

To,  
IITD-AIA Foundation of Smart Manufacturing

Subject: **Weekly Progress Report for Week 5**

Dear Sir,

Following is the weekly progress report dating from 3<sup>rd</sup> July to 9<sup>th</sup> of July, 2023. I went ahead and researched on shearing machine and practiced on Datasets for a clearer understanding of the things.

## My Understanding of the Project: INTP23-ML-5: Equipment Failure Prediction for Predictive Maintenance

Predictive Maintenance is the procedure of using already existing data of various factors which might cause equipment failure and using those data available to us to predict when an equipment might fail in the future. It basically works on the principle of Condition Monitoring. Condition-monitoring tools combined with artificial intelligence and machine learning techniques forecast expected machine failure.

Predictive maintenance helps in:

- reducing maintenance costs
- maintenance scheduling and planning
- improving reliability.

With the help of such technologies, we can predict and perform maintenance activities without disrupting normal machine activities.

Weekly Progress:

**3<sup>rd</sup> July 2023:**

Read CNC's Machine Tool Wear Diagnostic Paper

- I read the paper from the github repository.
- I learned about prognostic steps of the system prediction
- I couldn't work on the dataset due to prior commitments but will surely work more on it tomorrow.

**4<sup>th</sup> July 2023:**

N/A (Was not able to submit my daily report on time due to prior important commitments)

**5<sup>th</sup> July 2023:**

Practiced on CNC Mill Tool Dataset

- I went through the paper from the GitHub repository again to get a clearer understanding of it.
- I utilized numpy, matplotlib, seaborn for data visualization
- I used sklearn and utilized RandomForestClassifier and fine-tuned it to receive maximum accuracy.

**6<sup>th</sup> July 2023:**

Watched a YouTube video explaining various models

- I understood boosting algorithms and stacking ensemble learning
- I also learned about logistic and linear regression
- I also looked into unsupervised learning.

**7<sup>th</sup> June 2023:**

Practiced on Global Emission Dataset

- I utilized numpy, pandas, seaborn
- I also learned plotly.express since it was a unique tool which i found out via an article on medium
- I also utilized it for visualization purposes

**8<sup>th</sup> July 2023:**

Predicted on Breast Cancer Prediction Dataset

- I utilized numpy, pandas, sklearn for the dataset.
- I also learned fastai.tabular.all for the dataset
- I also looked into Benign and Malignant for my dataset prediction.

