OPTIMAI Progress Achieved

4ZDM Cluster Workshop
Dr. Nikolaos Dimitriou

08/07/21

OPTIMAI

Presentation outline

OPTIMAI Overview

Project Identity Card & Consortium

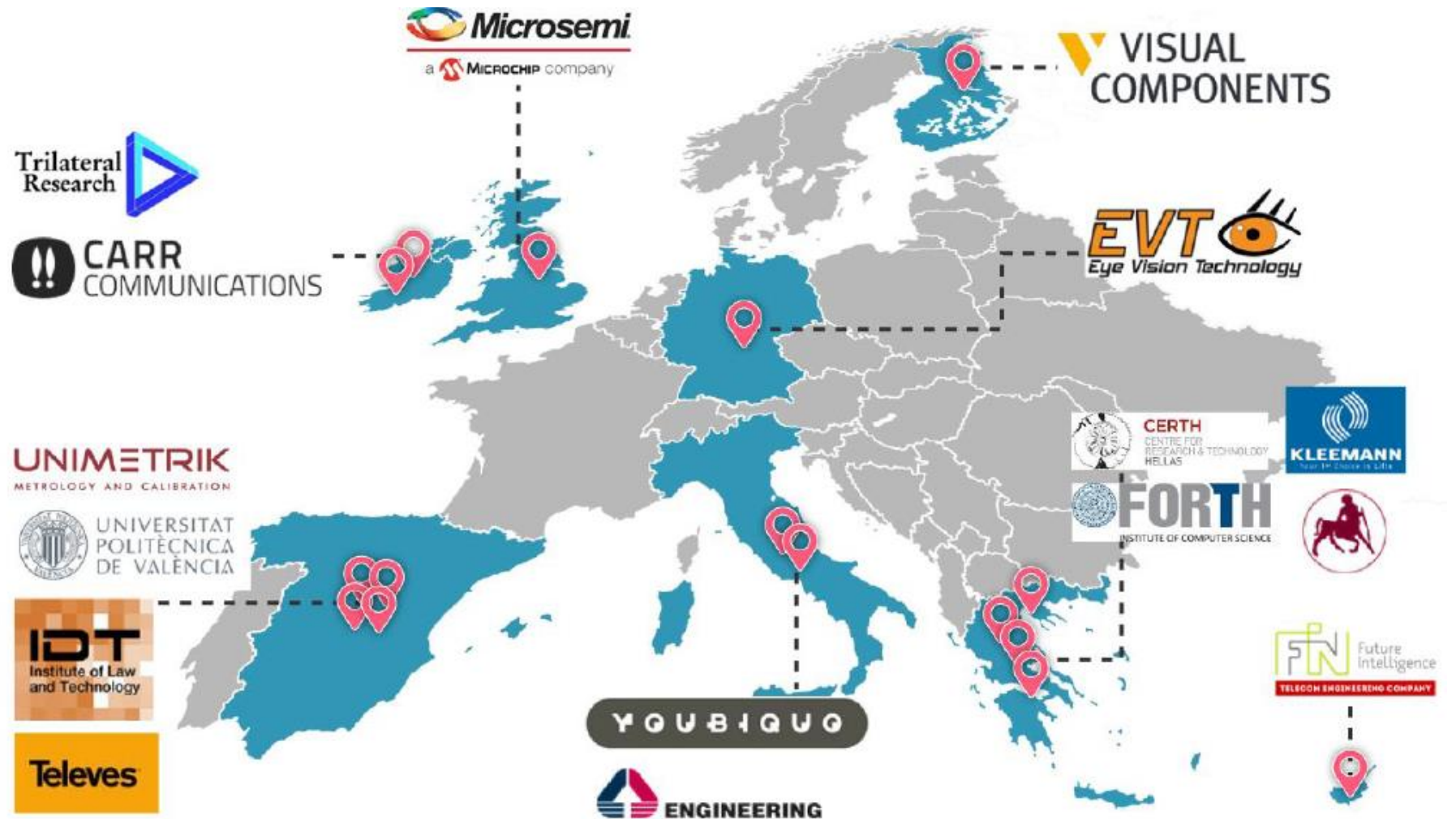# OPTIMAI Project Identity Card

Title: Optimizing Manufacturing Processes through Artificial Intelligence and Virtualization

Grant Number	**958264**
H2020 Call	H2020-NMBP-TR-IND-2020-singlestage
Duration	36 Months
Starting Date	**1 January 2021**
EU contribution	**€ 8.359.087,50**
Countries	Greece, Cyprus, Germany, Finland, Italy, Spain, Ireland, United Kingdom

