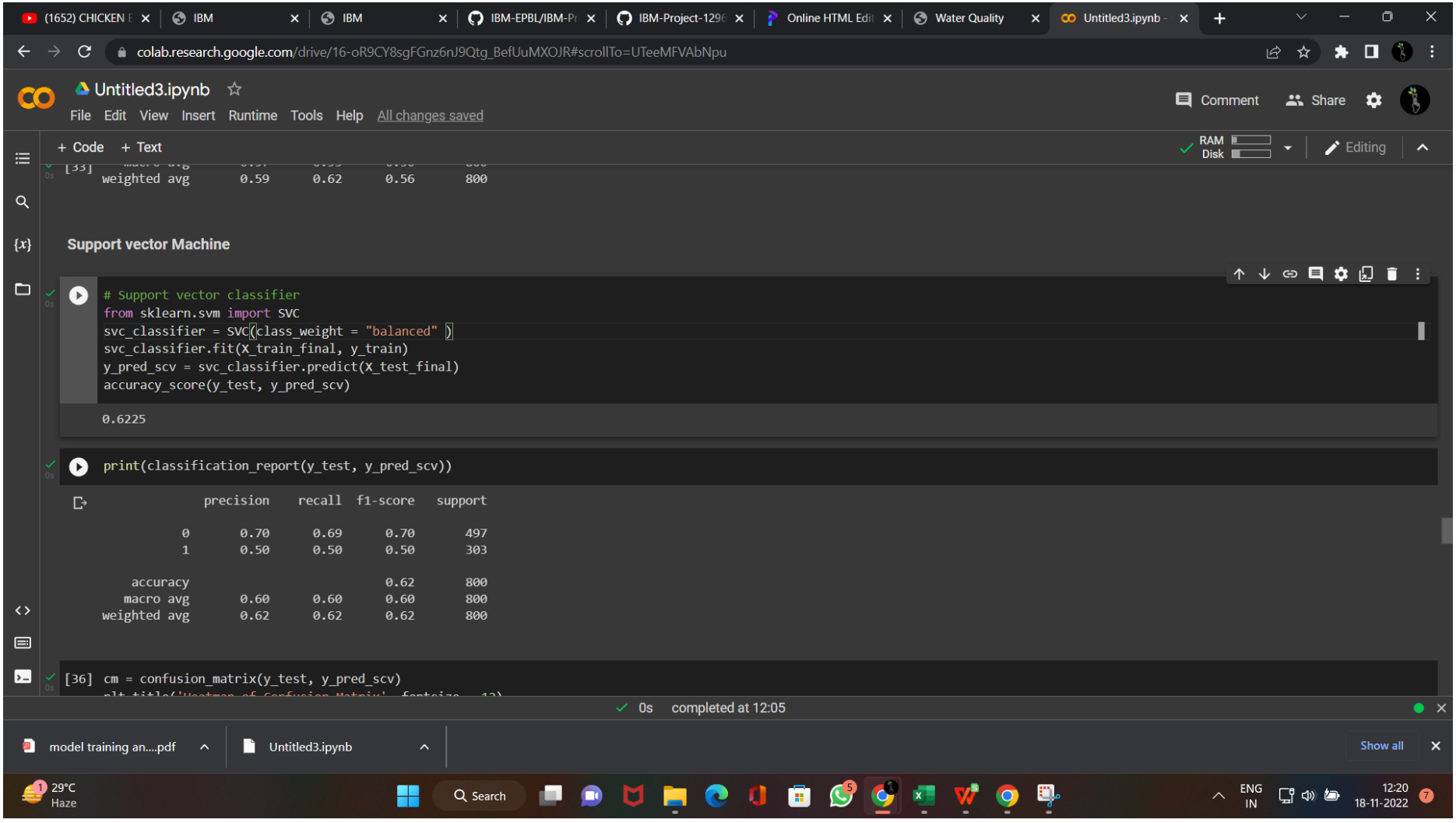
SPRINT 3

Project Deliverables (Model Building Code & Evaluation)

Team ID	PNT2022TMID37191
Project Name	Efficient Water Quality Analysis & Prediction using Machine Learning

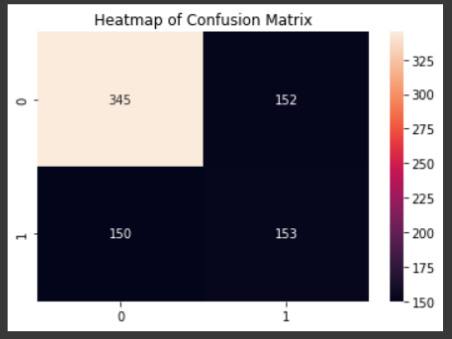
Using the best accuracy algorithm (SVC) we are going to train our model for deployment:



