AI-based Front-End Generation

Project Plan.

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1.1 Company

iO Digital is a company that actively breaks down barriers between the agency, technology and consulting sectors. It operates at the crossroad of strategy, marketing, innovation and digital. By using its expertise in these areas iO positions itself to effectively address challenges for clients.

1.2 Stakeholders

Within the company there are a few stakeholders in this project. Each stakeholder has their own specific interest into the project.

- **The chapter lead** is curious about the possibilities of AI. They will be involved in helping to develop the POC quality framework.

- **The digital marketing team** would like a solution for developing materials and campaign pages. They are also partially the end-user for my project. They will be involved in helping assess the user requirements.

- **The technology director** wants to speed up the process of creating landing pages.

Some of these stakeholders have more power to influence the project than others. Below is shown how these stakeholders are placed in relation to interest and power.
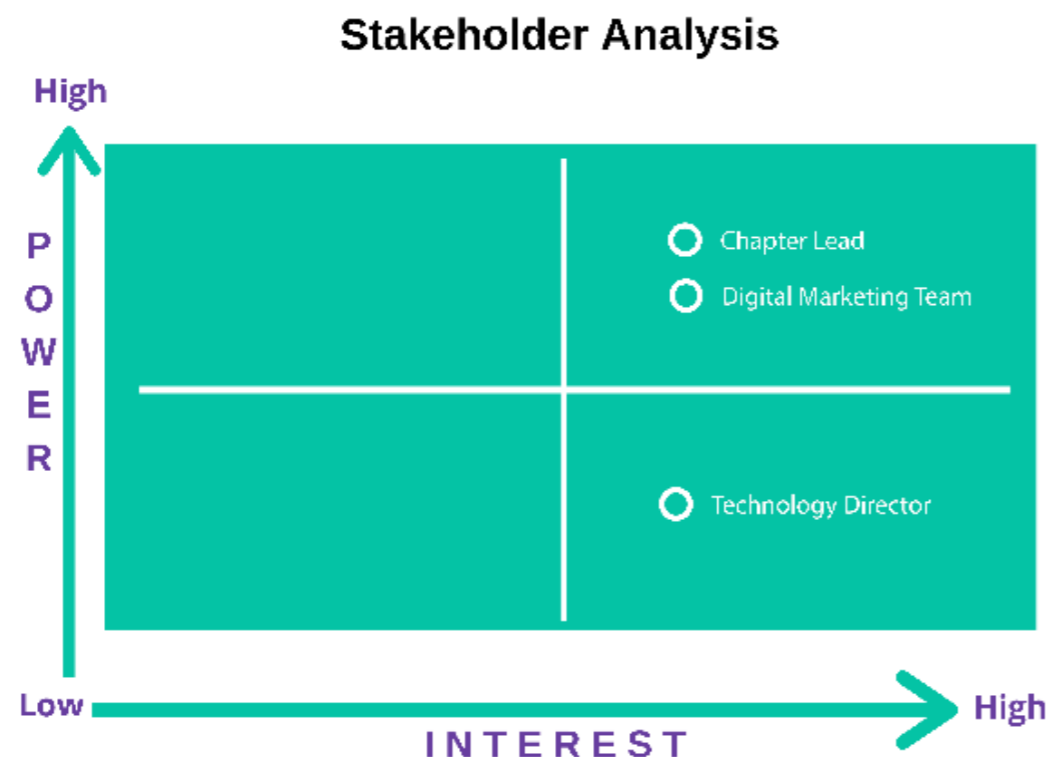
1.3 Reason

This assignment looks into how iO Digital, can use generative AI to solve a pressing issue. The company and their cleints regularly face the challenge of creating temporary "theme pages" for promotions or events on their websites. This task is currently manual, time consuming, and becomes a bottleneck especially during peak times like Christmas when such pages are in high demand.

The goal is to explore and implement a solution that uses AI to automate the creation of these pages, making the process faster, less labor intensive, and more efficient. This not only has the potential to significantly optimize development for iO Digital and its clients but also aligns with the company's commitment to innovation.

By doing research on existing AI tools and developing a proof of concept, this assignment will show how generative AI can change the way temporary promotional pages are created, which will save time and resources while maintaining certain standards of quality and compliance.

1.4 Assignment

The task is to research and proof the potential of generative AI in optimizing front-end development for creating temporary theme/promotional pages. This involves:

1. Conducting research on the end users (marketing team) and existing AI technologies that can generate front-end code and templates.