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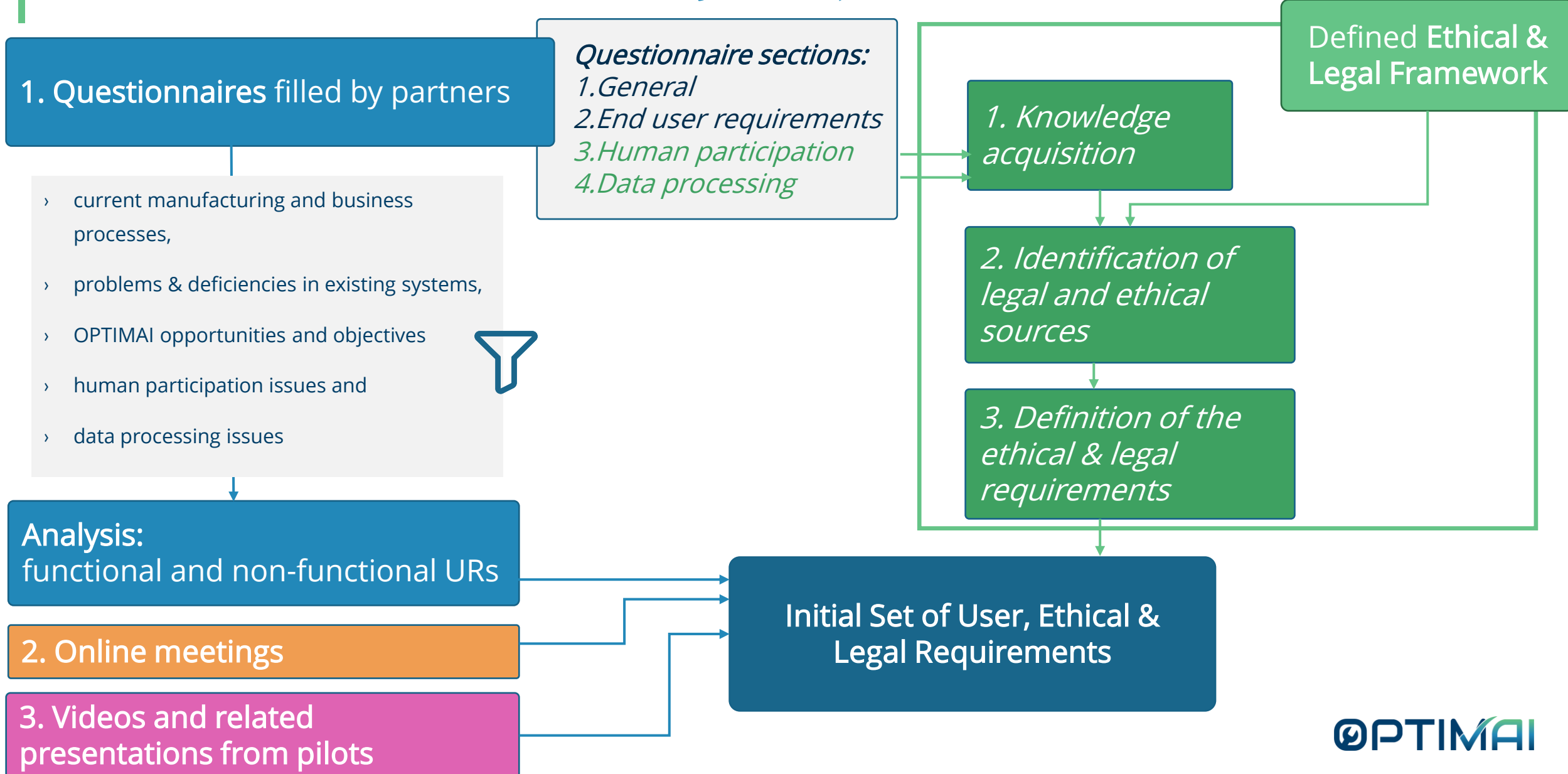
The Consortium

- 16 Partners
- 8 European Countries

Consolidating User, Ethics & Legal Requirements

Elicitation & Results

Elicitation of User Ethics & Legal Requirements

1. Questionnaires filled by partners

> current manufacturing and business processes,
>
> problems & deficiencies in existing systems,
>
> OPTIMAI opportunities and objectives
>
> human participation issues and
>
> data processing issues

