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# IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

#### USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser

#### **STUDENT DATA & MASTER PROGRAMME**

Save this form according the format "IDE Master Graduation Project Brief\_familyname\_firstname\_studentnumber\_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1!

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family name	Verhoeven	Your master program	mme (only select the options that apply to you):							
initials	A.J. given name Pim	IDE master(s):	( PD)	$\left( \int DfI \right)$	SPD)					
student number	4398866	2 <sup>nd</sup> non-IDE master								
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			Chair should request the IDE
** chair	Dr. Zoltan Rusák	dept. / section: SD	Board of Examiners for approval
** mentor	Ir. Sander Mulder	dept. / section: DC	of a non-IDE mentor, including a solution letter and c.v.
2 <sup>rd</sup> mentor			Second mentor only
	organisation.		applies in case the
	City:	country:	an external organisation
comments			Ensure a heterogeneous team
(optional)			In case you wish to include two
1			section, please explain why

IDE TU Delft - E&SA Department /// Graduation project brief & study overview /// 2018-01 v30

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**TU**Delft

<b>APPROVAL PROJECT BRIEF</b> To be filled in by the chair of the supervisory team.	
chair <u>Dr. Zoltan Rusák</u>	date 01. 10. 2021 signature
<b>CHECK STUDY PROGRESS</b> To be filled in by the SSC E&SA (Shared Service Ce The study progress will be checked for a 2nd time	enter, Education & Student Affairs), after approval of the project brief by the Chair, just before the green light meeting.
Master electives no. of EC accumulated in total: Of which, taking the conditional requirements into account, can be part of the exam programme List of electives obtained before the third semester without approval of the BoF	21       EC       X       YES       all 1st year master courses passed         21       EC       NO       missing 1st year master courses are:
name <u>C. van der Bunt</u>	date <u>11 - 10 - 2021</u> signature <u>CB</u>
<b>FORMAL APPROVAL GRADUATION PROJEC</b> To be filled in by the Board of Examiners of IDE TU Next, please assess, (dis)approve and sign this Pro	<b>T</b> Delft. Please check the supervisory team and study the parts of the brief marked **. oject Brief, by using the criteria below.
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Personal Project Brief - IDE Master Graduation



### Prototyping for AI interaction: Increasing the adoption of AI systems

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date <u>13 - 09 - 2021</u>

<u>14 - 02 - 2022</u> end date

#### **INTRODUCTION \*\***

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

Throughout the design process, designers experience challenges when designing for Human-Al Interactions (see figure 1). During my studies, I saw designers (including myself) go through the design process to create services, products and/or strategies, and adding an Al element to it in the late stages without real validation.

According to Kurvinen et al. (2008) the primary aim of prototyping is to generate information for design processes and decision, and to explore and communicate hypotheses about the design and its context. Given that AI systems are highly context-sensitive (Engel et al., 2021), prototyping in these contexts could generate fruitful insights.

As of right now, designers do not really know how to prototype for AI systems, this is mainly due to the fluctuating nature of AI systems when it acquires new learning data (Yang et al., 2020). These difficulties are not limited to designers as companies are increasingly experimenting with AI solutions. Rowsell-Jones and Howard (2019) estimate that throughout 2022, 85% of AI projects will fail to meet intended targets and present inaccurate outcomes. These targets and outcomes can be caused by technological challenges, however, this is not always the cause. It's as important to align the way of working, structure and culture of a company for AI adoption (Fountaine et al., 2019, figure 2).

Combining the challenges with human-Alinteractions for designers and in businesses to manage/adopt Al systems, sets up an interesting opportunity to develop an approach to account for these human-Al interactions through prototyping and improve adoption by minimizing negative interactions (barriers).

This project will be done within the COALA (COgnitive Assisted agile manufacturing for a LAbor force supported by trustworthy Artificial Intelligence) program. This program consists of 14 partners ranging from different universities and companies that aim to create a digital Al assistant to reduce labour shortage, reduce the cost of lost knowledge due to job change or retirement, and gather data on the factory floor. Within the program, there are four main objectives and I will be working on the third one: "Overcome barriers and reduce scepticism regarding the use of a voice-enabled DIA".

One of the program partners is a company with a factory in the Netherlands and Italy (Diversey). This company will be the focus of the design project. They have a digital tool to gather data about production line stoppages that is not being adopted right now. The DIA is introduced to improve data gathering, however, will this improve things or will there arise new/different adoption barriers? That is what I like to discover within this thesis.

The main focus will be to increase the adoption of COALA within the Dutch factory of Diversey. However, Diversey and COALA operate in many different contexts so by synthesizing an approach to discover Human-Al interactions and address change management could help Diservey, COALA, and even designers outside of the program as well.

