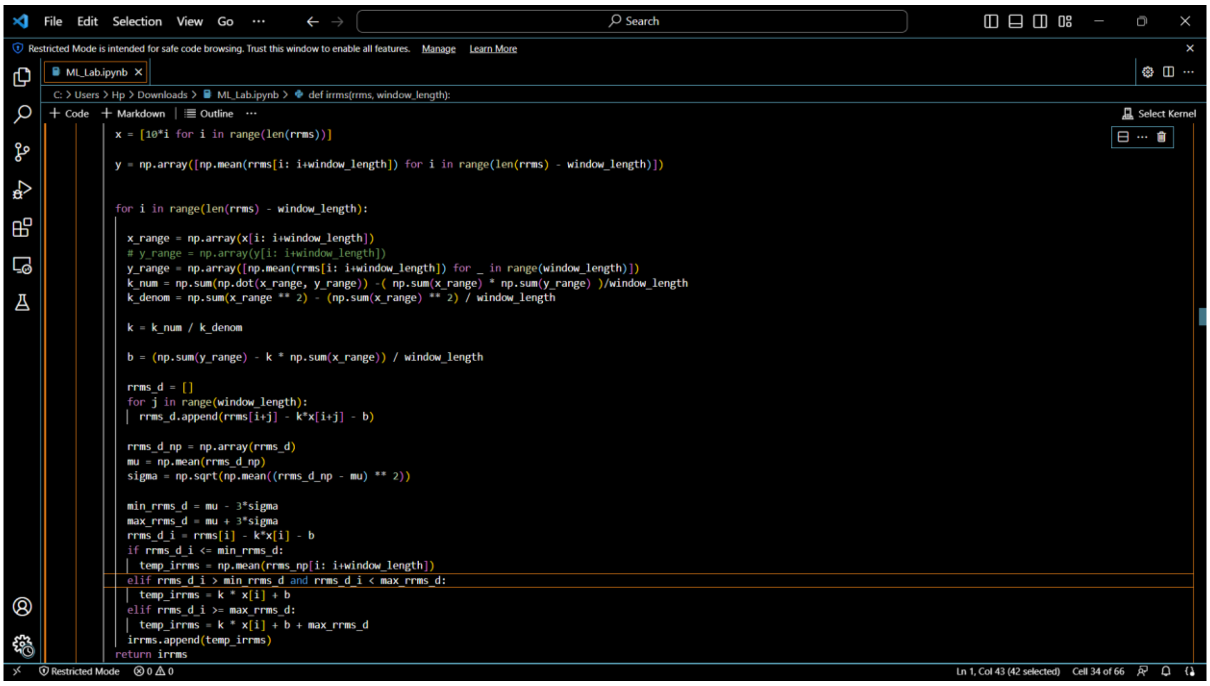
WEEK-2

12th Jun 2023

Anomaly Detection and SVM analysis:

Implementation:

Implemented about Support Vector Machine to find the accuracy of a model and got it as highest accuracy result as compared to other algorithm.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Restricted Mode is intended for safe code browsing. Trust this window to enable all features.
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ML_Lab.ipynb
C: > Users > Hp > Downloads > ML_Lab.ipynb > def irrms(rrms, window_length):
+ Code
+ Markdown
Outline
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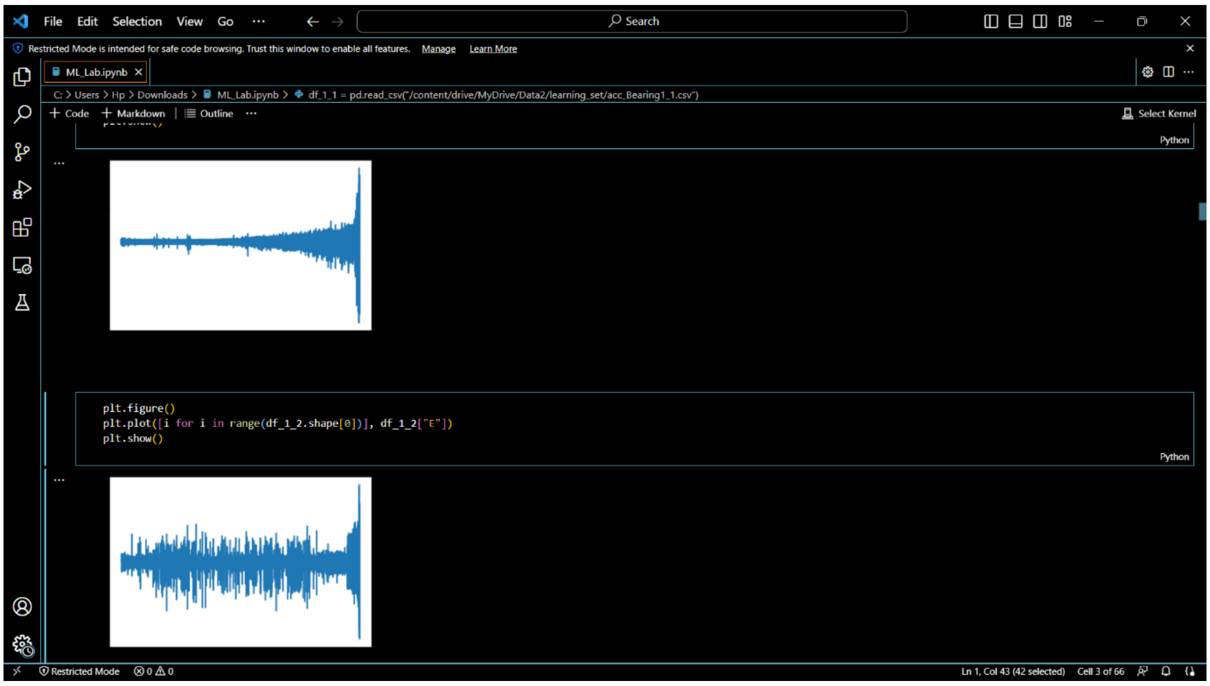
Ln 1, Col 43 (42 selected)
Cell 34 of 66

```
    x = [10*i for i in range(len(rrms))]

    y = np.array([np.mean(rrms[i: i+window_length]) for i in range(len(rrms) - window_length)])


    for i in range(len(rrms) - window_length):

        x_range = np.array(x[i: i+window_length])
        # y_range = np.array(y[i: i+window_length])
        y_range = np.array([np.mean(rrms[i: i+window_length]) for _ in range(window_length)])
        k_num = np.sum(np.dot(x_range, y_range)) -( np.sum(x_range) * np.sum(y_range) )/window_length
        k_denom = np.sum(x_range ** 2) - (np.sum(x_range) ** 2) / window_length

        k = k_num / k_denom

        b = (np.sum(y_range) - k * np.sum(x_range)) / window_length

        rrms_d = []
        for j in range(window_length):
            rrms_d.append(rrms[i+j] - k*x[i+j] - b)

        rrms_d_np = np.array(rrms_d)
        mu = np.mean(rrms_d_np)
        sigma = np.sqrt(np.mean((rrms_d_np - mu) ** 2))

        min_rrms_d = mu - 3*sigma
        max_rrms_d = mu + 3*sigma
        rrms_d_i = rrms[i] - k*x[i] - b
        if rrms_d_i <= min_rrms_d:
            temp_irrms = np.mean(rrms_np[i: i+window_length])
        elif rrms_d_i > min_rrms_d and rrms_d_i < max_rrms_d:
            temp_irrms = k * x[i] + b
        elif rrms_d_i >= max_rrms_d:
            temp_irrms = k * x[i] + b + max_rrms_d
        irrms.append(temp_irrms)
    return irrms
```


