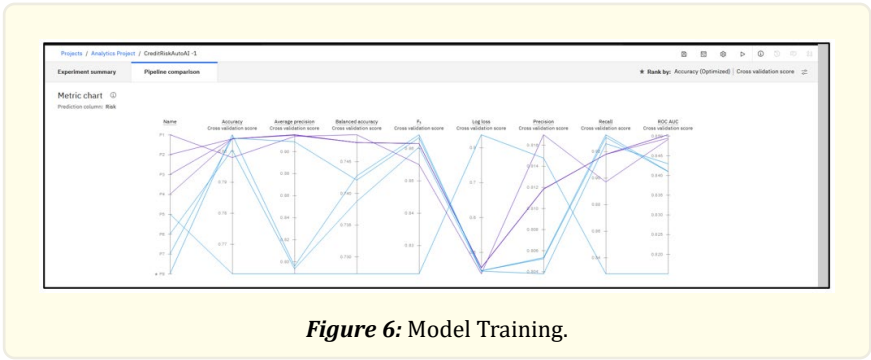


Figure 6: Model Training.

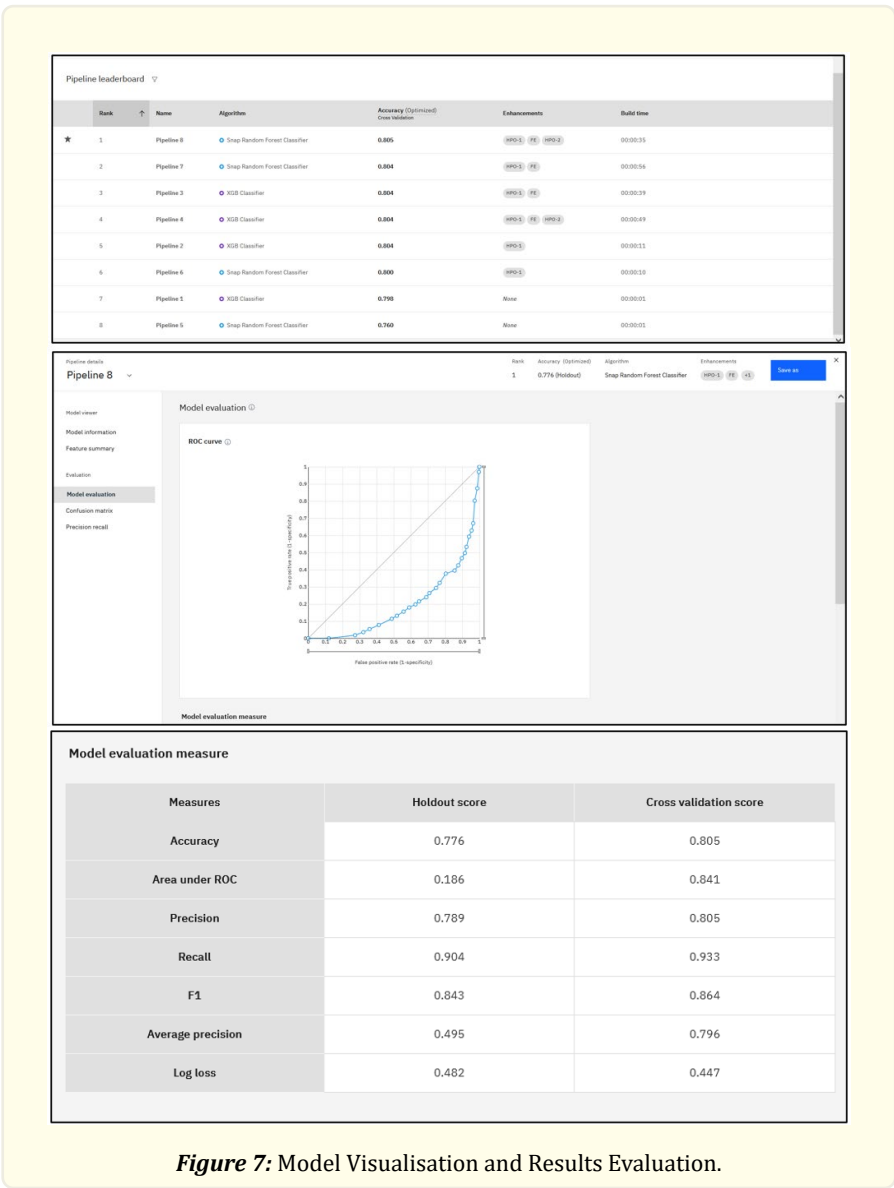


Figure 7: Model Visualisation and Results Evaluation.

