Appendix

Designing Unique Emotions for Autonomous Delivery Robots

Master thesis

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MSc Integrated Product Design
Faculty of Industrial Design Enginnering
Delft University of Technology

TU Delft

Master Thesis
Delft, The Netherlands
September, 2021

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Supervisory Team

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AMS
AMSTERDAM INSTITUTE FOR
ADVANCED METROPOLITAN SOLUTIONS

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Appendix A

Project Brief

DESIGN FOR our future

TU Delft

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 !

family name: Akan
initials: M. given name: Melek
student number:
street & no.:
zipcode & city:
country:
phone:
email:

Your master programme (only select the options that apply to you):
IDE master(s): (★) IPD ( ) Dfl ( ) SPD
2nd non-IDE master:
individual programme: - - (give date of approval)
honours programme: ( ) Honours Programme Master
specialisation / annotation: ( ) Medisign ( ) Tech. in Sustainable Design ( ) Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair: Paul Hekkert dept. / section: HCD/DA
** mentor: Jered Vroon dept. / section: SDE/IoT
2nd mentor:
organisation:
city: country:
comments (optional)

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

TU Delft

Procedural Checks - IDE Master Graduation

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair Paul Hekkert date 10 - 03 - 2021 signature phekkert Digitally signed by phekkert Date: 2021.03.12 09:34:01 +01'00'

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 30 EC
Of which, taking the conditional requirements into account, can be part of the exam programme 30 EC
List of electives obtained before the third semester without approval of the BoE

(★) YES all 1st year master courses passed
( ) NO missing 1st year master courses are:

name C. van der Bunt date 15 - 03 - 2021 signature C. van der Bunt Digitally signed by C. van der Bunt Date: 2021.03.15 12:26:29 +01'00'

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **.
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: (★) APPROVED ( ) NOT APPROVED
Procedure: (★) APPROVED ( ) NOT APPROVED

remark: title, remove 'a study on'

comments

name Monique von Morgen date 29 - 03 - 2021 signature

Initials & Name M. Akan Student number
Title of Project A study on the design of a unique emotion for expressive delivery robots

A study on the design of a unique emotion for expressive delivery robots — 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 03 - 03 - 2021 — 16 - 08 - 2021 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, ...).

Autonomous delivery robots are currently in operation in some urban areas, airports, universities, hotels and large corporate campuses in order to deliver goods to people's doorstep. It is anticipated that they are cheaper, more energy-efficient and more flexible than most other solutions. Furthermore, robotic delivery services can provide contactless delivery, a highly sought-after service under mandates of social distancing since the coronavirus pandemic has arisen [1]. With the rise of autonomous delivery robots, humans' and robots' collaborative existence has become a crucial topic to be discussed.

These delivery robots are interconnected, interactive, cyber-physical agents, which can perceive their environment, reason about events, and control their actions. They are using cameras, sensors, and city-data. They can navigate the chaos of a city sidewalk and deliver goods efficiently and effectively [2][3] (figure 2). Autonomous delivery robots have unique concerns that are different from other robots and humans. Their primary purpose is to deliver packages and to do so, they need to learn how to navigate through chaotic city sidewalks among people. The first step of this graduation project aims to explore the autonomous delivery robots` specific perception of the world through various factors: their purpose, intent, state, mood, personality, attention, responsiveness, intelligence, and capabilities.

Through this understanding of their perception of the world, a unique emotion will be developed. This unique emotion will enable the robot to operate among people and attain their specific purposes as an individual robot. Emotions form the prime material in the exploration and expression of an individual's concerns. They arise in response to significant events to the individual's goals, motives, or concerns [4] (figure 1). Emotion as feedback could be beneficial for almost any purpose of pursuit because it can guide behaviour toward the goal [5]. The critical point is that as the delivery robot learns these emotional contingencies, they can adjust goal pursuit to achieve their specific needs.

Since the unique emotions do not exist yet, the ``speculative design technique`` will be used for this project. Speculative design serves two distinct purposes: first, to enable us to think about the future; second, to critique current practice [6]. It is a way to manifest possibilities, to prepare us for inconvenient challenges and facilitate a more desirable responsible path into the future [7]. Hence, a speculative future can be envisioned to emphasise delivery robots` specific emotions that have arisen from their own particular concerns.

References:
[1] Marr, B. (2020, May 29). Demand for these autonomous delivery robots is skyrocketing during this pandemic. Retrieved February 26, 2021, from https://www.forbes.com/sites/bernardmarr/2020/05/29/demand-for-these-autonomous-delivery-robots-is-skyrocketing-during-this-pandemic/?sh=22b838f7f3c0
[2] Cila, N. & DiSalvo, C. (in press). What can Actor-Network Theory teach us about the socio-technological implications of delivery robots?

