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## Introduction

Our project is focused on “Predicting Energy Behaviour of Prosumers in Estonia”. The objective of this project is to develop a prediction model for prosumer energy patterns in Estonia to minimize future imbalance costs. We successfully completed the project on schedule and achieved a high level of accuracy in our model. Overall, I would like to appreciate my group members for the extensive hours we worked, especially considering that we are simultaneously preparing to submit our project for the Kaggle competition. To view our entire project deliverables check this [GitHub](#) link.

## Chapter 1

### Reflection on the Project and Group Dynamics

Reflecting on the learning journey, particularly focusing on Boundary Crossing Competence, I must mention that I had a really good set of group members where we learned a lot from each other. The communication between the group was always constructive and respectful and an important aspect is that each person had the other person's back which I think helped both in the improvement of the project and also personal knowledge.

When it came to dividing tasks among the group, we finalized by discussing everyone's role in the starting stage of our project. My responsibility was primarily focused on visualization using ArcGIS and the Seaborn Library and I believe I met the expectations. You can find my work in the Python notebook, included in my individual portfolio.

As a group, we identified each person's strengths and limitations. We acted on our strengths and supported each other in need of help. We also collaborated and stimulated others to learn in this project, for example, our first choice was to use Matplotlib for visualization. However, after considering different perspectives and knowledge, we switched to Seaborn for visualization which proved to be a beneficial change in the final product.

### Reflection on Personal Development

On the other hand, I also engaged in critical self-reflection about my knowledge of data science. I feel like I've acquired knowledge about various Python libraries and how to effectively use them for my own specific project needs. and I have also learned to visualize complex environmental data in a way that's easily understandable for a general audience.

Secondly, I have also learned about machine learning algorithms. While I haven't mastered coding entire models, I did make a meaningful contribution to a segment of our model. I explored packages like Catboost and LighGBM in the Python library, understanding the distinctions between their outputs. Additionally, I learned how to address these differences using ensemble models and gained insights into the limitations of such models. I was also able to apply the ArcGIS knowledge from my previous courses to visualize the production and consumption of energy in each county in Estonia.

## Chapter 2

### Reflection on the Personal Learning Outcomes

#### **Learning goal 1 & 2:**

To get familiar with one of the Python notebooks i.e., Jupyter Notebook. When I started the course, my knowledge was limited to data frame types. By the end, I became proficient in using Jupyter Notebook and familiarized myself with the Matplotlib and Seaborn libraries for visualizing our project analysis. I was able to effectively visualize our complex data and synthesize it, applied statistical methods based on the mean, and presented the findings through Seaborn line plots in a way that the general audience could understand. Therefore I produced a working Python Jupyter Notebook that showcases the data wrangling and visualization techniques used in our project using Matplotlib and Seaborn libraries.

#### **Learning goal 3:**

I aim to learn Machine Learning in Python for our project's Predictive Analysis, and at the end of my group project, I believe I achieved this. I dived into the Catboost and LighGBM packages in the Python library. Although I didn't become a master at these libraries, I gained a good understanding of them, including the differences in their outputs. I also learned how to build an ensemble model to minimize Mean Absolute Error, making our predictive analysis more accurate. In the end, I got the hang of using this machine-learning tool and successfully conducted Predictive Analysis. I have submitted a Python notebook along with my individual portfolio, showcasing practical applications of the machine learning package in our analysis.

#### **Learning goal 4:**

I was also able to explore the ethical aspects of data and algorithms in data science research, focusing on the considerations needed to address ethical challenges in using big data. The goal to understand and apply these ethics in my analysis was reflected in Assignments that focused on the social and ethical considerations of data science and machine learning algorithms. I also gained knowledge about legal licensing codes, especially because our data was open-sourced and licensed under CC BY-NC-SA 4.0. The key lesson was recognizing that ethical and safety issues can be minimized when datasets are legally licensed for open access, as was the case with our project.

#### **Learning goal 5:**

At the end of the course, I have improved my skills in presenting information on complex data in an easily visualized format. Working on our group project, I became acquainted with ArcGIS for visualizing our analysis. Throughout this process, I also familiarized myself with new ArcGIS tools like Table to Table, Summary Statistics, and Finding Country Layouts. I've submitted the ArcGIS toolbox, Map layouts, and documentation outlining the steps, demonstrating the effective use of ArcGIS in our analysis.

## Conclusion

To conclude, I was able to improve my Python and machine learning skills and I also acquired skills in extracting meaningful patterns in data and presenting them effectively through data visualization techniques in Python and ArcGIS. And special mention to my group mates for stimulating and encouraging a culture of continuous learning. As I plan to start my master's thesis, where I hope to use machine learning to tackle an environmental issue, I see the learning outcomes of this course as a valuable step in preparing for that research.

To view Individual Portfolio check this [GitHub](#) link.