SCHOOL OF ELECTRONICS ENGINEERING
KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY
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Minor Project (EC 3082)

REDUCTION OF LARGE SCALE INDUSTRIAL PAPER PRODUCTION USING MACHINE LEARNING

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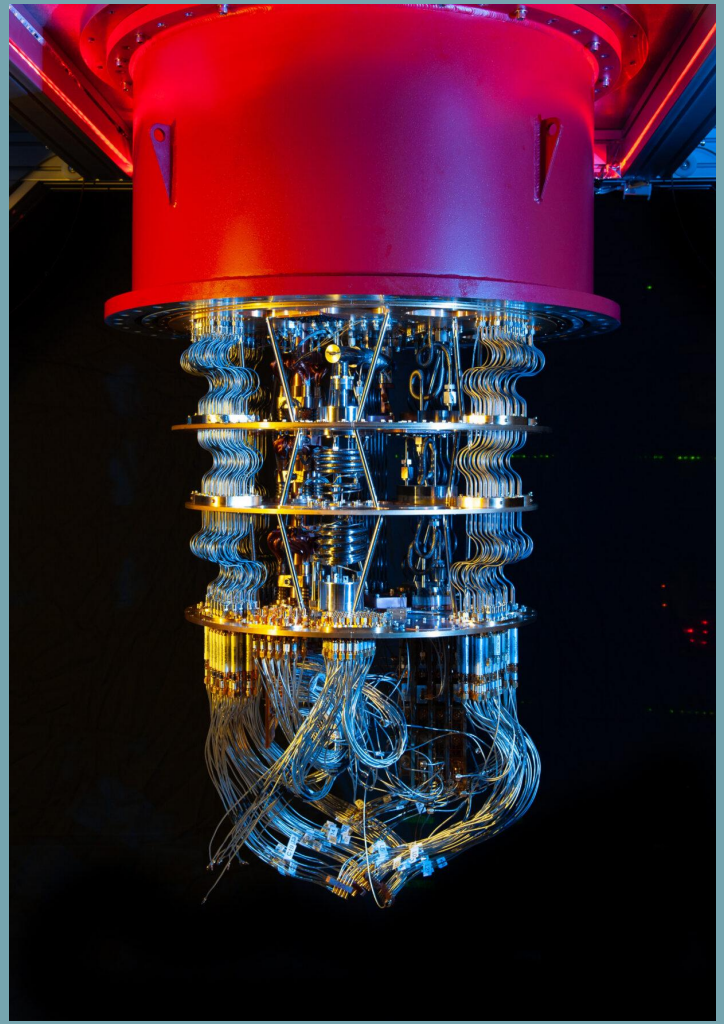
“A machine learning based SOLUTION to counter the negative impact of large-scale industrial paper production on NATURE and the economy.”



Introduction

During the COVID-19 pandemic students and working professionals all over the world transitioned to **electronic media** that changed the global work culture.

The future is digital and needs integration and a **hybridized** system to evolve.

Therefore, we have decided to develop a machine learning based solution to tackle the impact of:

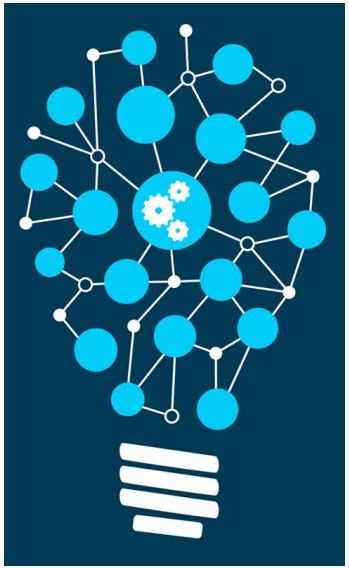
- Large-scale industrial paper production on **environment**.
- **Institutional & courier charges** for the distribution of study materials/textbooks per semester in an academic year.

Literature Review

Author	Title	Source	Findings
Chao-Ying Joanne Peng, Kuk Lida Lee, Gary M. Ingersoll (2002)	An Introduction to Logistic Regression Analysis and Reporting	Indiana University Bloomington	Logistic regression is a powerful analytical technique for use when the outcome variable is dichotomous.
Adriana Erthal Abdenur (2020)	How Can Artificial Intelligence Help Curb Deforestation in the Amazon?	The Global Observatory	Tracking deforestation using satellite imagery analysis.
L . Maria Subashini (2015)	Review on Biological Treatment processes of Pulp and Paper Industry Waste Water	IJIRSET	The pulp and paper industrial waste waters are a major environmental concern.