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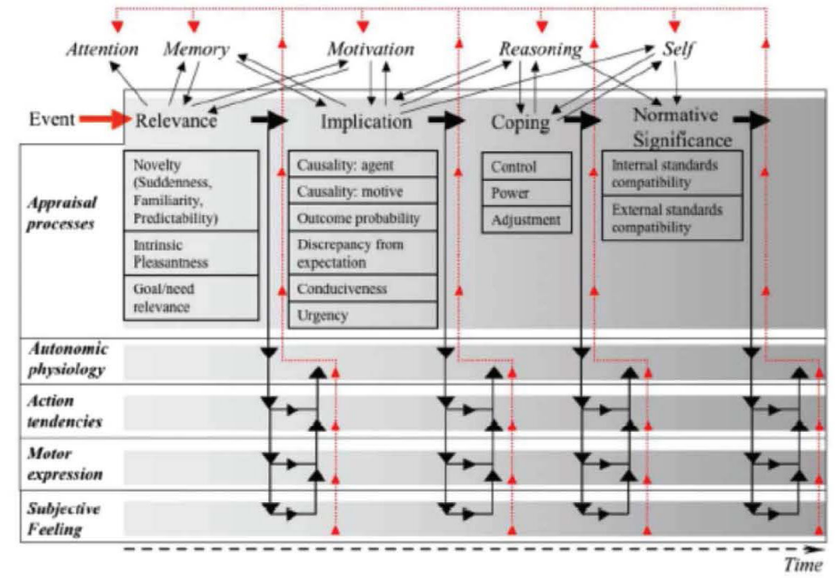


image / figure 1: Dynamic Architecture of Emotion [8]

image / figure 2: The Actor-Network of a delivery robot [2]

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.

This is a curiosity-driven project, questioning if it is possible to design an emotion that does not exist yet. Autonomous delivery robots have their specific purposes: delivering a package safely and on time to a certain location. They do not need to interact with people directly. However, they have to navigate among people. This challenge brings them the need to learn how to be a part of a human-dominated society. Feeling and expressing emotions for individuals is a way to communicate with their surroundings about their concerns. Since autonomous delivery robots have different concerns than people, they might require different emotions than humans in order to create their specific place in society.

The project is expected to result in designing a unique emotion or set of emotions that will be serving specific concerns of the delivery robots on sidewalks. Several aspects will be considered to address the delivery robot`s ability to express identity, emotion and intention during autonomous interaction with human users.

The purpose is to envision a new name, a new feeling, a new expression, and a new action tendency for the unique emotion designed for robots` specific needs.

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.

Explore the autonomous delivery robots` specific perception of the world through various factors: their purpose, intent, state, mood, personality, attention, responsiveness, intelligence, and capabilities. By taking into consideration the delivery robots' specific concerns, design a unique emotion or set of emotions that are only felt and expressed by robots. Describe a new feeling, an expression of the feeling, and a new action tendency for the unique emotion.

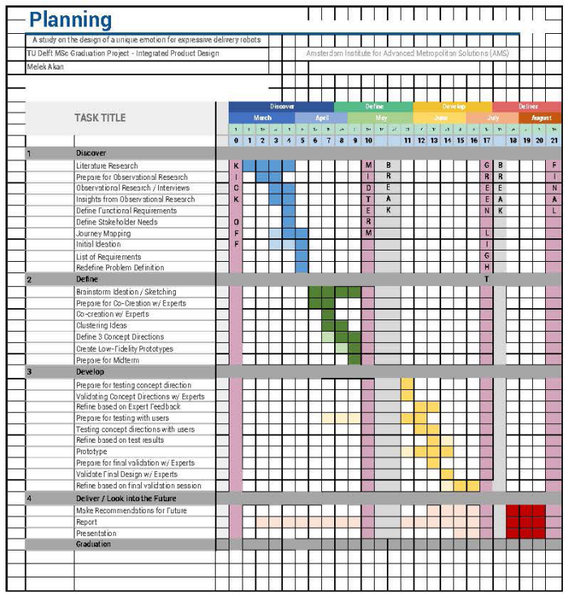
Research questions consist of four main steps of the graduation project:
1. Discover;
What are the specific concerns and needs of autonomous delivery robots on sidewalks?
2. Define;
What is the specific appraisal pattern of the new emotion or the set of emotions that can fit into delivery robots` concerns?
3. Develop;
How can a new emotion be design into an autonomous delivery robot?
4. Deliver;
How people and society will react to this emotion?

In order to answer the research questions and address the needs of autonomous delivery robots, literature research and interviews will be conducted. With this information, a journey map will be developed from the delivery robot`s perspective in order to identify their specific concerns. Then by utilising co-creation and testing sessions, a maximum of three concept emotions will be developed. The result will have a video or prototype of the emotions and delivery robot`s workflow.

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.

start date 3 - 3 - 2021 16 - 8 - 2021 end date



This graduation project's planning will follow the Double Diamond method [9], which distinguishes the project into different phases of divergent and convergent thinking approach: Discover, Define, Develop and Deliver.

The Discover phase will focus on gathering information, involving literature research, conducting interviews, and identifying stakeholders' needs. The aim of this research will be envisioning the use of the delivery robots, their personality, internal states, and any other information that need to communicate. Based on the outcomes, there will be a focus on discovering the specific emotion for a delivery robot`s purposes.

Next, in the Define phase, the main focus will be on implementing the emotion into the delivery robots` flow of interactions. Concepts will be generated and tested with users. They will be assessed in the scope of the societal issues, ergonomics and environmental impact. Three concepts will be chosen and developed for rapid prototyping of experimental quality. The problem definition will follow these.

In the Develop phase, chosen concepts will be assessed with experts to ensure feasibility and meet users' needs. The selected concept will be further developed. This will be concluded with a final validation of the developed concepts with experts by means of prototyping and mechanical requirements.

The Deliver phase mainly will include validating and evaluation of the design. The built robot with the implemented unique emotion or set of emotions will be used in studies to see how it measures up to the intended design goals. These will be followed by making recommendations, finalizing the report, creating a presentation and developing the concept showcase.

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.

