

Personal Development Report

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AI-core-AI4-RB02

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1 Introduction

My name is Michael, a 21-year-old technology enthusiast with roots in Warsaw. I completed my secondary education with a VWO diploma in Milanówek, a place where the integration of technology in daily life sparked my curiosity and shaped my academic pursuits.

At the age of 14, my passion for technology manifested in a significant project — the creation of a robotic prosthetic limb for a teacher. This venture, which was brought to life by the time I was 16, involved the innovative use of Arduino, 3D printing, and open-source coding. It employed Electromyography (EMG) to interpret muscle movements, translating them into commands that enabled the prosthetic to move.

Following this success, I sought out internships that aligned with my interests, allowing me to delve deeper into 3D printing and data forensics. These experiences were invaluable, providing a practical foundation for my theoretical knowledge.

My academic journey continued at Fontys in Eindhoven, where I initially explored Mechatronics. However, my fascination with the intricate world of ICT and Software Engineering soon became apparent, prompting a shift in my focus. I find the complexities of ICT particularly compelling, as they offer endless possibilities for innovation and problem-solving.

Currently, in my quest for knowledge, I am keen to explore the convergence of coding with infrastructure. My objective is to expand my understanding of software systems and their underlying frameworks, while also enhancing my proficiency in hardware development.

In my personal time, I engage in designing PCBs and advancing my own tech-related projects. These activities not only fuel my creativity but also complement my academic and professional goals. Additionally, I have a keen interest in the evolution of gaming and enjoy exploring the historical context and development processes behind modern games. Culinary exploration is another pastime of mine, providing a delicious outlet for experimentation and discovery.

2 Learning outcomes

2.1 Data Preparation & Analysis

You are able to aggregate and prepare given datasets as well as other (open) datasets and use them in data analysis and identify opportunities for predictive analytics.

Aggregate means acquiring data from a variety of different sources and in different formats and putting it together into a meaningful larger total dataset. Prepare consists of cleaning the data according to theories of data quality, in such a way that the process of cleaning and preparing those data is repeatable, transparent to others, and the results are suitable for data analysis. Data analysis implies amongst others: descriptive analytics, statistical overviews, derived columns, trend analysis, etc. Opportunities for predictive analytics can be identified by finding correlations between features, principle component analysis, summarization, anomaly detection, etc. and include an impact forecast.

2.1.1 Rating - self assessment

Beginning

2.1.2 Evidence

Data according to sales were obtained from client, and were anonymized to protect company which provides data for personal challenge. Sales data were obtained raw with thousands of products through last 4 years in monthly fashion. Data from all products were aggregated and sum of all sales in month. After processing it was exported to csv file. Feature data about inflation and unemployment were obtained from national database of Poland. Data was raw, and was provided yearly with values per month, data was aggregated and put in to one file with sales data, also

2.2 Model Engineering

You are able to use findings from data analysis to preprocess data, apply machine learning algorithms and evaluate the quality and

Findings from data analysis implies that your choice of data sources and feature selection is based on opportunities for predictive analytics that you previously identified. Preprocess refers to applying systematic ways like feature selection, encoding, scaling, etc. of turning raw datasets into formats that are more suitable for model training. Apply consists of training of different types of models like classification, regression, etc., as well as tuning hyper-parameters. Evaluate means judging the results of machine learning with respect to recall, precision, accuracy, cross-validation, over/underfitted etc. A defined domain refers to the fact that your evaluation must address the problem and impact definition as given by the domain stakeholders, and evaluation metrics must be translated to be meaningful to them.

2.2.1 Rating - self assessment

Beginning

2.2.2 Evidence

Various types of models were implemented (Decision tree regression, Random forest regression, Linear regression, Prophet) in personal project with purpose of predicting future sales. Performance of models were tested by train-test split method with result of relatively satisfactory results. Models were also tested by cross-validation methods which are harder to apply when working with time series based data and models. Unfortunately accuracy measured by cross validation was not as accurate as assumptions, but it is caused because of nature of project itself and provided data. Forecasting time-series based data is not easiest task, especially when our sales data lack of any seasonality due to nature of product, business model of company, recent global events and economic crisis. Data for model was collected from client and from open sources, data was modified in way that it can be applied for model which is using client monthly based data. Data was aggregated together into one data set to be easily readable and accessible for model

2.3 Explainable AI

You deliver AI projects that follow the three 'Explainable AI' principles of transparency, interpretability, and explainability.

Transparency means that the process by which the used input data results in prediction models is reproducible, reliably described and its decisions are motivated. Interpretability addresses the possibility for humans to comprehend the project cohesion and results by making them comparable to the domain knowledge and baselines. Explainability refers to the application of tools and methods that turn black-box models into grey/white-box models by having the model draw out its decision making process and/or describe its feature importance.

2.3.1 Rating - self assessment

Undefined

2.3.2 Evidence

2.4 Professional Standard

You show that you conduct work in accordance with an industry supported methodological approach (AI Project Methodology) in terms of your project's goals, stakeholder involvement, applied research, decision making and reporting.

Goals refer to identified authentic immediate and long term issues that you work towards finding appropriate solutions for. Whilst defining your goals you explore the context and environment of your project and you make the necessary business, sustainable and ethical considerations. Stakeholder involvement implies that you involve relevant and competent partners in your project from beginning to the end. During your project you communicate constructively with all your stakeholders. Applied research implies that you effectively use research strategies and methods, like those in the DOT-framework, for your domain understanding and other research activities. Decision making means that you correctly identify the need for further iterations, using evaluation models like the TIC-tool and your stakeholder feedback. Reporting refers to well structured and well motivated, correct and relevant documents, using APA style referencing for used external sources, as well as using visualizations, concluding your project proportionally covering all four phases of the methodology.

2.4.1 Rating - self assessment

Orienting

2.4.2 Evidence

2.5 Personal Leadership

You are aware of your strengths and pitfalls in ICT as well as your personal development. To nurture personal growth you are able to engage in actions that align with your core values, in a way that suits you.

Being aware of your strengths and pitfalls means that you are able to recognize (among other things through self-reflection and asking for feedback) what you are already good at and

where growth is still possible. Being able to engage in actions means that you take responsibility, growing towards a professional ICT practitioner, seeing and seizing opportunities in a structured, planned and efficient way. In a way that suits you means that in the activities you undertake you apply an approach that fits your style of acquiring knowledge and skills.

2.5.1 Rating - self assessment

Orienting

2.5.2 Evidence

2.6 Internship Preparation

You create chances to acquire and define an internship assignment based on a match between your ambitions, the school's requirements and the field of expertise related to your profile or specialisation

2.6.1 Rating - self assessment

Beginning

2.6.2 Evidence

3 Conclusion

4 Conclusion