Deployment of the model

Once we have gathered our results as shown in Figure 7, we save our model which gave use the most accurate result as shown in Figure 8. At the end we create a deployment space for our Snap Random Forest Classifier model and promote our model into the space we created as shown in Figure 9. Finally, we were able to successfully deploy our model as shown in Figure 10.

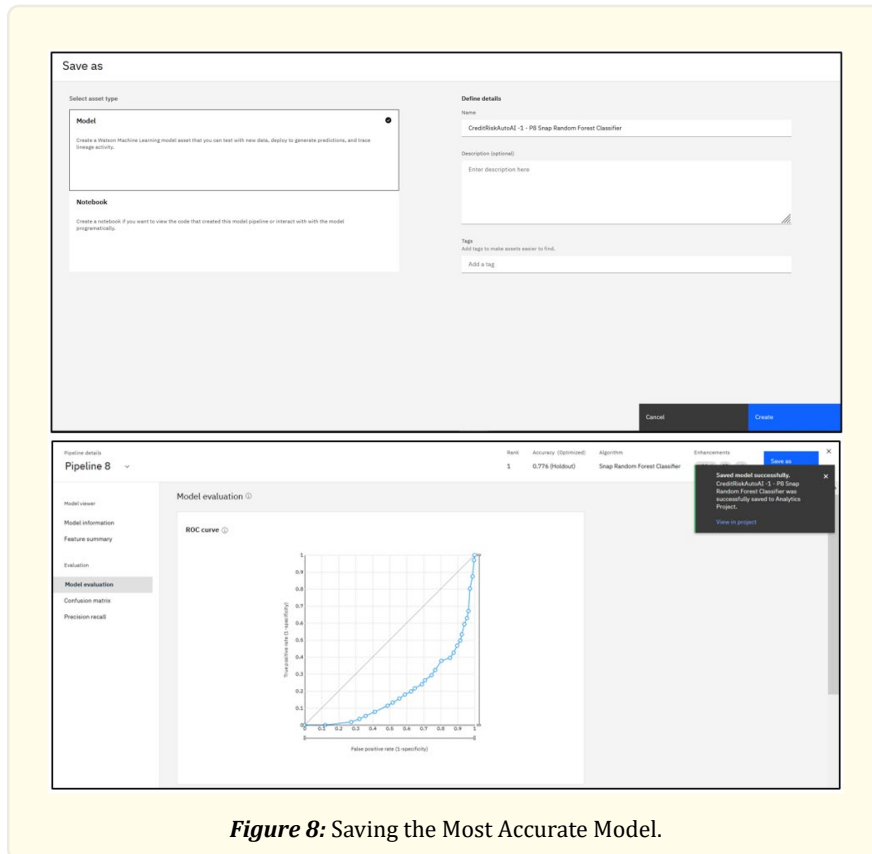
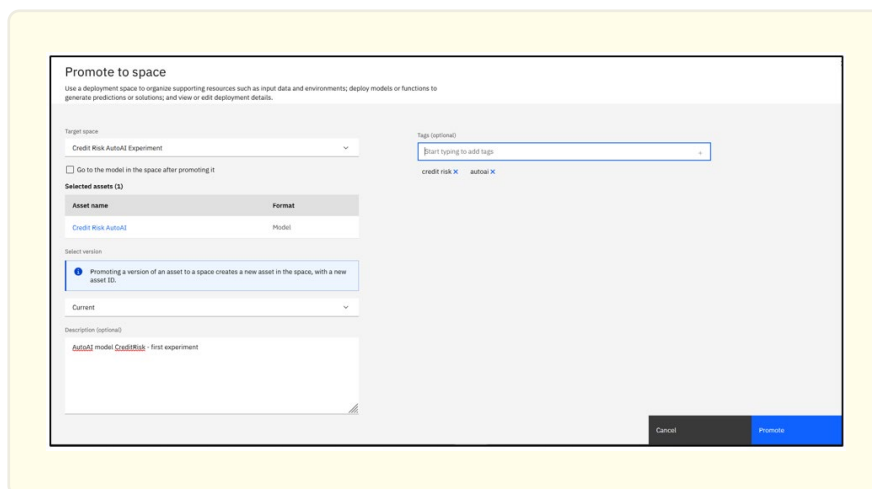


Figure 8: Saving the Most Accurate Model.