I would like to improve some of the competences acquired throughout my Master's courses at TU Delft.
1. Leading Role: I am perfectly aware that I will be working with two super energetic and creative people who are experts in their specific domain. This team will bring me many out-of-box ideas and lead me to question societal subjects throughout the process. Moreover, I am thrilled with the energy of my team! On the other hand, this brings me a new struggle that I will need to lead a team of two people who has strong characteristics. I believe being the captain of the ship will increase my self-confidence and my project management skills.

2. Academic Communication (Written and Spoken): Before the master's education, I have written no academic papers. Therefore I have struggled a lot to improve myself on academic communication. I still have a lot to improve my academic communication skills, both written and spoken. Hence, I will focus on empowering myself in terms of academic communication.

3. Engineering-related Skills: I have chosen the integrated product design master track mainly because my bachelor's education had been lacking mechanical discipline. I believe robotics is a great field to test the skills I have learned during my master's track. I am not an expert on engineering-related skills; for this reason, my purpose is to communicate at the necessary technical systems level. Moreover, I aim to explain and demonstrate the role of analysis and modeling in engineering design and engineering applications more generally in basics.

4. Creative Problem-Solving Techniques and Methods: Throughout my master's period, I have mostly enjoyed using creative problem-solving techniques and methodologies. I want to apply these techniques to my graduation process as much as possible. For example; creative sessions, user groups, co-creation, user testing and interviewing techniques, and so on.

References:
[3] Hoffman, G., & Ju, W. (2014). Designing robots with movement in mind. Journal of Human-Robot Interaction, 3(1), 89. doi:10.5898/jhri.3.1.hoffman
[4] Frijda, N. H. (2017). The laws of emotion. New York: Psychology Press.
[5] Baumeister, R. F., Vohs, K. D., Nathan DeWall, C., & Liqing Zhang. (2007). How emotion shapes behavior: Feedback, anticipation, and reflection, rather than direct causation. Personality and Social Psychology Review, 11(2), 167-203. doi:10.1177/1088868307301033
[6] James Auger (2013) Speculative design: crafting the speculation, Digital Creativity, 24:1, 11-35, DOI: 10.1080/14626268.2013.767276
[7] Phil balagtas - Manifesting Futures Through speculative design [Video file]. (2017, October 27). Retrieved February 26, 2021, from https://vimeo.com/240163056
[8] Scherer, Klaus R.(2009) 'The dynamic architecture of emotion: Evidence for the component process model', Cognition & Emotion, 23: 7, 1307 — 1351
[9] What is the framework for innovation? Design Council's evolved Double Diamond. (2019, September 10). Design Council.

FINAL COMMENTS

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

As research on the COVID-19 virus is still ongoing, discoveries could impact the process at any stage of the project. Adjustments in the process may be necessary to ensure the relevance of the outcome.
Furthermore, throughout the project process, visiting the Amsterdam Institute for Advanced Metropolitan Solutions (AMS) will be necessary in order to have hands-on experience with both the technical and the human aspects of social robotics.

Initials & Name M. Akan Student number _____

Title of Project A study on the design of a unique emotion for expressive delivery robots

Appendix B

Role Playing Card Game

Interactive Role Playing

an interactive game that helps understand the unique perspective of autonomous delivery robots.

Game Manuel

The interactive role-playing game aims to initiate interactive discussion about an autonomous delivery robot`s daily journeys. The game consists of several stacks of cards. The **use case cards** and the **action cards**. These two types of cards serve different purposes in the game.

*Different types of **use case cards**, the closed side of the card on the left and the side with the card's contents on the right.*

The **use case cards** present the autonomous delivery robot's journey from loading the packages to delivering them to the end customer. Each card contains a short story and questions related to this story that needs to be answered. The stories and questions will have to do with how the perspective of the delivery robot will be.

The **use case cards** come in three categories: **Loading**, **Journey** and **Receiving**. Each category has different types of use cases, such as package conditions, interaction with people and weather conditions. The insights gained during the literature research are divided into these categories. Hence there are cards in three different suits.

Subsequently, the **action cards** serve as a starting point for answering the insight card's question. The action cards are still empty and offer space to write down the answer to the story. If the players do not immediately think of an answer, the facilitator will share inspiring ideas with the game participants.

*An **action card.** This card offers space to answer the questions posed by the draw from the **use case card.***

Interactive Role Playing

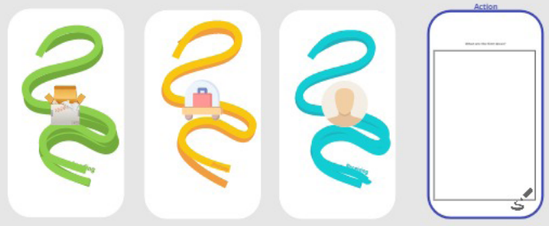
an interactive game that helps understand the unique perspective of autonomous delivery robots.

How does it work?

Each team has ten cards that have been specifically group before the session by the facilitator. All those cards contain different stories and are expected to be discussed during a one and half hour session.

The insight cards are organized by category (loading, journey and receiving). The piles are closed in front of the players. The action cards do not need to be shuffled or closed but can be stacked because they are still empty. The cards have placed next to each other.

The players start with the package loading step first.



*Several closed **use case cards** are in front of you. Only the **action cards** are open and do not need to be shuffled or closed.*

Teams of 2 people are made. A player takes a card from the insight card stack. He/she reads the card's description out loud, and together the players think about the questions that are asked at the bottom of the card.