Questionnaire sections:
1. *General*
2. *End user requirements*
3. *Human participation*
4. *Data processing*

Defined **Ethical & Legal Framework**

1. Knowledge acquisition

2. Identification of legal and ethical sources

3. Definition of the ethical & legal requirements

Analysis:
functional and non-functional URs

2. Online meetings

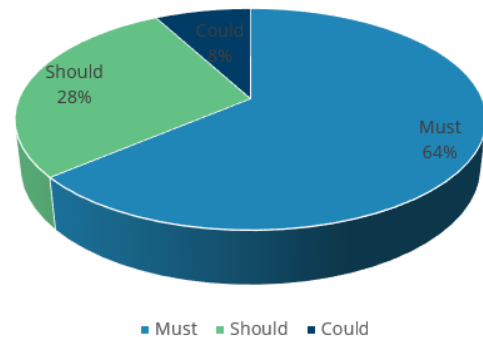**3. Videos and related presentations from pilots**

Initial Set of User, Ethical & Legal Requirements

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Results: OPTIMAI User Ethics & Legal Requirements

› Initial set of requirements

› Elicitation of requirements is an ongoing process

Requirement by category		Count
User requirements	Questionnaire User Requirements	14
	Pilots' videos User Requirements	33
Functional Requirements	Functional Requirements	15
Non-Functional Requirements	Key Performance Indicators	18
	Legal requirements	10
	Ethical Requirements	24
	Technological Innovation Potential	13
	Total	**127**

Requirements by priority

■ Must ■ Should ■ Could

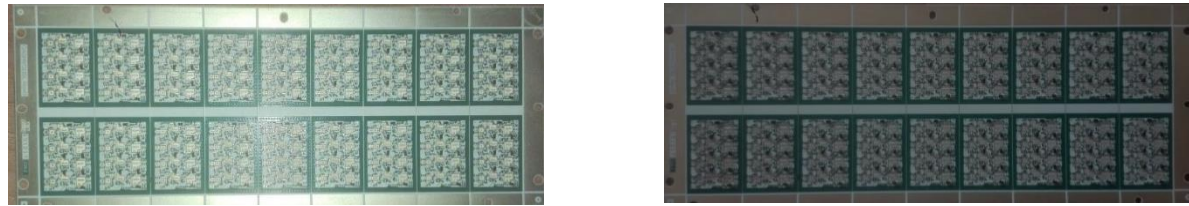# ZDM Technologies

Ongoing Research
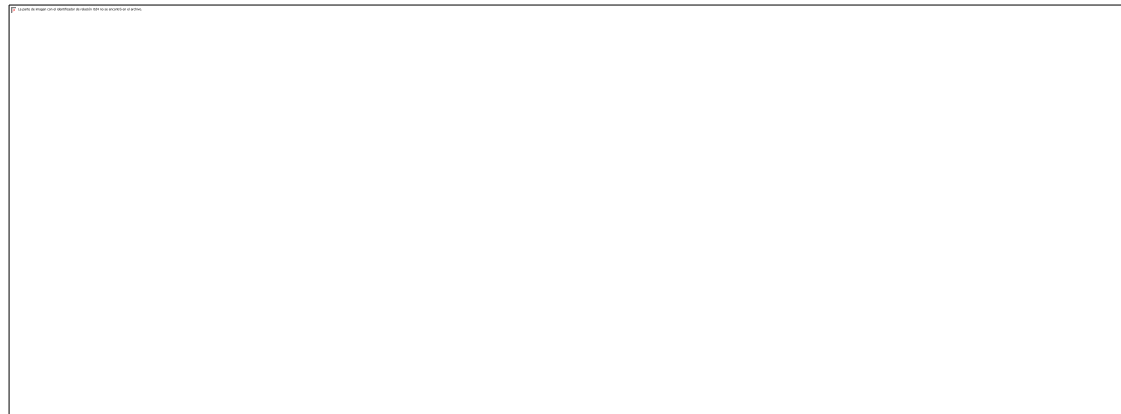
Optimizing Illumination Conditions for ZDM