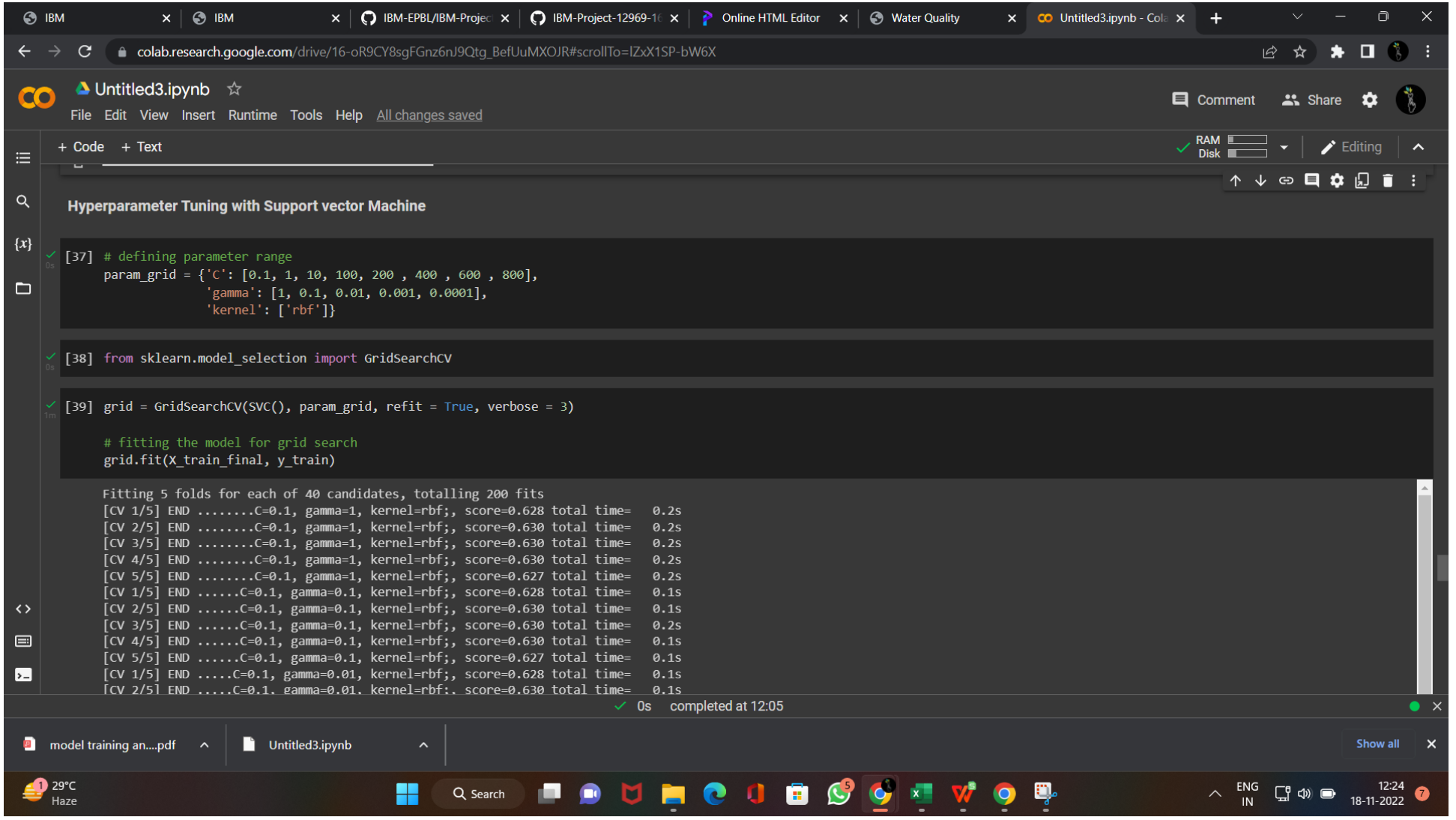
```
              1       0.50      0.50      0.50       303

       accuracy                           0.62       800
      macro avg       0.60      0.60      0.60       800
   weighted avg       0.62      0.62      0.62       800
```

```
cm = confusion_matrix(y_test, y_pred_scv)
plt.title('Heatmap of Confusion Matrix', fontsize = 12)
sns.heatmap(cm, annot = True, fmt = "d")
plt.show()
```