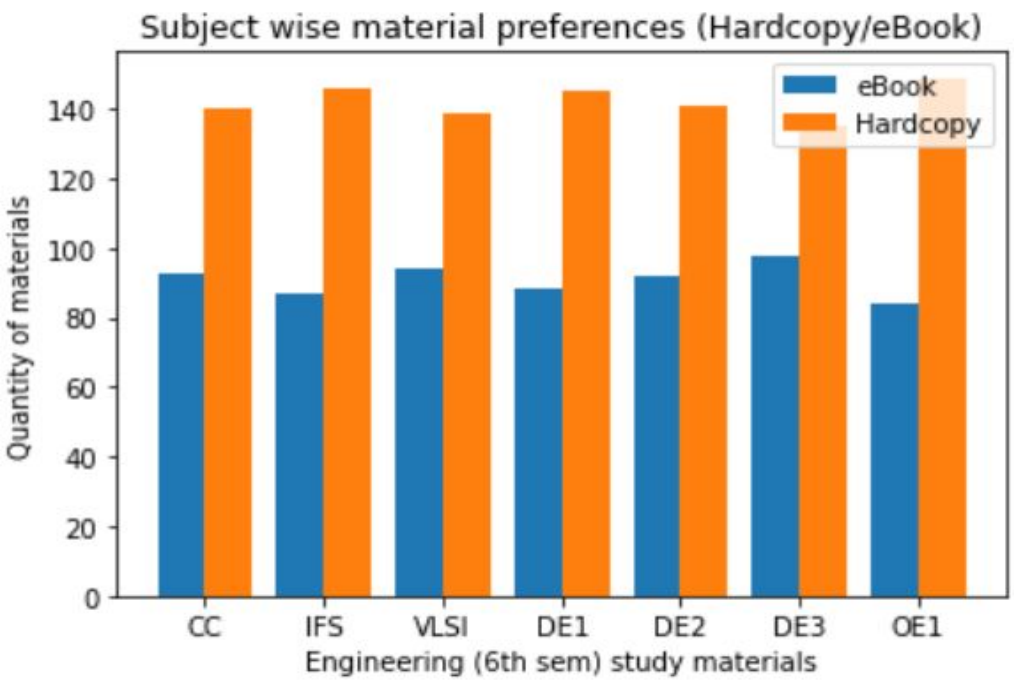
Methodology

1. Defining the problem statement
2. Acquiring the dataset
3. Data Preprocessing



4. Exploratory Data Analysis (EDA)
5. Splitting the dataset
6. Training the model

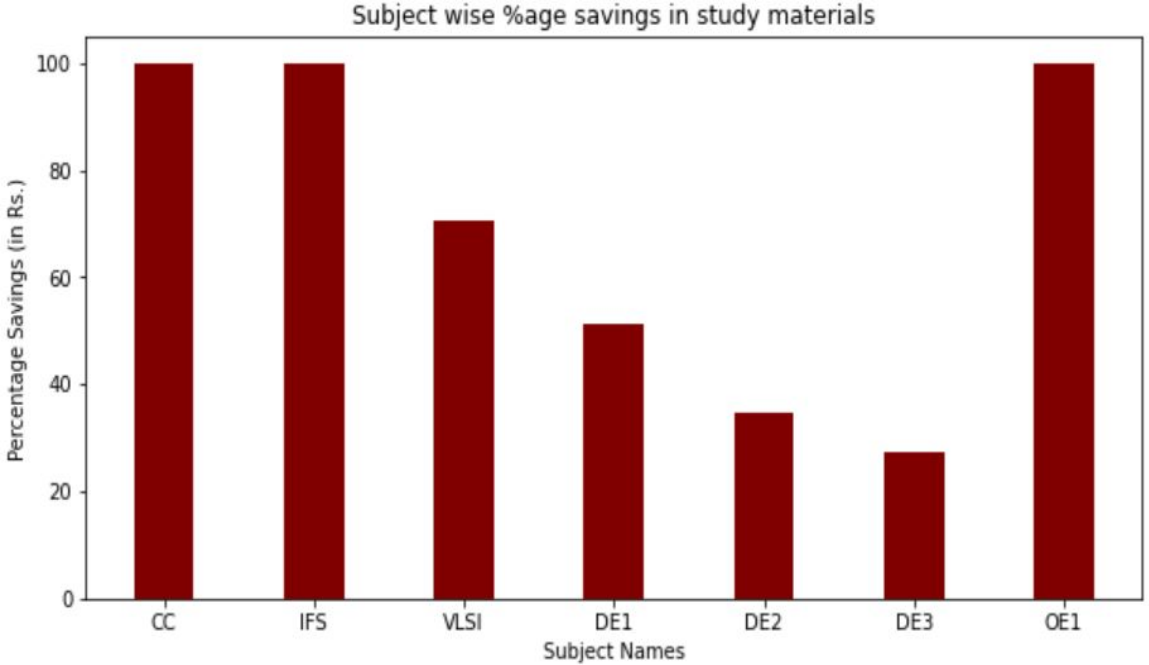
Exploratory Data Analysis



Observations:

- More no. of students have chosen hardcopy in the subject **Open Elective (OE-1)**.
- There is a sharp similarity in the subjects of **Department Elective 1 (DE-1)** and **Inferential