2. Evaluating these technologies for quality, flexibility, and web standards.

3. Selecting and testing a set of these tools in a proof of concept to automate the generation of theme pages.

4. Implementing a solution that integrates with content management systems and e-commerce platforms, specifically through APIs.

5. Deploying an AI generated theme page on a cloud platform to validate the concept.

6. Making sure the final product meets certain standards of accessibility and quality.

The end goal is to showcase an efficient method to generate promotional web pages, reducing manual labor and speeding up deployment.

2.1 Objectives

The objectives show the stakeholders interests and desired outcomes for the project, which reflects their interests and priorities.

General objectives

Improve efficiency

- Stakeholders want to optimize the process of creating temporary theme pages for promotions or events.
- They want to reduce the time and effort currently required for manual development of these pages.
- The objective is to use generative AI to automate the generation of theme pages efficiently.

Resource optimization

- Stakeholders want to optimize resource allocation.
- They want to minimize manual labor involved in creating and deploying temporary promotional pages.
- The project targets resource efficiency through the use of AI.

Client satisfaction

- Stakeholders prioritize enhancing client satisfaction by improving service delivery.
- They want to provide clients with more efficient solutions for temporary theme pages.
- The project aims to improve the overall client experience.

Specific objectives

Chapter Lead's Objectives

- Explore the potential of AI powered front-end generation.
- Understand the capabilities and possibilities offered by AI technologies in the project.

Technology Director's Objectives

- Speed up the process of landing page creation.
- Identify efficient methods which uses AI for optimizing the development of landing pages.

Digital Marketing Team's Objectives

- Develop materials and campaign pages efficiently.
- Seek a solution that integrates AI to optimize the creation of marketing assets and campaign pages.

By aligning the project objectives with the interests of the stakeholders, the goal is to create a solution that also fulfills their interests.

2.2 Scope

My internship will be 20 weeks long of which I will spend %100 on the assignment. Because the final product will be a proof of concept, the assignment is appropriate for one person to work on. This means I will be responsible from beginning to end.

During the assignment I will be working on the following tasks:

- Doing research needed for the concepting stage
- Creating concepts using the research
- Creating low-fi prototypes for these concepts
- Creating a quality framework
- Creating the proof of concept
- Assessing the proof of concept using the quality framework.

Within the assignment, there are certain parameters that indicate what will be included and what will not be included in the project. This makes sure the delivered products are as they are expected to be.

The project includes	The project does not include
Research document	Maintenance of the application
Concepts	
Low fidelity prototypes	
Proof of concept	
Test plan and tests	
Advice report	

2.3 Complexity-exploration

To see the balance between complexity and exploration, the complexity-exploration matrix has been determined along with a visual representation. This project revolves mostly around AI, more specifically, generative AI. AI is currently very upcoming with new tools and functionalities coming out each day. Using generative AI to create promotional pages is something that has very little research yet. This will need quite some exploration in order to create a proof of concept. But of course, the broader perspectives such as generative AI have a lot more research/resources available.

In terms of complexity, a project like this would be quite complex to make, therfor I aim to create a proof of concept. The proof of concept will need to use generative AI to create temporary promotional theme pages, which would preferably be integrated into existing pages within a platform (for example, Magento).

Visualized next is how the project is balanced between complexity and exploration:
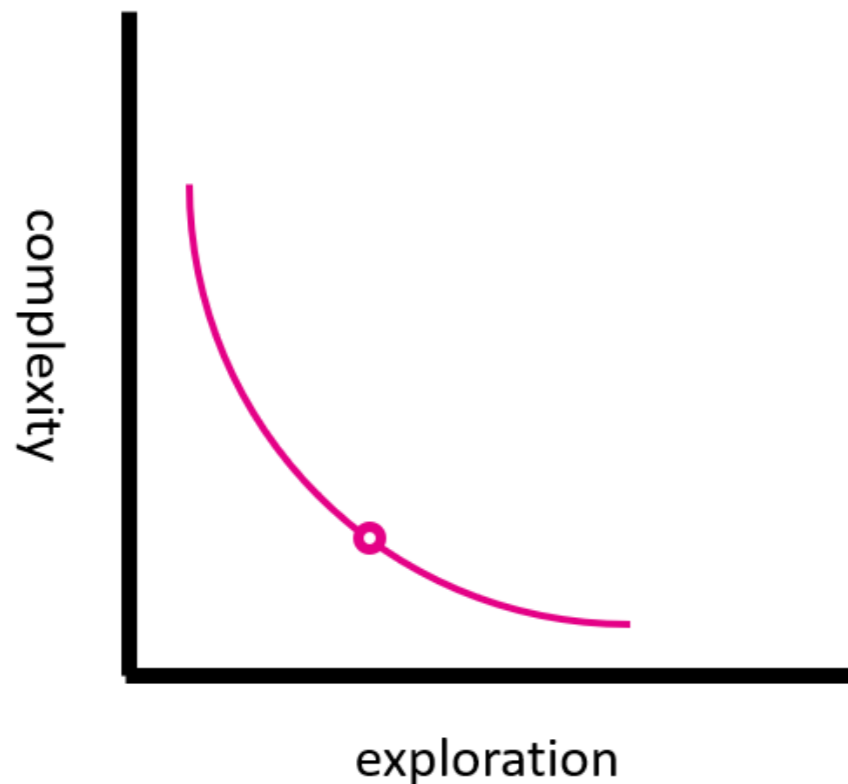
2.4 Technology readiness level transfer

