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| Disassembly Project |  |
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## **Preface**

This report is about the disassembly project. This project endeavours to enhance the disassembly 1 identification and inspection stages. Previous efforts have primarily refined the sorting system utilizing a robotic arm. However, the current focus is to augment product identification and inspection capabilities. The primary objective is to develop a prototype capable of swiftly and accurately identifying products with minimal training requirements. Before proceeding with the prototype development, it is imperative to conduct comprehensive research on the available technologies and methodologies pertinent to this objective.

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## **Version management**

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## **Summary**

## **Glossary**

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| **Special words** | **Declaration** |
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## **Introduction**

## **The company**

### 2.1 About Fontys Innovation Lab Hight Tech Embedded Systems (HTES)

The HTES research group conducts applied research on systems in which robots and humans work together and use data and knowledge about their environment to act. We look at systems in the following four application areas:

⦁ Smart Industry - digitalisation of the manufacturing industry - data, work processes,

robotics.

⦁ Robotlab (Big Chemistry) - digitisation of chemistry - data, AI, robotics.

⦁ Smart Disassembly - digitalisation of de-assembly in return flows of products.

⦁ Air quality perception (AQE) - air quality perception for the living environment – measuring

with IoT, citizen science.

The research group looks at this from a technical ICT perspective, focusing on the use of modelling to determine and improve the architecture and the way systems are integrated. Research on modelling focuses on creating digital twins. Various technologies are used for this purpose, such as machine learning, Internet of Things, asset administration shell, digital product passport, intelligent agents. They do this with companies that are partnered with Fontys ICT and other innovations labs in the Netherlands.

## **The assignment**

### Context

Smart disassembly is a project running at the HTES research group. Disassembly is about separating products, to get a product decomposed in its parts. It is a phase when remanufacturing, refurbishing or recycling a product.

Problems that arise with disassembly is for example the problem of how every product needs to be disassembled in a different way. A product might be disassembled easily when parts are just clicked together. Sometimes the disassembly is more difficult when parts are glued together, and also when thinking about how to determine and guarantee the status of the product components can be difficult. These problems I had to tackle in my assignment.

### Cause of the assignment

The manufacturing industry faces a pressing challenge: balancing economic growth with environmental responsibility. Our reliance on raw materials and traditional manufacturing processes contributes significantly to greenhouse gas emissions and resource depletion.

This is where the Disassembly Project comes in. By focusing on disassembly as a core strategy, we aim to create a more sustainable future for the Brainport region's manufacturing sector. Disassembly unlocks several key benefits:

* Reduced reliance on critical raw materials:   
  By efficiently disassembling products, we can reuse valuable components, lessening the demand for raw materials. This helps conserve finite resources and protects the environment.
* Lower carbon footprint:   
  Manufacturing from scratch is energy-intensive. Disassembly allows for remanufacturing, refurbishing, and recycling, all of which require less energy compared to traditional production methods. This translates to a significant reduction in greenhouse gas emissions.
* Improved resource management:   
  Disassembly promotes a circular economy, where products have a longer lifespan and resources are kept in use for as long as possible. This minimizes waste generation and promotes responsible resource management.

The HTES research group recognized that companies need practical tools to imrpove the disassembly process. The Disassembly Project, with its focus on creating a more automatic disassembly line, will provide manufacturers with the knowledge and resources required to achieve a more sustainable production model.

### Goals of the assignement

The project endeavours to enhance the disassembly program by advancing the classification, identification and inspection stages (circled in figure…. ).Afbeelding met tekst, schermopname, Lettertype, Rechthoek

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Me and the company mentor set the following goals:

1. Find and test time and resource efficient ways to identify products.
2. Find and test efficient ways to inspect a product.
3. Make a demo to show my findings.

### Realisation

### Planning of the assigntment

For the

## **The research**

### Research questions

### Realisation and results of the research

## **The product**

### The previous product

### Designs

### Realisation

### Finalproduct

## **Conclusion and recomondations**

## **Evaluation**

## **References**

## **Attatchment 1:**