

To,
IITD-AIA Foundation of Smart Manufacturing

Subject: **Weekly Progress Report for Week 2**

Dear Sir,

Following is the weekly progress report dating from 12th to 18th of June, 2023. I went ahead and researched on the equipment failure prediction and predictive maintenance.

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:

12th June 2023:

Practiced on Credit Card Approving Dataset from Kaggle.

- Went through the resources mentioned in this Kaggle link:
<https://www.kaggle.com/datasets/rikdifos/credit-card-approval-prediction>
- Practiced on the dataset to help improve my skills
- Practice file:
<https://www.fsmskills.in/draftfile.php/24378/user/draft/20162730/12th%20June%20Practice.ipynb>

13th June 2023:

Practiced on Heart Failure Prediction Dataset from Kaggle.

- Went through the resources mentioned in this Kaggle link:
<https://www.kaggle.com/datasets/andrewmvd/heart-failure-clinical-data>
- Practiced on the dataset to help improve my knowledge
- Practice file:
https://www.fsmskills.in/pluginfile.php/26645/mod_diary/entry/8535/13th%20June%20Practice.ipynb

14th June 2023:

Researched on the Shearing Machine after 13th June 2023 meet.

- Went through the various documents on the shearing machine, and learned on the basics of how it works, various components including baffle, shearing blades and others.
- Went through a research paper I found on ResearchGate:
https://www.researchgate.net/publication/326837099_Design_and_Fabrication_of_Automated_Pneumatic_Shearing_Machine_to_Cut_Aluminium_Sheet
- Went through a short simulation video depicting the same:
<https://www.facebook.com/masysntua/videos/kinematic-simulation-of-hydraulic-shearing-machine/1634919866764766/>

15th June 2023:

Learned via the Time Series Course on Kaggle

- I went through the course and what all it has to offer. I went through the different topics included in the course.
- I went ahead and started on Linear Regression with Time Series with lag feature.
- I also went ahead and started on Trends and focused on Moving Averages Plot.
- I also focused on time step feature and understood linear regression.

16th June 2023:

Continued Learning on Time Series Course on Kaggle

- I went ahead and learned about Seasonality and learned how to create indicators to capture change.
- I also went ahead and learned to predict the future using the past datasets using lag embedding via the flu trends example.
- I also tried to understand hybrid model's faced a little bit of difficulty in it. I will focus on it again tomorrow.

17th June 2023:

Started on Machine Learning Course for Beginners.

- I started from the basics of Machine Learning.
- I learned about Supervised and Unsupervised Learning and understood the basic differences.
- I also learned about logistic and linear regression.
- I went ahead and explored the concept of boosting since it was not well aware to me initially.
- YouTube: <https://www.youtube.com/watch?v=NWONeJKn6kc>

18th June 2023:

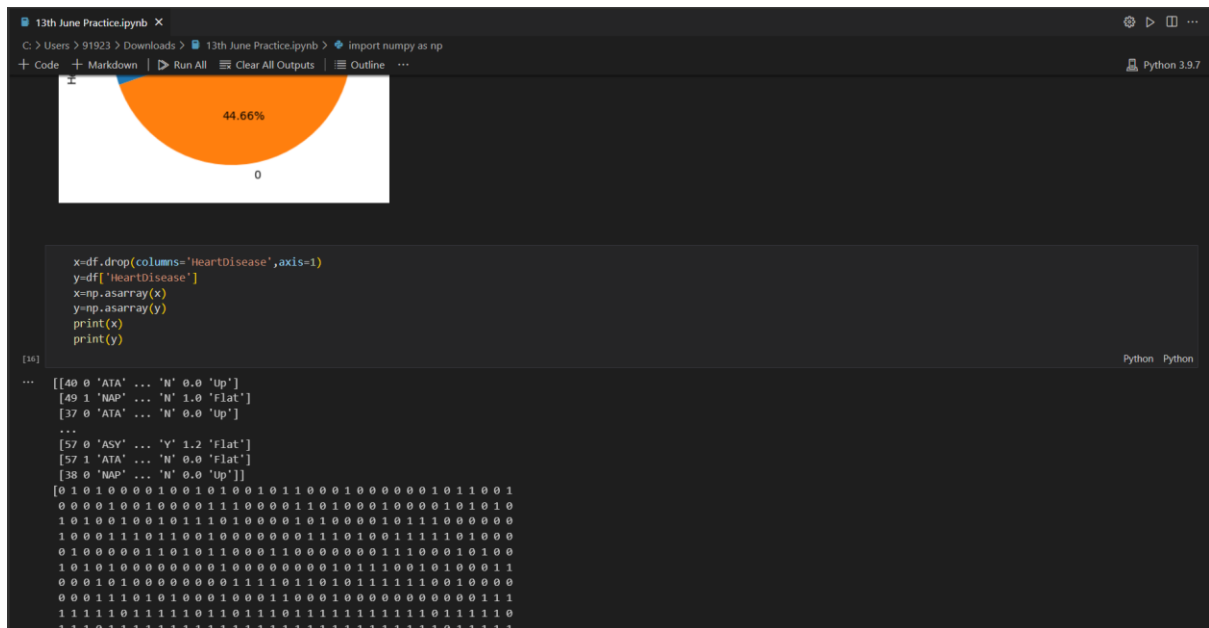
Continued on Machine Learning Course for Beginners.

- I learned about learning theory and decision trees.
- I explored the various kinds of decision trees and its importance.
- I started on unsupervised learning and explored more about its algorithm types.
- YouTube: <https://www.youtube.com/watch?v=NWONeJKn6kc>

12th June



13th June



14th June

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DESIGN AND FABRICATION OF AUTOMATED PNEUMATIC SHEARING MACHINE TO CUT ALUMINIUM SHEET

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ABSTRACT

Automation within the contemporary world is inevitable. Any automatic machine focuses towards the economical use of man, machine and material well worth the most. For small and tiny scale industrial units the sheet cutting machine is manually operated. In this paper, solenoid valve and Arduino controller is used for automation. The machine works with the help of double acting pneumatic cylinder. The piston is connected to the moving cutter. The machine is easy to transport and transfer. The compressed air from the compressor is used as the force medium for this operation. There are double acting pneumatic cylinders, solenoid valves, flow control valves and the Arduino is used. The arm from the compressor enters to the solenoid valve. The function of solenoid valves all of air correct time interval. The 5/2 solenoid valve is used. At one position the piston is pushed by the air entering the cylinder thus obtaining cutting stroke. The releasing stroke is obtained by the movement of piston in backward direction due to the air entering the cylinder from the other side. The speed of the cutting and releasing stroke is varied by the Arduino controller.

KEYWORDS: Automation, Arduino Controller, Solenoid Valve & Double Acting Cylinder

Original Article