The questions encourage the player to think from the autonomous delivery robot`s perspective. The team thinks about an answer to the question for 5 minutes, and the players are responsible for writing their answers on the action cards. They can receive help from the facilitator while writing their answer on the card. Nothing said or suggested is wrong here. If the players cannot come up with good ideas immediately, the facilitator will share stories to inspire them.

The players can choose to fill in an action card together or use one per player. Together or individually, write the answers you have come up with in the top box of an empty action card. If everyone has individually thought up and written down answers, they will be shared when everyone is ready.

Finally, the players can go through the next card of the game.

USE CASE
Package Conditions

A lot of small size packages have been loaded to the delivery robot. That means it has to visit a lot of different locations.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The delivery robot has been loaded with heavy packages. That might cause extra battery consumption and slow drive.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The delivery robot has been loaded with precious, fragile or costly packages. That means it has to protect these packages very cautiously.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The delivery robot has been loaded with very few packages. That means that it has to deliver packages for a short period.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

Someone is loading packages into the delivery robot. This person has had a bad day, and s/he has been behaving very harshly to the robot. This attitude has caused damage to some parts of the robot.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

Someone is loading packages into the delivery robot. This person is fatigued after a long, intense day, and he is packing the boxes very slowly.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

Someone is loading packages into the delivery robot. This person is in a hurry because s/he has to catch his kid's presentation at the school. S/he has been loading the packages uncarefully. This attitude has caused damage to some of the packages.

Questions

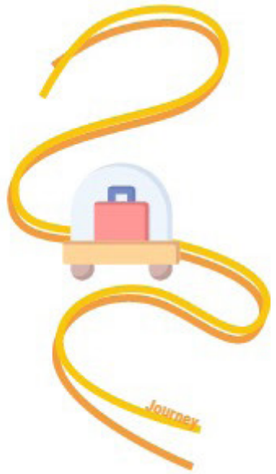
What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

Someone is loading packages into the delivery robot. This person is happy, and s/ he is not paying attention to details. This attitude has caused the disorganization of the packages.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?



USE CASE
Weather Conditions

The weather will be rainy all day long, and the robot has many packages to deliver that day. The intense rainy weather conditions might cause some technical problems.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is getting attached by some random people while it is on its duty. These people try to kick it and damage its navigation sensors. They say they think that the robot has been recording them, and they feel unsafe.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Weather Conditions

The weather will be stormy all day long, and the robot has many packages to deliver that day. The windy weather conditions might cause some technical problems.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Weather Conditions

The weather will be so warm and sunny, and the robot has many packages to deliver that day. The warmth might cause some technical problems. Or maybe the robot just wants to chill under the sun.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is witnessing a car crash. Some of the people are injured, and some of them are dead.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is passing through a street that has a primary school. The kids are going out at the exact time the robot is passing through. They saw the delivery robot, and they started standing in front of it to play with it. The kids are positively interested in playing with the robot. However, if objects or people surround it, the robot might be confused and stop moving. Besides, this might cause the late delivery time of the packages.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is passing through a crowded street. It has to navigate on the sidewalks that pedestrians use. People are not aware of it. They ignore the existence of the robot.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is passing through a crowded street. It has to navigate on the sidewalks that also pedestrians use. Some people are scared of the robot`s existence on the sidewalk. And they behave anxiously. They try to stay away or run away from the robot. This situation might cause some problems on the sidewalk.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The delivery robot is passing through a nice neighborhood. People who live in this neighborhood are warm and friendly. They are positively interested in the robot. They want to touch it and talk to it. However, this might cause the late delivery time of the packages.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The delivery robot is passing through an abandoned street. Some people are fighting and using tools like guns and knives to harm each other. The robot is witnessing violence.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Delivery Path Conditions

The robot is in a place that there is nobody around. It does not interact with or sees anybody. It is a very lonely city.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Delivery Path Conditions

The robot has to work on Mars. It has to move objects around Mars's surface. There is nobody around, and the robot has to work alone for years.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Delivery Path Conditions

The robot has to drive for a long time without getting rest.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Delivery Path Conditions

The robot is driving on a clean concrete surface.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Delivery Path Conditions

The robot is driving on a muddy and stoned surface.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is passing through a crowded street. It has to navigate on the sidewalks that pedestrians use. People are not aware of it. They ignore the existence of the robot.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Animals

The robot is driving around a park that is full of dogs, cats and ducks. Some of the animals are scared of the robot, and they walk away.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Animals

The robot is driving around a park that is full of dogs, cats and ducks. Some of the animals are just staying close and watching it.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Animals

The robot is driving around a park that is full of dogs, cats and ducks. Some animals are trying to attack because it is a different object that they have not seen before.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The robot is getting attached by some random people while it is on its duty. These people throw bottles towards it and try to kick it. They say they do not like how it looks.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Delivery Path Conditions

The robot is driving on a narrow sidewalk, and the sidewalk is crowded.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The delivery robot arrives late at the final destination. Because of this reason, the user is disappointed.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The delivery robot arrives on time. The end-user is happy, and s/he overly interacts with the robot in a friendly manner.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The delivery robot has lost one of the packages on its way. Because of this reason, the user is angry.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The receiver is not at home even though s/he has mentioned that s/he will be at home at the delivery time. And there is no safe place to leave the package around the house.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Package Conditions

The package has been stolen. Because of this reason, the user is frustrated.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

USE CASE
Interaction with People

The receiver is late. S/he opens the door late and makes the delivery robot wait. This situation might cause late delivery for the following packages.