› Controlling illumination in industrial vision is crucial for defect detection

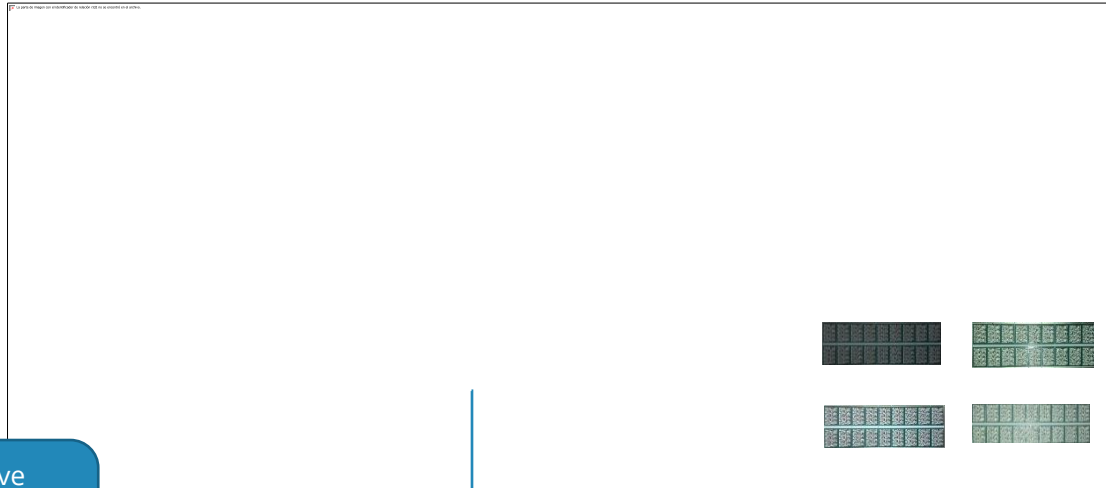 › Excessive or insufficient light decreases image quality

› The acquisition software comprises an image acquisition unit and an illumination unit
› The image acquisition unit collects 2D data from industrial cameras
› The illumination unit controls the illumination conditions during acquisition
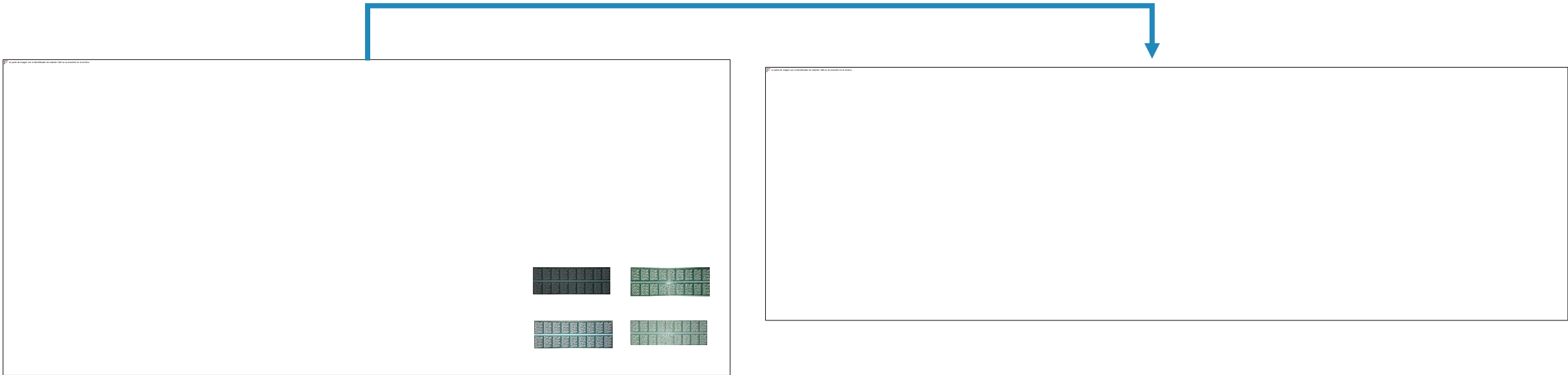
Optimizing Illumination Conditions for ZDM

› Deep Reinforcement Learning agent receives images with varying illumination levels from the inspection environment

› Illumination conditions are dynamically adjusted based on goal-oriented reward criteria in order to

    › Increase image quality (e.g. decrease saturation, control)

