



## Optimizing Manufacturing Processes through Artificial Intelligence and Virtualization

OPTIMAI aims to create a new European industry ecosystem focused on innovative solutions to optimize production, reduce defects and improve quality to safeguard European industry for generations to come



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OPTIMAI Project



OPTIMAI H2020

### OPTIMAI PROJECT PARTNERS



## OPTIMAI A QUICK EXPLAINER

### Quality Control Sensors

The following types of sensors control the quality of the manufacturing process and detect defects along the way:

- 3D scanning sensors
- Machine vision cameras
- Vibration sensors
- Energy consumption sensors
- Air quality sensors

### AR glasses

The OPTIMAI AR glasses are used for data visualisation and decision-making support. They provide real-time assistance on the production line and facilitate defect detection and reconfiguration of the system on-the-fly. A sleek UI and intuitive gestures allow operators to easily interact with the AR glasses, maintaining their focus on the job

### Intelligent Marketplace

The intelligent marketplace for scrap re-use and AI sharing is one of OPTIMAI's key innovations for industry. The intelligent marketplace indexes defective parts to allow for them to be repurposed and traded across industries. The marketplace also supports the sharing of AI algorithms to enable third parties to use the AI models for defect detection and prediction.

### Blockchain

Blockchain provides a decentralised solution for real-time validity and traceability. OPTIMAI employs permissioned Ethereum blockchain with the Proof-of-Authority (PoA) consensus mechanism. Data including sensor measurements is sent by sensors and stored in the blockchain using smart contracts. Blockchain also enables the immutable record of AI system choices and activities, resulting in more trustworthy AI.

### Middleware

The OPTIMAI middleware forwards data to the blockchain. The middleware orchestrates the data collection to ensure time-stamping and data registration.

### AI Framework

Cloud-based, AI-driven solutions such as:

#### Digital twins

Enabling the virtualisation of manufacturing systems along with AI-powered simulation of the production process, using Visual Components 4.0 software.

#### Smart Quality Control

Driving optimization of the production through AI-driven defect detection and prediction services and production monitoring and quality control services.

#### (Re)configuration service

Intelligent orchestration of manual and automated production equipment (re)configuration.

### End-Users

**Televes**

**KLEEMANN**

**MICROCHIP**

### The OPTIMAI Pilots

The OPTIMAI Pilot studies play a key role in demonstrating how European Manufacturing processes can be optimised through the use of AI and digital twinning technology. The pilots form the cornerstone of the empirical work of the project.

To maximise the impact of OPTIMAI on European industry, the project

team is developing solutions that can be applied to a wide range of industrial settings. These solutions are tested and validated in three selected pilots that cover a number of industrial domains:

- **Kleemann:** Manufacturing of lifts (Greece)
- **Televes:** Manufacturing of antennas (Spain)
- **Microchip Technology Caldicot Ltd:** Assembly of microelectronics (UK)

### Technical enquiries:

Dr Nikolaos Dimitriou, CERTH / ITI,  
OPTIMAI Project Coordinator - email: nikdim@iti.gr

### Media enquiries:

Carr Communications  
email: linda@carrcommunications.ie

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