Statistics (IFS)** as both these subjects show an almost identical trend.

Exploratory Data Analysis



Observations:

- It can be seen that **100%** of the 'total amount' of Cellular Communication **(CC)**, Inferential Statistics **(IFS)** and Open Elective-1 **(OE-1)** is saved.
- The subject of Department Elective-3 **(DE-3)** stands lowest with around **30%** savings.

Exploratory Data Analysis

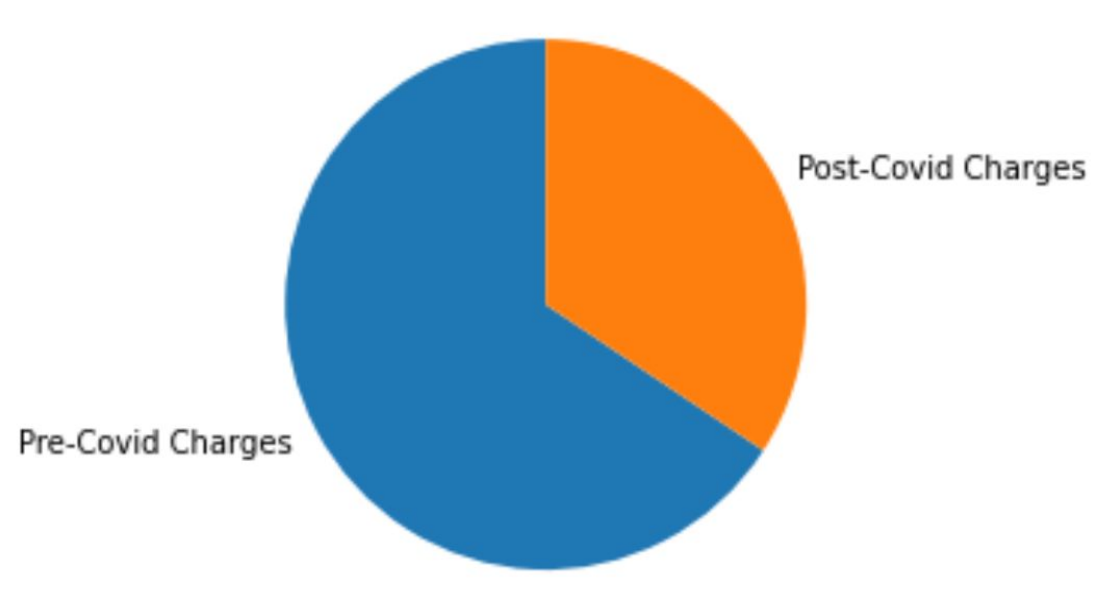
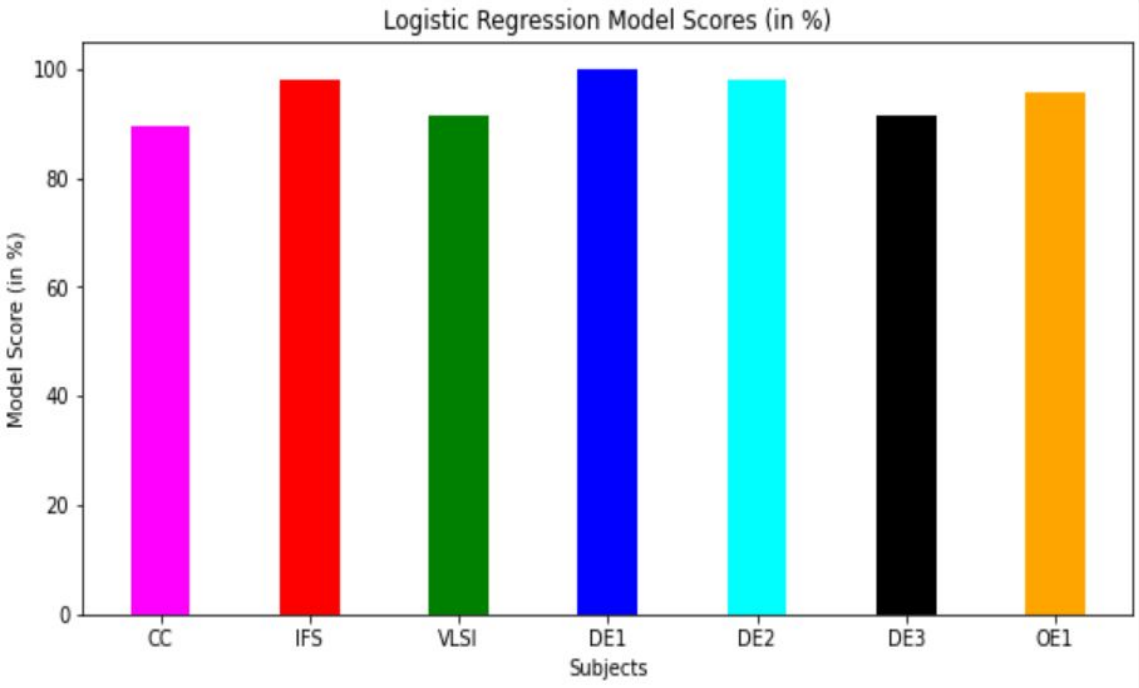