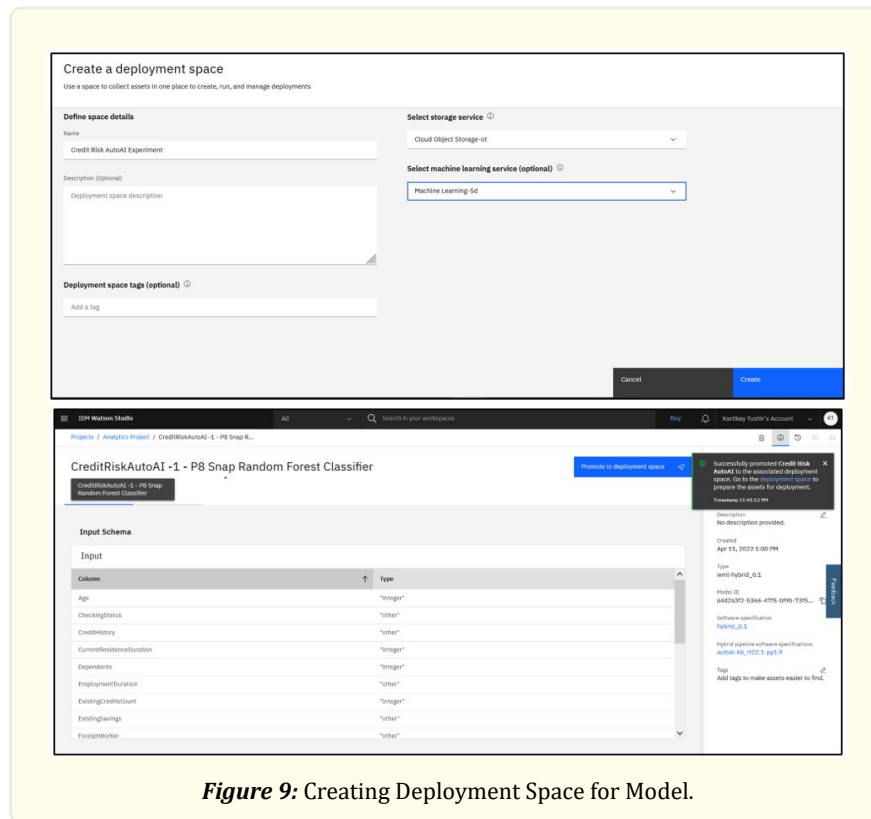


Figure 9: Creating Deployment Space for Model.

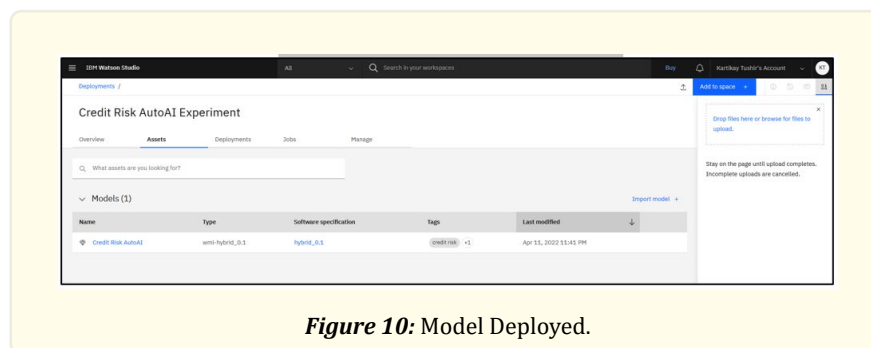


Figure 10: Model Deployed.

Conclusion

Using one of the IBM Watson services, we were able to use AutoAI Tool for predicting whether a person is eligible for getting a loan sanctioned by the bank or not. The Tool used was able to automatically chose the best fit algorithm which is in this case was Snap Random Forest Classifier model in Machine Learning for prediction of the Risk factor.

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