To assess to what extent my project resulting products bring the innovation closer to the market, I created the technology readiness level transfer. Currently this project is just an idea, and doesn't have any research or prototypes yet. The technology readiness level is currently at 0.

The final product of my project will be a proof of concept. Due to the otherwise complexity of this project, the proof of concept will be in the form of a small scale prototype. The final product is expected to have technology readiness level 4. How I plan to reach this level is shown in the following breakdown:

TRL 0 - Idea/Concept Stage

- The project is at the initial stage of recognizing the problem of manual creation of temporary theme pages.

- There's a clear understanding of the problem and the potential of using generative AI to address it.

- The stakeholders are identified, and the assignment objectives are outlined.

TRL 1 - Basic Principles Observed

- The assignment objectives and scope are defined.

- Initial research is conducted on AI based front-end generation frameworks and tools.

- The potential technology to be used is identified.

TRL 2 - Technology Concept Formulated

- Research on AI tools and frameworks for front-end generation is ongoing.

- The relationship between generative AI and front-end development is made.

- The assignment requirements and goals are clear, including the development of a proof of concept for AI generated theme pages.

TRL 3 - Proof of Concept Demonstrated

- A proof of concept is developed to showcase the possibility of using generative AI for creating theme pages.

- Selected AI tools are tested and integrated into the proof of concept.

- Initial testing against quality standards such as WCAG guidelines is done.

- Integration with API based data sources (StoryBlok, Magento) is explored and tested.

TRL 4 - Prototype Developed and Validated

- The assignment delivers a validated prototype for generating and deploying AI generated theme pages.

- The prototype is tested against quality standards and guidelines.

- Integration with existing platforms (e.g. Magento) is explored and demonstrated.

- The assignment concludes with a research report on AI based front-end generation frameworks, tools, and the effectiveness of generative AI in optimzing page creation.

0 IDEA
Unproven concept, no testing has been performed

1 BASIC RESEARCH
You can now describe the need(s) but have no evidence

2 TECHNOLOGY FORMULATION
Concept and application have been formulated

3 NEEDS VALIDATION
You have an initial 'offering'; stakeholders like your slideware

4 SMALL SCALE PROTOTYPE
Built in a laboratory environment ("ugly" prototype)

5 LARGE SCALE PROTOTYPE
Tested in intended environmentt

6 PROTOTYPE SYSTEM
Tested in intended environment close to expected performance

7 DEMONSTRATION SYSTEM
Operating in operational environment at pre-commercial scale

8 FIRST OF A KIND COMMERCIAL SYSTEM
All technical processes and systems to support commercial activity in ready state

9 FULL COMMERCIAL APPLICATION
Technology on 'general availability' for all consumers

IDEA

PROTOTYPE

VALIDATION

PRODUCTION

applied research

Technology Readiness Levels as adapted by the CloudWATCH2 project

3.1 Problem

The main problem is the time consuming task of creating temporary "theme pages" for promotions or events manually. Because iO's clients have digital platforms with content lasting for years, the periodic need to create temporary pages for specific promotions is a bottleneck. The opportunity lies in developing a tool that uses generative AI to efficiently generate these theme pages, removing the need to build them from scratch.