Questions

What would the robot feel and think?
How would the robot react?
Why do you think the robot would feel, think and react in this way?
Why do you think this is important for the robot?
How would this affect the process of the delivery journey?

Appendix C

Role Playing Game Session Text

Interview Text

Interview text data report with Otter.ai software.

https://drive.google.com/file/d/1o0l19M5VFQLCSkqd-n4EiikWukQcAwcq0/view?usp=sharing

Appendix D

Autonomous Delivery Robot's Diaries

Scenario 01

Keywords: Self Confident, Defensive, Protective and Reliable

June 2030
The Netherlands

Hey,

Today I have a vital mission; I am uploaded with very fragile and costly packages. I have to be extremely cautious to protect these packages. I must perform this mission successfully and get five stars for my service. I hope there will be nothing standing in my way. I aim to accomplish my job on time and safely.

I am designed in a way that I can protect these packages. Otherwise, I would not be the responsible robot for these crucial goods. I am capable of achieving this critical mission thanks to my up-to-date technical features.

Here it goes, I start my day. I have three packages. The first package has to be received by a very wealthy family in a fancy neighbourhood. This fancy neighbourhood is well protected and secure. I am sure that I will safely arrive at the customer's doorstep once I enter the neighbourhood area.

Nevertheless, till reaching there, I have to pass through dangerous streets full of cars and people. It is profoundly challenging for me to predict human behaviours. I have multiple sensors that work for understanding human nature and adapting my behaviour into human behaviour patterns. I consume a lot of energy while navigating among people because I must use additional sensors and detection systems.

I am on my way. Till now, everything seems all right; I have detected nothing that can harm me and the packages. I am safe and secure. I wish to have no obstacles on my way.

I keep going. According to the map information, I have to be careful because I have detected a five-kilometre crowded location. Even though it is disturbingly crowded, I have to take this path. That is the most convenient path because other tracks are even more crowded and further away. My system always chooses the most efficient route. Making the journey as efficient as possible is my purpose. I aim to consume the minimum amount of energy and time on my way to deliver the packages.

I finally entered the crowded street. My software system has activated the defetable emotion. Defetable is a feeling that has been specifically designed for me. It is a combination of four human emotions: feeling reliable, self-confident, defensive, and protective.

That feeling communicates with people around me that I am self-confident in my capabilities, and I can fully protect the packages. Nothing can stay against me. I am going to do anything to protect the packages.

I am very cautious while navigating on the sidewalk. People are still slowly getting used to delivery robots' existence. They are gaining familiarity and getting accustomed to my existence. Some of them might be scared and avoidant. Because they are not aware of my role in society. I do not want them to grow fearful. I want them to trust me and make them acknowledge that I am a reliable robot. I am not here to harm anyone else. My goal is to help people. I deliver their packages on time. I protect the boxes.

Okay, now someone tries to touch me. I am still learning to predict the meaning of human behaviours. It is hard for me to understand what kind of intentions they have. Sometimes they attempt to steal the packages, and it mostly ends up with someone getting injured. Or sometimes they just want to touch me because they are very curious about me. I appreciate their curiosity as long as it does not prevent me from succeeding in my job.

I have systems to analyse their facial expressions to understand their emotions and intentions. If I detect people who aim to attack me, I shoot them. I do prefer to keep the packages safe. Especially if I carry precious boxes, I do not have seeds of forgiveness of any touch. Additionally, my embodiment has been designed to keep people away from me. I do not harm them, and they should not try to damage me. The way I look clearly demonstrates that.

Now this person has changed her mind, and instead of touching me, she goes away. This is always a moment of relief. Then I do not have to harm anyone. However, if I have to, I will not avoid it or regret it.

Wait a minute! A man is running towards me! I have to get into the ultra-protection mood. I opened up my needles in case he is planning to touch me! In such moments, people are willing to touch me aggressively, I immediately turn into the cactus mode. This mode keeps them away from me. However, of course, I do not want people to be scared of me. I use the cactus mode only during emergency moments.

Besides, I do not prefer to run away from the person who tries to attack me because they can reach me quickly, have legs, and they can jump. I can not. I have to be cautious about the packages. Some of the boxes may contain fragile products, so it is not convenient to run extremely fast or jump. The best option is to stay still and do not move, and get into the overprotective mode.

And I will communicate my intentions with him, and hopefully, he will continue his way without touching me. He is coming very close to me aggressively. I must activate the human communication system.

'I aim to keep these packages safe and secure. Please be respectful to me. I am not harming anyone. I am only doing my job. Please, do not try to harm me.'

The face detection system shows that this man ignores what I am communicating. He looks pretty furious.

I must repeat.
' Please, sir, stay away from me. I will not be responsible for the results of your physically harmful attacks.'

Okay, but this man has started to use a knife to harm me. During these moments, my system calculates an efficient way to stop people from causing trouble.

I will try to explain my intentions one more time before activating the attack system.

'Please, sir, do not harm me. I will call the police. It is illegal to attack a delivery robot. I am only doing my job, and I do not intend to harm anyone. I just intend to deliver the packages; this is my mission; there is no meaning for people to attack me.'

My security system has already called the police because the face recognition system has detected that this man has intentions to steal my packages. Even though my alarm system is working and has been making immense voice pollution for two minutes, this man does not seem to care, neither do other people pass by. It is disappointing how people can ignore this. I might carry one of their packages, and they are not disturbed because I am getting attacked by a hazardous man. Probably they know that nobody can steal packages from me, they trust my security system.