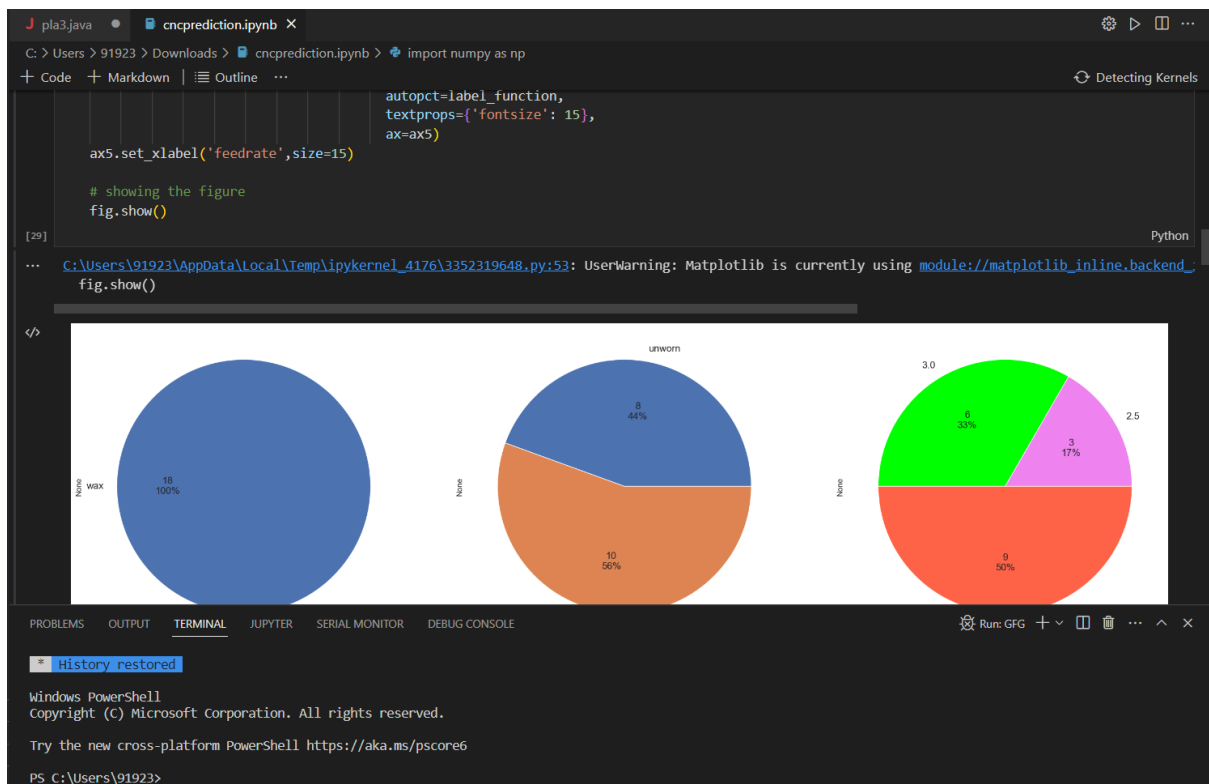
**9<sup>th</sup> July 2023:**

Revised on previous dataset code's

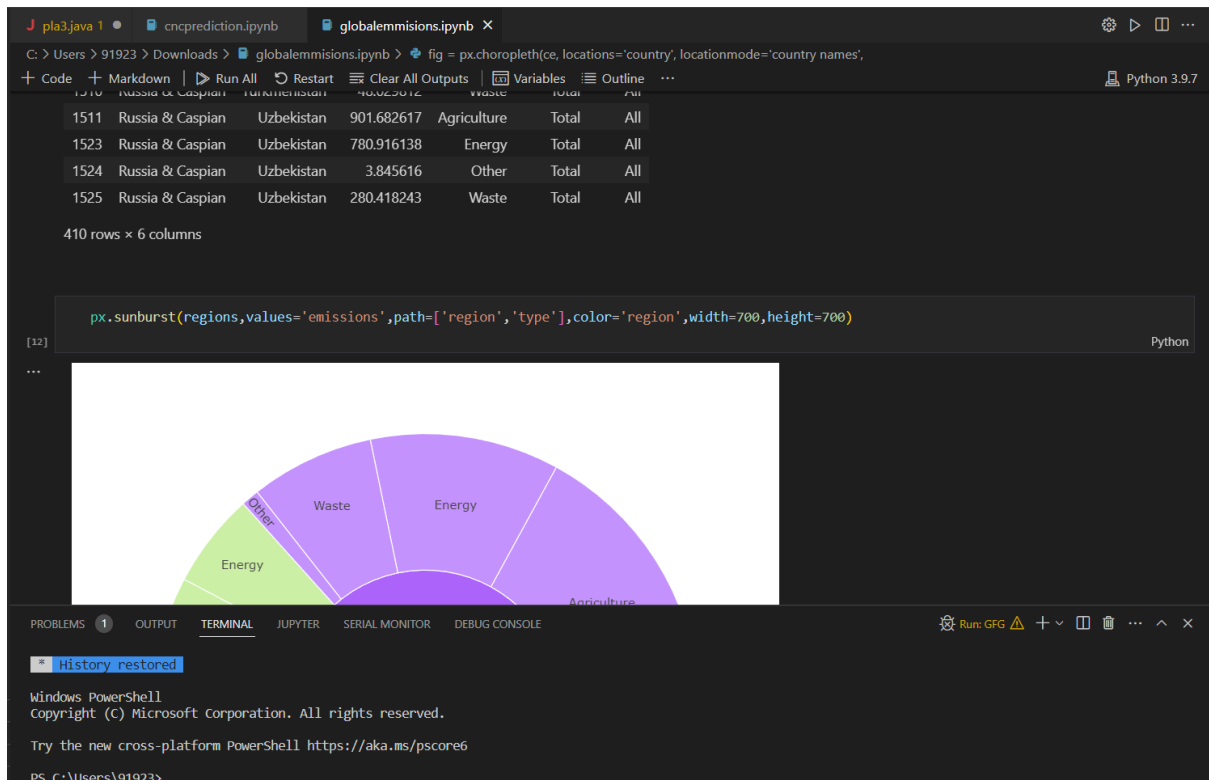
- I went through some of the errors in a few coding files I did before
- I was able to rectify some errors and was able to understand where I went wrong.