3.2 Methodology

CMD methods

For doing my research questions, I will use CMD methods to acquire the information that is needed. Using websites like cmdmethods.nl I will find the appropriate method to use like library, field, lab, showroom, and workshop. The figure below shows how the different methods within CMD are set up and when to choose them.
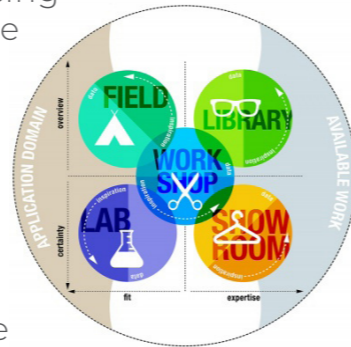
For each research question, I will use different methods. Each type is more appropriate for different phases within my project. In the table below is shown how I will tackle the research

The main research question for this assignment is as follows:

How can generative AI improve the efficiency of creating temporary theme/promotional pages, so that clients can streamline its workflow, reduce manual labor, and quickly deploy temporary content?

This main research question can be divided into sub questions. For each sub-question, I assigned a CMD method in order to research it properly.

1. What are the marketing team's (end-users) requirements so that the POC can be effective?

Interview (Field): Interviewing end-users to get a better understanding of their wants and needs.

Literature study (Library): Researching and analyzing articles and studies related to Content Management Systems.

Usability Testing (Lab): Testing the POC with the end users to detect potential problems users have, so they can be corrected.

2. How can the efficiency be measured so that improvement can be validated?

Literature Study (Library): Researching and analysing other tests related to AI in order to find potential KPIs.

Interview (Field): Interviewing end-users in order to find out their key performance indicators (KPIs) in measuring the impact and effectiveness of the POC on their usual workflow.

A/B Testing (Lab): Comparing two different scenarios in creating a temporary page, one manually and one with the tool.

3. What are the requirements to make the POC usable and implementable?

Expert Interview (Library): Interviewing the Chapter Lead to find out what is needed in order to make the POC implementable on the technical side.

Interview (Field): Interviewing end-users to find out what is needed in order to make the POC usable in their usual workflow.

Tinkering (Workshop): Experimenting with the identified tools & services to find any potential obstacles.

4. What are the content quality requirements for the POC pages and how can the POC adhere to it?

Co-Creation (Workshop): Working with the Chapter Lead to develop a POC quality framework.

Guideline conformity analysis (Showroom): Making sure the POC meets the guidelines and standards of the quality framework.

Usability Testing (Lab): Testing the POC against the quality framework in order to find out any problems in the content output.

5. What AI tools can be used for generating visual elements and how can they be used in the POC?

Literature study (Library): Researching and analyzing different articles, studies and services related to generative AI.

Competitive Analysis (Library): Comparing the different AI tools from my research and determining their pro's and con's.

Ideation (Workshop): Generating and developing new ideas.

Prototyping (Workshop): Creating low-fi prototypes using my finds to better understand what works and what doesn't.

6. How can we make sure that the branding/feel stays consistent throughout the AI generated pages?

Literature study (Library): Researching and analyzing different articles and studies related to AI input/prompting.

Tinkering (Workshop): Altering and trying out new things on the low-poly prototypes and noting down my observations.

Usability Testing (Lab): Testing the POC in order to find out any problems with the consistency in the content that the POC outputs.

3.3 Regulative cycle

The regulative cycle is a framework to guide the iterative and continuous improvement of the project. It consists of four main phases: analysis, design, realization, and evaluation.

Below is shown how the products are categorized and how they are being itterated.