The limitations would be the scope of the project, there are a lot of challenges and barriers that come with design with/for Al. Therefore, I want to concentrate on the challenges regarding Human Al interaction and not the technical aspect of Al like providing data, gather data, and cleaning data for learning purposes.

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Initials & Name A.J. Verhoeven

Student number 4398866

#### Personal Project Brief - IDE Master Graduation

introduction (continued) space for images



## **ŤU**Delft

#### Personal Project Brief - IDE Master Graduation

#### **PROBLEM DEFINITION** \*\*

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

Central design challenge:

How can you improve the adoption of AI services by accounting for human-AI interaction barriers through prototyping?

1) What aspects influence the adoption of an AI system and in what way?

- 2) How to assess what are the most prominent contextual factors that influence adoption?
- 3) How can Human-Al interactions be discovered through prototyping?
- 4) How can adoption barriers be prioritized and minimized?

5) How can the minimized barriers be integrated into the company and Al design?

#### **ASSIGNMENT \*\***

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, .... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

Create a strategy for Diversey on how to minimize doption human-AL interactions barriers through company and/or AL changes and the management of these changes.

The end deliverable will be a strategy that will include:

- The possible barriers for adoption of the voice-enabled DIA and Diversey's context

- How to address these barriers in the early stages of the DIA
- How to integrate these changes into the company and the AI model over time

The final deliverable will be a strategy on how to tackle the discovered barriers, however, due to the fact that the contextual and dynamic nature of AI systems these won't be the last barriers for adoption. That is why an extra ambition would be to convert the process towards the strategy into an approach to discover barriers in new or other contexts.

Student number 4398866

The project will be a success when the acceptance of working with a digital (AI) tool is raised for the operators

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Initials & Name A.J. Verhoeven

### **ŤU**Delft

#### Personal Project Brief - IDE Master Graduation

#### PLANNING AND APPROACH \*\*

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

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The Gantt chart is listed above. The most important dates for the Gantt chart are Midterm (1-11), Green light (11-1), Gradution (week 6), and the holiday weeks (week 51 & 52). The planning describes the following approach:

1. Build a framework from literature research and expert interviews as an overview of factors that influence the degree of adoption.

2. Fill the contextual factors in from the AI design, company and societal trends through context analysis into the framework

3. Use the filled in framework as a starting point for potential barriers and prototype with/for AI to discover Human-AI interactions

4. Validate barriers or determine new barriers for adoption of the Al system from the prototyping insights and develop a new frame for adoption strategy.

5. Develop a concept to minimize the most prominent barriers for adoptions and validate the concept through interviews and prototypes

6. Generate a strategy for the AI and company changes to increase adoption of the AI service

(7. Transform the framework to an approach for other contexts)

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Initials & Name	A.J.	Verhoeven	Student number 4398866	-
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#### Personal Project Brief - IDE Master Graduation

#### MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... . Stick to no more than five ambitions.

#### Motivation

Throughout my studies, I've explored the digital field of data and programming through electives, my own business, and my minor. However, it still feels like I don't exactly know where to start and how to assess whether AI is a viable option during a design project within the given context. If this is the case for me (given my interests and experience with data and programming) then I can't imagine being the only one. Therefore I want to explore prototyping with/for AI so I can gain insights into the desirability and viability

Competences subject (AI):

- Understanding of the underlying technology
- Research background is different values created through Al
- Created insights from minor Machine Learning algorithms
- Created a reinforced learning model during a minor

#### Competences design:

- Able to manage different stakeholders and understanding their motives.
- Apply design methods in research
- Convey insights in an understandable and structured way
- Validate found insights

#### Personal development/ambitions:

- Be vulnerable and share my work to learn from it, instead of trying to make it perfect before sharing
- Being comfortable in uncharted and abstract territory and learn to keep working when the next steps are unclear
- To set achievable goals and being content with them
- Improve storytelling capabilities of conveying a strategy/future vision
- To find a generalizable way to account for Human-Al interactions through prototyping (Framework or approach)

This approach could help with:

1) Addressing the changement of introducing an AI system/service

2) Validation of a concept adoption (service, strategy product etc) that has an Al aspect to it

3) Risk assessment throughout the life cycle of a Al-enabled service or product

#### FINAL COMMENTS

i case your project brief needs final comments, please add any information you think is relevant

Yang, Q., Steinfeld, A., Rosé, C., & Zimmerman, J. (2020, April). Re-examining whether, why, and how human-Al interaction is uniquely difficult to design. In Proceedings of the 2020 chi conference on human factors in computing systems (pp. 1-13). |Fountaine, T., McCarthy, B., & Saleh, T. (2019). Building the Al-powered organization. Harvard Business Review, 97(4), 62-73. | Engel, C., Ebel, P., & van Giffen, B. (2021). Empirically exploring the cause-effect relationships of Al characteristics, project management challenges, and organizational change.

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