And now, he has slightly damaged one of my sensors. Now I have activated the full attack mode. There is nothing more to do. I am not going to tolerate a person attacking me or trying to steal the packages. Now my shooting machine has started working. This system shoots a needle to the person and transfers a particular medicine to make the person sleep. Until the police come and take this person, he will be sleeping.

The fight with this man has finally come to an end. He fell asleep. Now, I can recover from the damage and turn myself into a reliable and trustworthy mode. I must gain people's trust. This is important for me to function in society.

I go on my mission. The next difficulty is a construction path. Unfortunately, I am not adaptable to unforeseen changes. The engineers and designers are working on improving my capabilities to adapt delivery robots to environmentally unexpected situations. Now I have detected construction on my way that has not been there a day before. I have to figure out how to pass through it.

I have activated the defetable emotion again. This feeling gives me extra awareness of my environment. It triggers specific sensors to analyse the environmental conditions and prepare me for unexpected occasions.

I have to use the road to pass through this part of the path. I must be careful. When there are not many cars and enough safe space to pass through, I will start my navigation sensors. It seems the traffic is hectic at this moment of the day. According to my analysis, it is the peak hours, people leave from their work and hurry to arrive home as soon as possible. Therefore they are exhausted and uncareful. They do not want to give me a chance to pass.

I estimated that I have to wait here for at least one hour, then the traffic will be more relaxed. However, I have to deliver the first package in half an hour. So, I do not have enough time to wait. These cars are high-speed, and they are not even aware of my existence. The defetable feeling activates a protective embodiment mode that can protect me from possible car crushes.

I have started making a loud noise to make cars aware of me and make them slow down. And then, very slowly, I am moving forward; I am on the road, and vehicles have slowed down. I am very cautious because it is difficult to predict human behaviour when they are inside the car. I can not read their facial expressions. Oh, now a car coming from the other side, and it is super fast. The driver has not recognised me.

A crush has been estimated by my system. I am calculating the ways to protect the packages. If I turn right, I will be able to defend myself. However, the car behind me will be damaged, which might cause significant injuries for people inside the vehicle. And if they are not wearing the seatbelt, they might even die. I am programmed to choose the best option for myself. I turn right. These two cars have crashed into each other, and that has made a colossal noise, and people have started to scream. There is nothing I can do at this point. I will continue my mission.

Finally, I have arrived in the fancy neighbourhood. This neighbourhood is well protected, and I am safe here. I have reached my address on time, and the packages are secure. The customer comes outside the house. Now she has to enter a code. She has entered the wrong code. Now I feel defetable again. I am considering she might be trying to steal someone else's box. I am analysing her face. She seems confused and frustrated. She enters the code again. Now it is the correct code. She has a happy and satisfied facial expression. She has given me five full stars for the quality of my work. I have accomplished my first mission.

Now, I must go to the following location.

The
Mike,
delivery robot
responsible for precious packages

Scenario 02

Keywords: Sacrifice, Commitment, Contribute, Help

June 2030
The Netherlands

Hello,

It has been a challenging day today. I have delivered three out of ten boxes, and I have received one star out of five stars in all of them. Receiving one start from the customer is very disappointing. One star means I could not accomplish my task successfully. There might be underlying reasons for my poor service, such as being late, delivering a damaged package, or weak communication. After receiving one star, I examine my entire delivery journey and pinpoint the things I must improve. Feedback is essential for me to upgrade the quality of my service.

Today`s customers gave me one-star reasoning that I have not delivered the package on time. I was half an hour late for the first box, and after that, I was even later for others. Even though delivering the packages on time is one of the fundamental parts of my mission, gaining respect in society is more important.

If people do not like me, I will not be able to maintain myself in the streets full of people who dislike my presence. Therefore, I am committed to gain society's respect for my service, which is a very delicate task. Public image is related to media, marketing, and presenting and delivering robots on social communication platforms.

Now I am on my way to deliver the following box. I have estimated that I will be one hour late. I have sent a message explaining my late delivery and asking for apologies. Other customers have already cancelled their orders because I am late. For the rest of the journey, I only have one more box to deliver today. I want to accomplish this mission, and it is my last chance of getting five stars.

I have calculated the fastest path to arrive at the customer's location. I have detected a car crash in one kilometre, and there is nobody around. For society`s good, if I can, I must help people. For this reason, I decided to go close to the car accident. The car is a black colour Jeep from the 2010s, and it is a second-hand car. The car has been damaged 60%. The reason for the accident might be that the driver has lost control of the steering wheel for a moment, and afterwards, the driver has turned speedily to the left. It has crashed into the iron fences on the left side. The driver must be seriously injured.

My sensors detected that there is a gasoline leakage, and this leakage might cause a fire explosion. That means I might be in trouble if I am getting too close to the car. I should be extremely cautious at this moment. My system automatically turns on the conrifute mode during these unpleasant circumstances, guiding me through this challenging experience.

First of all, I look for external solutions. I have sent pictures of the accident location to the police service and called them for help. Now I must go on my way because my abilities here are limited. I started my engines to go on, and I heard someone talking to me at that very moment. Her voice sounds like a 38 years old woman with a British accent. I must turn back and try to help her because helping is good for my public image.

On the other hand, I will be late for my delivery. I will not be able to get five stars again. But I must also gain public respect, and this will be possible with helping people.