Analysis

- User personas
- User stories
- Requirements document
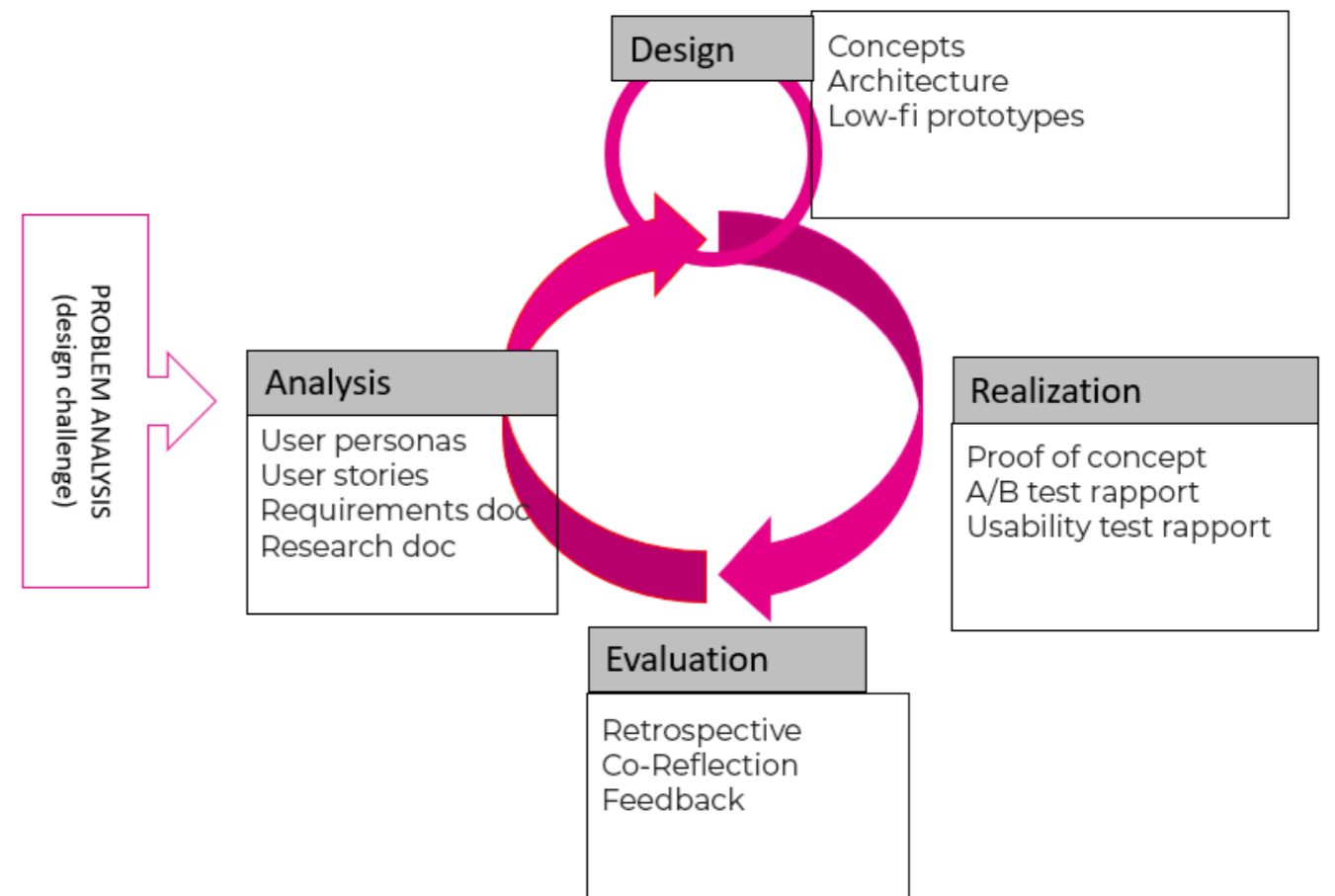- Research document

Design

- Concepts
- Architecture
- Low-fi prototypes

Realization

- Proof of concept
- Quality test report
- Quality test report

Evaluation

- Retrospective
- Co-Reflection
- Feedback

Problem & Methods.

4.1   Approach

For my project, I will make use of the scrum method. This is most suitable for this assignment as It contains multiple deliverables. Scrum is a method of making software or products in a flexible and efficient way. It delivers software or products in sprints, with a fixed length of (in this case) 3 weeks.

The sprints will also be beneficial for the project as it has multiple deliverables and it's more efficient to spread those products out over sprints.

The other reason why I chose scrum over something else, like the waterfall method for example, is that I'm more familiar with scrum as I've used it a lot in my previous semesters.

Throughout the sprints, I will keep iterating and improving the products that I'm making. This will help me to achieve an effective final prototype.

4.2   Strategy

Double diamond method

For my project, I will make use of the double diamond method which has a discover, define, develop, and deliver phase. This will ensure each deliverable has been through the proper process for it to be ready for demoing. It will allow me to properly explore and create potential solutions through diverging and converging. Within each phase of the Double Diamond, I can iterate and improve so it's ready to move on to the next phase.