## GitHub Repository: <https://github.com/JehanPatel/FSM-INT-2023>

### CNC Prediction



### Solar Prediction

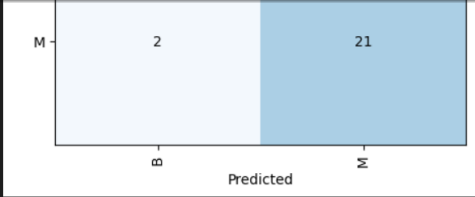


## Breast Cancer Prediction

plab3.java 1 • cncprediction.ipynb • globalemissions.ipynb • Breast Malignant Fastai.ipynb X

C: > Users > 91923 > Downloads > Breast Malignant Fastai.ipynb > data = pd.read\_csv("C:\\Users\\91923\\Downloads\\data (1).csv")

+ Code + Markdown ▶ Run All ↺ Restart ≡ Clear All Outputs 📄 Variables 📄 Outline ... Python 3.9.7



```
learn.show_results()
```

[19] Python

...

</>

	id	Radius_mean	Texture_mean	perimeter_mean	area_mean	smoothness_mean	compactness_mean	concavity_mean	concave points_mean	symmetry_mean	frac
)	0.00	-0.15	-1.42	-0.18	-0.26	0.02	-0.36	-0.67	-0.63	-1.64	
	0.00	-1.91	1.22	-1.92	-1.47	-3.20	-1.18	-1.19	-1.31	-0.82	
?	0.00	-1.23	0.46	-1.26	-1.07	-1.10	-1.27	-1.16	-1.17	-0.67	

PROBLEMS 1 OUTPUT TERMINAL JUPYTER SERIAL MONITOR DEBUG CONSOLE

Run: GFG + ▾ 📄 🗑️ ... ^ ×

\* History restored

Windows PowerShell  
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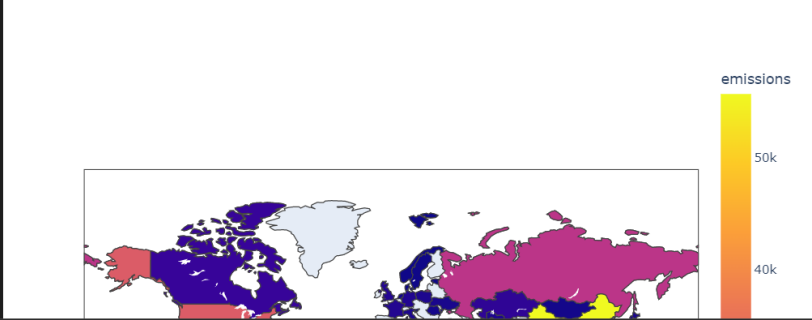
PS C:\Users\91923>

## Utilizing one of my favorite data visualization model

fig = px.choropleth(ce, locations='country', locationmode='country names',  
color='emissions', hover\_name='country',  
projection='miller',width=800, height=800 )  
fig.show()

[21] Python

...



emissions

50k

40k

PROBLEMS 1 OUTPUT TERMINAL JUPYTER SERIAL MONITOR DEBUG CONSOLE

Run: GFG + ▾ 📄 🗑️ ... ^ ×

\* History restored

Windows PowerShell  
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PS C:\Users\91923>