

# Reflection Report

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In reflecting on the final project outcomes, I realise the importance of personal and professional growth throughout this process. The project was a success in that the determinants were identified, the neural network was trained and a forecast was successfully produced. However, plenty of challenges were also faced along the way. During the project, there were moments of excitement, but also moments of frustration where I was stuck for ideas or the code faced unexpected issues. By examining these emotional reactions and the actions I took to work through these moments, I was able to identify areas where further learning and adjustment were necessary.

As the project unfolded, it became apparent that the project's scope needed to be altered. My initial scope was too wide - I initially wanted to provide forecasts for multiple economic variables, including the unemployment rate and interest rates. However, I soon realised that this approach was too ambitious given the time and page constraints. Each variable being projected will have its own specific set of determinants which would each need to be researched, sourced, prepared, and analysed. Scaling down the scope to only forecasting the US CPI allowed me to focus on the most critical aspects of the project, which were the research, the data analysis, and the neural network forecast.

One key milestone in the project that I was particularly proud of was when I found the optimal model structure after running the training tests on every model permutation. This testing took an extremely long time to finish, as there were 162 models tested with 100 Epochs each. Finally seeing the best model was the first key milestone in this project. Another milestone in this project was finding the strongest determinants of CPI according to my analysis. I was fascinated from the inception of this project by what the strongest determinants of inflation would prove to be, and some of the variables came as quite a surprise.

A significant challenge during this project was determining the appropriate way to narrow its scope. I became too attached to my first idea of also forecasting the unemployment rate and interest rates along with the inflation rate. It was difficult to let go of this idea and to reframe my project goals. To narrow the scope of the project, I had to select which of the 3 variables I believed would be the most beneficial to provide a forecast for. Given the current state of the US economy due to the COVID-19 pandemic and economic policies to help tackle it, I believed that inflation would be the most beneficial since the US inflation rate reached its highest level in almost 40 years.

Another challenge I faced was learning a neural network architecture for the project. I was not familiar with the LSTM architecture initially, and learning and implementing this new architecture proved to be a demanding task. To help learn more about this LSTM architecture, I consulted various research papers and online tutorials, and sought guidance from my supervisors - this allowed me to grasp its concepts and effectively implement it in my project.

I believe my approach to this project was effective and adaptable, and it allowed me to reach my project goals. When I encountered obstacles, such as needing to narrow the scope of the project or selecting an appropriate neural network model, I was able to adjust my strategy accordingly.

A key takeaway from this project was the importance of flexibility. By being open to change and adjusting my approach as needed, I was able to overcome obstacles and achieve my project goals. This experience has shown me that embracing reflection and learning from both successes and setbacks is essential for growth and improvement in future projects and academic pursuits.

During the project, I utilised a range of professional abilities including academic research, data analysis, problem-solving, communication, and teamwork. I conducted a thorough literature review, utilised statistical methods for data analysis, employed machine learning techniques, and effectively solved challenges that I encountered throughout the course of the project. Additionally, I maintained clear communication with my supervisors and other department members to gain insights and improve the project's overall quality.

The most valuable skills in this project were academic research, problem-solving, and data analysis. The research was crucial in gathering the set of economic determinants, and in understanding the nuances of neural network time-series forecasting. The data analysis allowed me to process and interpret the data that I gathered, ultimately leading to optimum model selection and accurate determinant selection. The problem-solving was essential when I encountered challenges, especially when adjusting the project scope.

The skills, knowledge, and insights that I gained from this project can be transferred to various workplace settings and any further studies. Research, data analysis, and problem-solving are essential skills in many sectors, including the computer science and financial industries. Conducting research can help to inform business decisions, and problem-solving can be employed to help with complex problems in a research setting. These skills are also very important in academic research, as they are fundamental to understanding complex problems and generating innovative solutions.

I would like to use and hone these skills in a professional context, particularly in the data science and analytics areas within the finance or technology sectors. These abilities are highly valued in both industries, and I believe that my experience in this project has prepared me to tackle similar challenges and contribute to innovation and growth within these industries. Furthermore, I learnt the importance of effective time management, especially when dealing with complex tasks, and the value of clear communication with supervisors to obtain guidance and feedback throughout the project.

This project has significantly contributed to my personal growth in terms of skill development. One particular aspect of personal growth that has been most significantly impacted by this project is my time management skills, especially when working on multiple complex tasks simultaneously. I had one large group project and another module to balance on top of this already large workload. I have learnt to effectively prioritise my work and allocate sufficient time for each aspect. By employing various professional skills and overcoming challenges, I have gained confidence in my abilities and prepared myself for future challenges and opportunities. My experiences and insights gained from this project have not only improved my technical skills but have also strengthened my adaptability and resilience. These skills will be invaluable as I embark on future professional and academic endeavours.