    › Increase defect detection performance

- Adjust illumination to Improve image quality
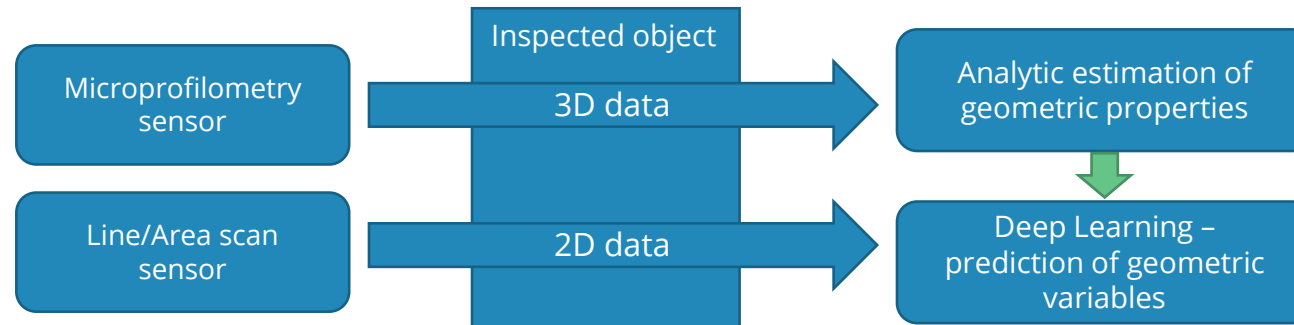- Adjust illumination to improve defect detection performance

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Optimizing Illumination Conditions for ZDM

› DRL agent learns to adjust illumination levels from visual input

› DRL agent uses a CNN (Convolutional Neural Network) to map the visual input to the correct actions on the illumination unit

Replacing lab sensors with in-line sensors

› Microprofilometry sensor scans the inspected object with high resolution 3D scans

› Geometric variables (e.g. volume) are estimated using 3D data

› 2D data from industrial Area/Line scan sensors are collected

› Deep Learning network learns to predict the geometric variables of the inspected object from 2D data

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Dissemination & Communication

Progress and ongoing work

OPTIMAI Website: optimai.eu

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ABOUT   OPTIMAI PARTNERS   NEWS & EVENTS   CONTACT

WELCOME TO THE
OPTIMAI PROJECT

ABOUT OPTIMAI

Industry is a crucial pillar of the European economy, accounting for 80% of EU exports and
industry has a long tradition in innovative, high-quality manufacturing but expanding globa
markets in China and elsewhere, posing a major challenge for European industry.

Against this backdrop, the
production, reduce defec

The outcomes of the OPT
unmatched potential for

OPTIMAI will see the deve
domains and developing

NEWSLETTER SIGNUP

To keep up-to-date with the latest developments on the OPTIMAI project,
sign up for our newsletter using the form provided here.

You can always unsubscribe at a later time if you change your mind. A link
to do so will be provided in each issue of the newsletter.

A note on your privacy and GDPR compliance

We use the newsletter management service MailChimp to store your name
and email address and to send out newsletters. Your data will not be used

First Name *

E.g. John

Last Name *

E.g. Doe

Email Address *

PROJECT PARTNERS

CERTH CENTRE FOR RESEARCH & TECHNOLOGY HELLAS · Televes · CARR COMMUNICATIONS · YOUBIQUO · VISUAL COMPONENTS · UNIVERSITAT POLITÈCNICA DE VALÈNCIA · UNIMETRIK METROLOGY AND CALIBRATION · UAB Universitat Autònoma de Barcelona

TRILATERAL RESEARCH · MICROCHIP · KLEEMANN · ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΙΑΣ · FORTH · Future Intelligence TELECOM ENGINEERING COMPANY · EVT · ENGINEERING

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OPTIMAI dissemination resources (guidelines, templates)

OPTIMAI Website and social media channels

Project website

https://optimai.eu/

The nucleus of online dissemination

The central virtual hub of information during the project and for 5 years after its lifetime

Twitter

@OPTIMAI_Project

https://twitter.com/OPTIMAI_Project

A real-time conversation hub, platform for awareness raising, dissemination, building relationships

LinkedIn

OPTIMAI Project

https://www.linkedin.com/company/optimai-project/

A platform for awareness raising, stakeholder engagement, dissemination

YouTube

OPTIMAI H2020

https://www.youtube.com/channel/UCgn6kut1if7_mAsDbSR0xMw

A platform for audio-visual highlights

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OPTIMAI Upcoming dissemination activities

› Stay tuned for the following:
- ✓ Public deliverables on website
- ✓ Project leaflet, poster and infographic
- ✓ Newsletter – subscribe to it here: https://optimai.eu/
- ✓ First project video
- ✓ Press release
- ✓ Conference presentations
- ✓ Open-access journal publications
- ✓ Networking and clustering activities

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Thank you

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