Hyperparameter Tuning with Support vector Machine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Water Quality
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File Edit View Insert Runtime Tools Help All changes saved
Comment
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Editing
Hyperparameter Tuning with Support vector Machine
[37] # defining parameter range
param_grid = {'C': [0.1, 1, 10, 100, 200 , 400 , 600 , 800],
'gamma': [1, 0.1, 0.01, 0.001, 0.0001],
'kernel': ['rbf']}
[38] from sklearn.model_selection import GridSearchCV
[39] grid = GridSearchCV(SVC(), param_grid, refit = True, verbose = 3)
# fitting the model for grid search
grid.fit(X_train_final, y_train)
Fitting 5 folds for each of 40 candidates, totalling 200 fits
[CV 1/5] END ....C=0.1, gamma=1, kernel=rbf;, score=0.628 total time= 0.2s
[CV 2/5] END ....C=0.1, gamma=1, kernel=rbf;, score=0.630 total time= 0.2s
[CV 3/5] END ....C=0.1, gamma=1, kernel=rbf;, score=0.630 total time= 0.2s
[CV 4/5] END ....C=0.1, gamma=1, kernel=rbf;, score=0.630 total time= 0.2s
[CV 5/5] END ....C=0.1, gamma=1, kernel=rbf;, score=0.627 total time= 0.2s
[CV 1/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=0.628 total time= 0.1s
[CV 2/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=0.630 total time= 0.1s
[CV 3/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=0.630 total time= 0.2s
[CV 4/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=0.630 total time= 0.1s
[CV 5/5] END ......C=0.1, gamma=0.1, kernel=rbf;, score=0.627 total time= 0.1s
[CV 1/5] END .....C=0.1, gamma=0.01, kernel=rbf;, score=0.628 total time= 0.1s
[CV 2/5] END .....C=0.1, gamma=0.01, kernel=rbf;, score=0.630 total time= 0.1s
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model training an....pdf
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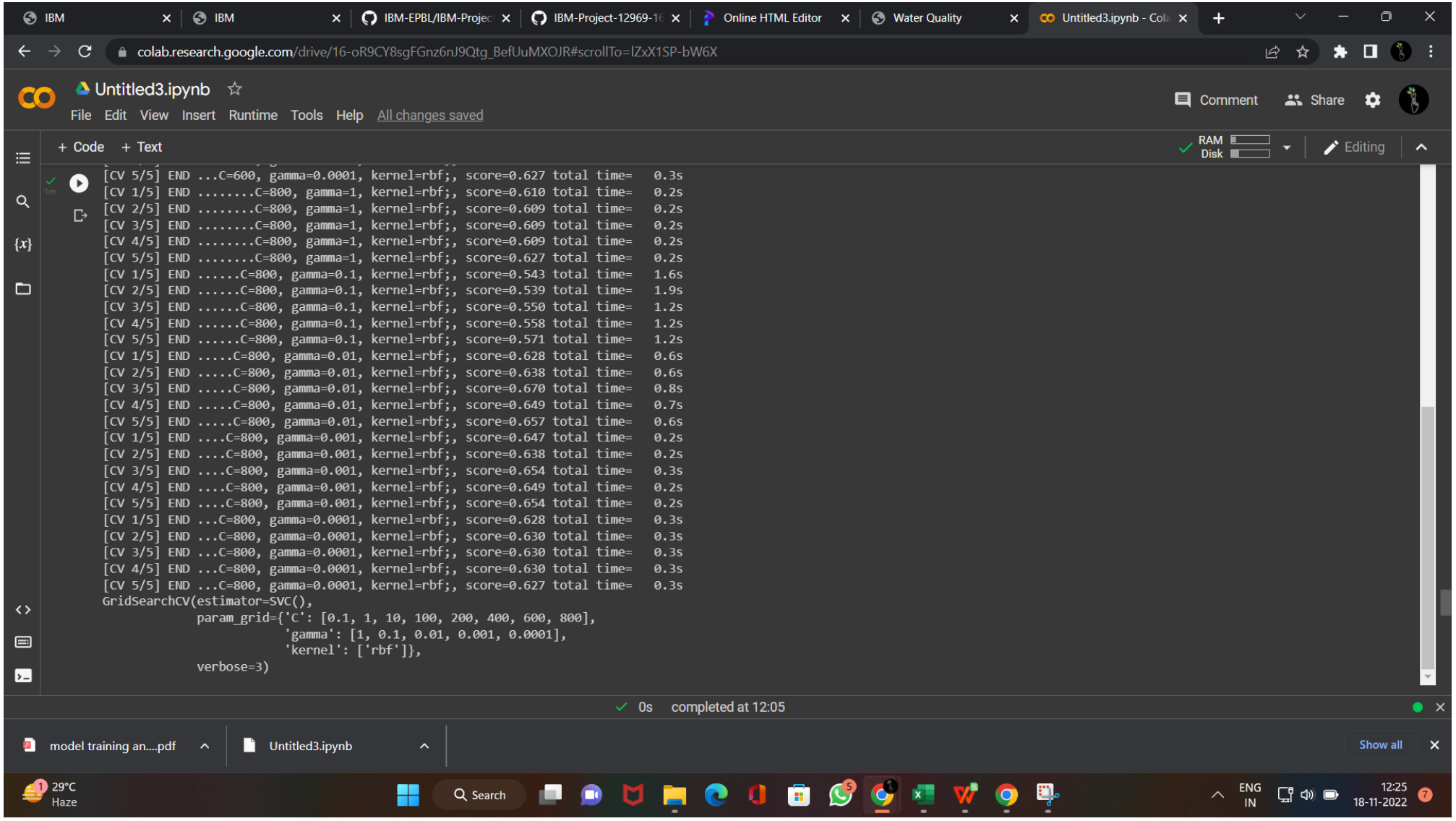

Now we have successfully trained our model , then we will save our trained model using *PICKLE library*

Model.pkl file: (this is the file where we will be saving our trained model)