

# Visualization of Production Quality and Status

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## 1 Introduction

Maillefer Extrusion develops industrial machinery for producing power cables and fiber optics. We have recently launched a measurement device that scans product surfaces for defects, using neural networks to analyze the measurements. In order to provide best customer value and experience, we need to communicate the results and findings of this device in most efficient way. In short, offer user friendly approach to visualize data, measured metrics and quality of produced cable products.

This project present an opportunity to acquire real life experience on how IT solutions are utilized in industrial production environment.

## 2 Project Goal

The goal is to create a software system for visualizing data from power cable manufacturing lines. The software will be used for top level process monitoring and product quality tracking.

The system should support multiple different data sources and data hierarchies. E.g., there can be multiple factories, each of them equipped with one or several production lines. This is illustrated in Figure 1.

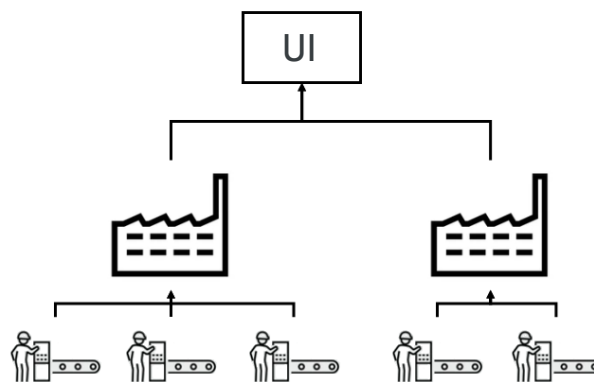


Figure 1. Example of data flow from source to visualization UI.

The data visualization tool should allow inspection of data from one production line at a time, or presenting data combined from multiple production lines or factories at once.

The system ideally supports dynamic queries for detailed inspection of derived metrics of selected time ranges. E.g., the user can select which data sources (production lines) to use, what is the time range for selecting data, and what kind of values or graphs is to be calculated and presented.

Example of various datatypes can be seen below in Figure 2.

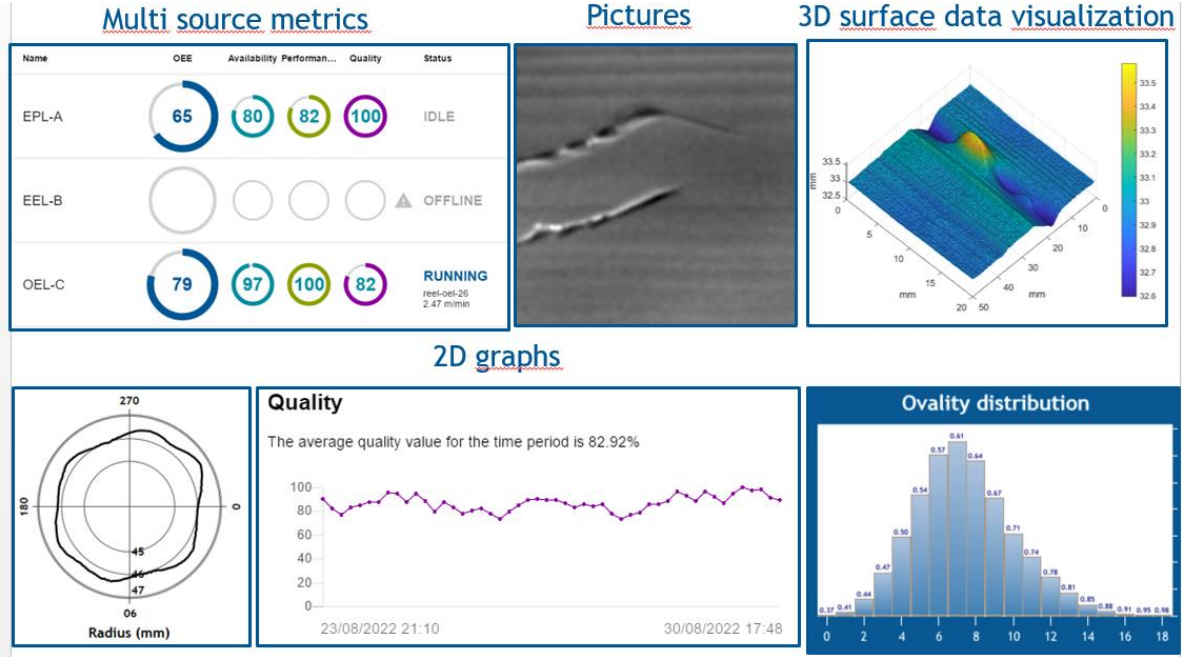


Figure 2. Examples of various datatypes and their visualization.

### 3 Technologies

We suggest developing a web-based solution usable with a standard browser. We recommend building the software on top of a stable stack like [ELK](#), or using another data science toolset with support for rich data visualization.

We propose development and deployment of the system on a cloud platform (E.g., Azure). The databases with process data will be provided by Maillefer in a suitable format for developing the system.

### 4 Requirements for the Students

Willingness to learn the project domain and new technologies is the primary requirements for this project. The resulting tools are intended for further development, so a quality-oriented software craftsmanship mindset is highly appreciated.

We expect the team to follow course instructions for applying Scrum to the development process, as well as established best practices of software development, such as using Git for version control,

implementing standards for code quality, peer reviewing all deliverables etc. A member of our team has acted as a coach on this course for several years and can offer tips on what practices dev teams have found valuable.

## 5 Legal Issues

### Intellectual Property Rights (IPR)

The resulting intellectual property rights to all the results will belong to the client.

### Non-disclosure Agreement (NDA)

Signing the NDA included in the Aalto contract is required. This is mostly for convenience: to be able to work at the client's premises and handle the client's real industrial data.

## 6 Client

### Short Introduction

Maillefer Extrusion is a Finnish-Swiss engineering company with main offices at Vantaa employing 400 people. Internationally we have second site in Lausanne, Switzerland, and branch offices and representatives in 8 countries. Maillefer has a decades long tradition of developing specialist software for the field, for example analysis and simulation tools.

### What do we offer?

We hope to arrange a social kickoff event with food and drinks at our offices in Vantaa, so everyone gets to know each other. During the project, all sprint meetings and demos can be held at our offices. Working space can also be arranged for other co-located working sessions if the team wants to work on the premises.

### Who are we?

The development team will work with our R&D team, many of whom are Aalto University alumni from various fields, mechanical & chemical engineering, automation and computer science.

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## 7 Additional Information

There exists a possibility of continuing to work with this and similar projects after the course under internships or junior developer positions.