File Edit Selection View Go
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Restricted Mode is intended for safe code browsing. Trust this window to enable all features. Manage Learn More
ML_Lab.ipynb
C: > Users > Hp > Downloads > ML_Lab.ipynb > df_1_1 = pd.read_csv("/content/drive/MyDrive/Data2/learning_set/acc_Bearing1_1.csv")
Code Markdown Outline
Select Kernel
Python
Restricted Mode
Ln 1, Col 43 (42 selected) Cell 3 of 66

```
plt.figure()
plt.plot([i for i in range(df_1_2.shape[0])], df_1_2["E"])
plt.show()
```

13th Jun 2023

Support Vector Machine

Implementation:

Learned algorithm of SVM and implemented it to predict the fault.

In SVM, the algorithm tries to find an optimal hyperplane that separates the different classes in the input data. The hyperplane is chosen in such a way that it maximizes the margin, which is the distance between the hyperplane and the nearest data points of each class. The data points that are closest to the hyperplane are called support vectors.

14th Jun 2023

Learned about the PyTorch library and got to know about how it helps to solve the problems based on neural network. Also explored different uses & features of this library.

PyTorch is an open-source machine learning library that is widely used for developing and training deep learning models. It provides a flexible and efficient framework for building neural networks and performing numerical computations. PyTorch supports dynamic computational graphs, which allow for more flexibility in model architecture compared to static graph frameworks.

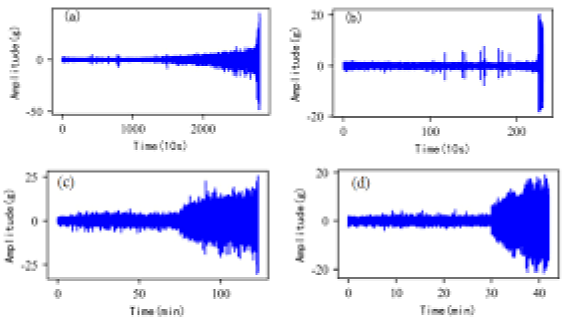
15th Jun 2023

Performance Evaluation and Optimization:

Learned how to evaluate the performance of a model and optimize its parameters. Explored techniques like cross-validation, hyperparameter tuning, and model selection to ensure the model is accurate and reliable.

16th Jun 2023

Learned about the bearing degradation and analyze different pictures and graphs and got to know about at what time a bearing degradation occurs and system failure occurs in case of bearing



17th Jun 2023

Gained a good understanding of bearings, their types, functioning, failure modes, and the factors that affect their life expectancy. It will help me to interpret the dataset and make accurate predictions. Also complete the yesterday's analysis about some uncleared images.

Bearings are mechanical components designed to enable rotational or linear movement between two parts. They reduce friction and provide support for moving parts, allowing them to operate smoothly and efficiently. There are various types of bearings, each with its own design and function.

18th Jun 2023

Implemented the SVM model and preprocessed the NASA bearing dataset practiced on kaggle.

After that currently working with this for more high accuracy.