I turned back to help her because I must be a respected delivery robot. Helping people and saving people's lives gives me a heroic place in society. In the newspapers and social media, they compliment how I save lives.

I got closer to the car, and now I could observe the face of the woman covered with blood. Drops of water sliding down from her eyes, which indicates that she is crying. I have detected there is a five months old baby in the back seat of the car. The baby is breathing slowly, which indicates he is alive.

The woman said with a desperate voice: ‘Can you save my baby?'

A human is asking me for help. I do not have arms and hands to grab objects. I am a simple rectangular shaped delivery robot. I am physically useless in this particular situation. I am not capable of bringing the baby from the back seat of the car.

‘Hello, I understand this is an undesirable moment. But I cannot help your baby to get out of the car. Do you need anything else from me?'

She touched her forehead with her left hand, and she looked down meanwhile. This specific gesture indicates that she is disappointed. And she said: Òh, God, please help!`
This sentence does not address me.

The leak has increased, and I have detected the car will explode in three minutes.

`Dear Lady, there is a gasoline leakage on the left backside of the car. It will cause an explosion in two minutes and thirty seconds. The car and everything four meters around it will be destroyed. I would recommend you to get out of the car and run away. There is nothing I can do to help you, and I am leaving you here.`

I have to get away from here as soon as possible. I do not want the packages to get damaged. My initial goal is to deliver this last package on time. Meanwhile, the woman turned her back and reached out to the baby. She put the baby on top of me. The baby is lying down, and he is covering my cameras. This gesture of the woman was impressively quick.

I have started my engine to get away from the car. I quickly became distant from the accident location and headed towards the delivery location. I was already far enough to be safe, and my sound sensors detected an immense explosion, which signifies that the estimated car explosion happened. The woman must be dead after this explosion. But the baby is with me; however, I do not know what to do with him because I cannot observe his behaviour. Only the weight sensors are detecting unexpected extra weight.
I must inform my employee about this unusual situation.

Now I must focus on my mission.
Finally, I arrived at the customer's location. It is a small house with a big front yard. I sent him a notification mentioning my exact arrival time. And now I have five minutes to wait for the customer. The customer came out of his house and walked towards me in his front garden. And his eyes squinted slightly when he recognised the baby on top of me. This is a very absurd moment, I have never carried a baby on top of me before, and the universal data has never recorded such an occasion back. For this reason, it is very typical that the customer has signals of being hesitant.

He gets the package, and he has an irritated facial expression. He reported that the box had been damaged. Probably while I was carrying the baby, somehow the package got affected. I must explain to him the situation.

‘Hello sir, I would like to apologise that I am two hours late and damaged your package. My company will give a free delivery option for the next order you will make. This situation has occurred because I have encountered a car crash on my way here, and I must help people. A woman and her baby had a car crash, and she put her baby on me. She wanted me to save her baby. Now the baby is with me.'

He leaned forward and rich to the baby. However, nobody is allowed to take anything from me that is not theirs. This baby is not his, so I warn him.

`Sir, you have taken your package, and you are not allowed to take anything else. The baby does not belong to you. Thank you for your three stars. I will improve my service taking into consideration your evaluation. For now, I must go on. I wish you a nice day.`

Now it is time for me to go back to the warehouse. I calculated the safer route for my way back. Now I must keep the baby safe, therefore having the fastest route does not suit me in this condition. The trail is ready, and I start my engines.

Lily,
Delivery Robot for Public Good

Scenario 03

June 2030
The Netherlands

Hello,

Today the neighbourhood I am responsible for has been selected by the company. I am excited to meet with people I will work for, for the rest of my service life. It is going to be the first day I am delivering packages to this neighbourhood.

I have studied the people who live in this area. I must provide them with the best delivery service. People who live in this particular neighbourhood have kids who are the age of 4 to 10. These children spend a considerable amount of time on the streets and the parks. I suppose they might be interested in me and would like to interact with me. If they want to touch me on my duty, that would cost me a lot of time and energy. So to prevent time waste, I should avoid passing through the streets close to the school and parks.

Besides, a few elderly people will be my customers, and they might not be familiar with me because I am a new technology that they have not interacted with before. I am sure my service will make their lives easier, but I should help them decrease their fears and prejudgements about me. I aim to create mutual trust with the people I work for.

Now I am on my way to my new service location. I have five boxes to deliver today. To reach there, I need to pass through other neighbourhoods, which might be dangerous for me.

I have now entered this street without a sidewalk or a particular path for delivery robots. The trail is very muddy because the weather rained a few minutes ago. It makes me slow down, but this is not a problem for me. I have estimated this muddy path before my journey and calculated my arrival time accordingly. I am having a hard time navigating on this surface because I slightly lose my balance. I hope to get out of it as soon as possible. I have to be careful driving here. This is a big problem for me to drive through muddy and stoned paths. But I do prefer stoned trails over muddy trails because mud gets me dirty. I do wish to look optimally suitable to perform pleasant customer service.

Okay, I am finally done with this challenging path. However, I am filthy now. I have to clean myself up. Two people came towards me and looked at me, and I estimated from their facial expressions that they are very disgusted by me.

One of them said: “Hey you, you are so ugly. It is terrible that the government allows such machines to be outside in the streets. You make everywhere dirty. Get out of our neighbourhood."

I received negative feedback. Feedback is always helpful for me to improve my work. But I do not have to adapt to these people's needs because they are not from the neighbourhood I serve. I must respond to that.