Fig: Pie chart representing the courier charge estimates

Observations:

It is evident from the pie chart that the **total weight**, **transportation** and **courier charges** of study materials have been reduced to about **one-third** after the Covid-19 pandemic.

Exploratory Data Analysis



Observations:

- It can be inferred that the model score for **DE-1** stands highest with **100%** and **IFS** holds the second place.
- **Cellular Communication** stands lowest with a model score of **89.36%**.

Advantages

- Reduction in deforestation.
- Portability and better memory management.
- Decrease in the amount of industrial toxins used to create pulp and bleach.
- Boost in the efficiency of water treatment.
- Promotes the concept of three R’s (Reduce, Reuse & Recycle)

IT industry once predicted that its emergence is to make paperless offices but its amazing to find that about 95% of office work across the world is still done on paper.

42% of all global wood harvest is used to make paper. Is it really worth it to cut down our life saving trees for this product?

Also the bleaching reagents without proper treatment that get released into river bodies prove to be graveyard for hydrological ecology.

According to a survey, an average tree gets converted in to 12000 A4 sheets. As per our calculations, we require almost 300 trees to run an engineering semester (6 month duration) and a tree requires a minimum of 3 years to grow and become mature.

Conclusion

This customized mechanism will help a learner optimize his study routine by reading books from a combination of:

- Electronic devices (laptops/smartphones/tablets) and/or
- Hardcopy format (conventional method).

It was also evident that a hybridized workflow like this can help the department save millions of rupees annually.

There are several other advantages of adopting this methodology which were briefly discussed in the previous slide.

References

[1] Chao-Ying Joanne Peng, Kuk Lida Lee, Gary M. Ingersoll (2002). "*An Introduction to Logistic Regression Analysis and Reporting*" Indiana University-Bloomington.

[2] Adriana Erthal Abdenur (2020). "*How Can Artificial Intelligence Help Curb Deforestation in the Amazon?*" The Global Observatory.

[3] L . Maria Subashini (2015). "*Review on Biological Treatment processes of Pulp and Paper Industry Waste Water*" IJIRSET.

Thank you!

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