During most of my semesters, I've used the Double Diamond for a variety of different projects. This has made me familiar with and comfortable using this method. I've noticed that it encourages me the come up with better and more creative concepts.
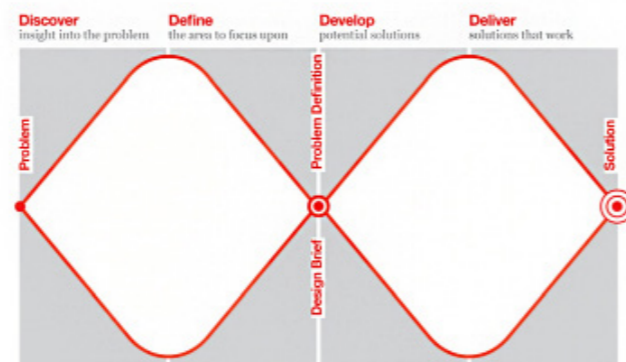
4.3   Breakdown of the project

Based on the Double Diamond method the tasks will be divided into the Discover, Explore, Develop and Deliver phase.

Discover

This is the first phase in the Double Diamond. Its main focus is to gather data from which to learn more about the possible solutions. In my case, the objective is to identify the opportunities. In this stage, it's crucial to organize and manage the information that's been collected

Define

With all this gathered data, it's time to filter through all that information. Not doing so could lead to focusing on irrelevant data which in turn could result in failure in later stages. This means to only take useful ideas from stage one and continuing those in the develop stage.

Develop

Now the designing starts and where I create the solutions discovered in previous phases. These solutions should be turned into a POC so that it can be tested, optimized, and evaluated.

Deliver/Test

This is the final stage of the Double Diamond. Here I can make sure there are no issues and involves doing testing From these tests, opinions and thoughts should be reflected in every iteration of the product.

Shown below is what should roughly speaking be delivered in each phase. You can find a more in-depth plan in 4.4 time plan.

Discover	Define	Develop	Deliver/Test
Research and finding/ possible solutions	More in-depth research and concepts	POC derived from research and concepts	Final user tests and POC

Strategy & Approach.

4.4   Time plan (Internship weeks)

Task	Sprint	For deliverable	Double Diamond Phase	Week
Project Plan	-	Project Plan	-	Week 1
Portfolio	-	Asessments	-	Week 2 - 18
Setting up research document	Sprint 1	Research document	Discover	Week 3 - 4
Doing research	Sprint 1	Research document	Discover	Week 3 - 6
Ideation from research	Sprint 2	Concept & Research document	Define	Week 6 - 7
Concepting	Sprint 2	Concept Low fidelity prototypes & Research document	Define	Week 7 - 9
Testing concepts	Sprint 3	Concept & Low fidelity prototypes & Research document	Define	Week 9 - 10
Creating POC	Sprint 3 & 4	POC	Develop	Week 10 - 15
Creating test plan	Sprint 5	Test plan	Deliver	Week 15 - 16
Testing POC	Sprint 5	Test plan	Deliver	Week 15 - 18
Iterating POC	Sprint 5	POC	Deliver	Week 15 - 18
Finalize POC	Sprint 5	POC	Deliver	Week 18 - 19
Assessments preparation	-	Assessments	Deliver	Week 19 - 20

4.5   Team members

Name & Email	Role/Task	Availability
Luuk Briels l.briels@student.fontys.nl	Product creator	5 days a week
Pim de Brabander pim.debrabander@iodigital.com	Product owner	At least once a week
Paul Reekers p.reekers@fontys.nl	Fontys coach	On request

4.6   Risks and fall-back activities

Risk	Prevention activities included in the plan	Fall-back Activities
Loss or corruption of project files	Using version control will keep this risk to a minimum. It will allow me to always revert back to an older version.	Making backups on an online cloud or using a git repository to save or revert changes.
Time	Working with scrum and a time plan to work the appropriate amount of time on each task.	Changing the scope of the project to adjust for the time needed.
Public transport	Communicating upcoming problems regarding public transport to find an alternative solution.	Possibility to work from home when transportation is not possible.
Absence of internship guide	Making sure to plan ahead to minimize potential roadblocks during the project.	Within iO Digital everyone is also reachable online using Slack, WhatsApp, and email. These could in case of absence be used as a last resort.

4.7   Finance

My project will be making use of different AI services and tools, as well as cloud services like AWS. These tools and services are likely to cost money. However, it is not yet certain how much a project like this will cost, as all the tools and services still have to be assessed and selected. The cost will also be dependant on how much the tools/services will be used during the development and testing phase.

Language models can range from $0.0005 to $0.12 per 1000 tokens. (1000 tokens is about 750 words)

Image generation models can range from $0.016 to $0.040 per image.

When looking at AWS, most of their products all start with a free tier, if more power/resources are needed then this price will go up.