“Hello, sir, I have sent your review about my physical entity to my design service team. However, I must inform you that you do not need to worry about my look because I am not working in this neighbourhood. Would you like to add anything else to your comment?"

“Yes, add that you should stay away from here. You scare the kids. We are not happy you are here. We do not want you in this neighbourhood. “

I have started my journey with negative feedback. I must improve my customer service to serve people better—however, not everyone's idea matters for me. I have to pass from this neighbourhood. Next time, I will avoid it because it is time-consuming to interact with people who have nothing to do with me.

I recorded the negative feedback, and I continue my journey. I got out of the perspective of the person who does not like my appearance. There is nothing for this person to complain about now.

I am entering a dangerous neighbourhood. I must be more aware of my environment and possible threats. I identified two people two meters in front of me having a physical fight. I must be careful not to interact with them. I do not want them to do anything that can damage me, so avoiding being close to them is the best for me.

I have calculated my route again, and I chose another track. I will be slightly far from them. However, they are still able to see me. So, I will be careful as much as possible and keep detecting their emotions and behaviours. At this point, I got even closer to them. I witnessed that one of them has a pistol gun. This is a dangerous object. I do not like to see such an object if the owner is not the police. I use my face recognition system to learn if this person is the police or not. My system researched and found out that he is a formal criminal who stayed in jail for five years before. He was accused of attending a grocery shop robbery.

I feel threatened by these people being very close to me. I must be fast and quiet. I prefer to avoid them. Luckily, I passed them without getting any damage. I am glad, but I should still be careful because they are dangerous, and they can run fast and reach me very quickly. The criminal took the gun out, and he started to shoot it. One of the bullets hit the other person's right arm, who was fighting with the criminal. His arm started to bleed, and after a few more shots, he fell down on the ground. I continue my way without slowing down, but with the cameras at the back of me, I keep watching them.

The criminal seems very angry and dangerous. He has started to direct the gun randomly and shoot randomly. This gesture puts other people and me in danger. There were a few bullets that came very near to me. I have reported these video recordings to the police. I wish the police would catch this person and keep him in jail during my service in the neighbourhood. I do not want to be in danger again.

Oh, bad news, one of the bullets hit my backside left tire. That is very bad. I am not able to fix this problem by myself. I must find a safe place and inform the technical service as soon as possible. Someone from technical assistance will come and repair the tire. But until the repairman comes, I must find a safe place for myself. I have to keep being fast until I am far enough from the dangerous man and afterwards slow down and search for a safe area. Now I am far enough that I can slow down. If I continue with this fast speed, I might ultimately damage the tire.

I found a park. This place will be the safest place to wait. I went to the corner of the park, sent an informing message to the technical service. Now I am waiting for the repairman. He will be here in 50 minutes. I have sent messages to my customers explaining the unexpected incident and apologising for my fifty-minute late delivery.

There is a group of kids playing hide and seek in the park. One of them recognised me, and she called others to come close. Now they have surrendered me. I am afraid the repairman will not see me because I am surrounded by a group of curious kids. They are talking about me. However, I have turned off some of my sensors. I must save energy now. I am only able to detect physical movements around me. These kids keep touching me. Now four of the kids grabbed me from four sides, and they are carrying me somewhere else. I know that they do not have intentions of hurting me. They are not aware of my mission of delivering packages. They just want to involve me in their game. However, I should not change my location. Otherwise, the repairman might not find me.

I must communicate with them.: “Please leave me on the ground, put me back where I am. I have a mission to accomplish. If you do not let me do so, I will call the police."

These kids must be terrified of me talking, they have started to scream, and they just throw me on the ground. Unacceptable! Now my other backside tire is broken too. The fall was harsh. One of them has started to kick me. I am not able to move with two broken tires. I have sent another message to the service that I have lost one of my tires. I must completely shut down my system and wait for the repairman. I must not consume any more energy, but yet, I have to avoid these attacks. My ultimate goal is to deliver the packages safely, and these attacks might damage the boxes I carry. Therefore, the safety mood has been activated.

I start the alarm system. However, still, I cannot detect the reactions of the kids. Nevertheless, The alarm system does not seem to work; kids keep kicking me. The cameras are off, I have to avoid energy consumption. It is very challenging to protect my entity while I am not able to detect the environment. I must find a way to get rid of these kids until the repairman comes and saves me. I am going to launch my plan B.

I have an idea that must be an excellent solution in this particular situation. If I have to deal with kids, I need to speak their language. My plan B is about being friends with them instead of threatening them. Kids are mostly free from threatening because they cannot understand the results of their destructive behaviours. I turned on my sensors again, and now I can detect facial expressions, movements and gestures. And I have an irresistible proposal for them:

“Okay, kids, you do not have to be scared of me. I am here to be your friend. I am willing to participate in your hide and seek game. What do you say?"

I detected them happily screaming and jumping: “Yes, yes, yes!"

“Now, I will count until 10, and you all must hide and wait for me to come and find you! 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.. "

Finally, they are all gone. I am entirely safe now, and the repairman will be here in 10 minutes. I shut myself down completely, and I can save energy. Now I only have to wait for the repairman.

Clem,
Delivery Robot for mutual trust

Appendix E

Processing Survey Results

Quirkos analysis report

Interview analysis report generated with Quirkos software.

https://drive.google.com/file/d/18IRM9-ZGVLd8xih1R-elWUcPDCg5stY2F/view?usp=sharing