ARTiCo

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AR in Tissue Converting

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23/03/2022 – PerCom 2022

Consiglio Nazionale delle Ricerche

ISTITUTO DI SCIENZA E TECNOLOGIE DELL'INFORMAZIONE "A. FAEDO"

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Signals & Images Laboratory

Introduction

- Tissue converting lines: <u>from paper tissue to paper roll</u> for domestic and sanitary usage

- Productivity and efficiency issues

  - Advanced automation

- Innovations based on ICT solutions:

  - Advanced <u>computer vision</u> and <u>video analytics</u> methods

- Augmented Reality interfaces developed to support converting <u>line monitoring and maintenance</u>
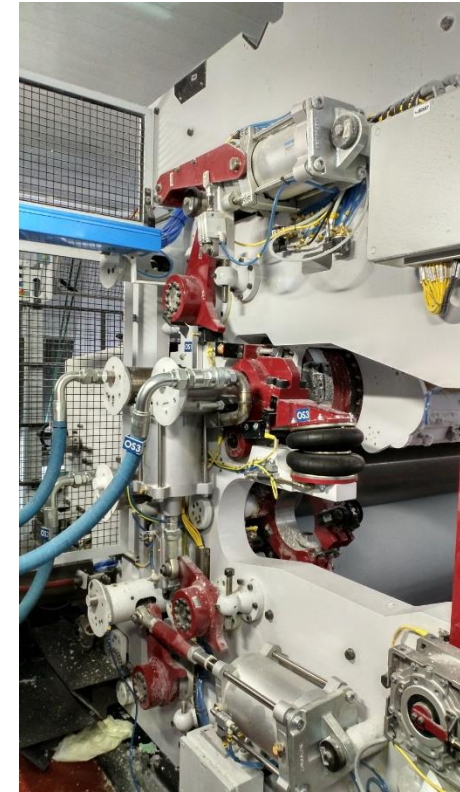
Introduction

- **10k+ components**
  - Ordinary and extraordinary maintenance
  - High-level skills required

- AR technologies to support the operator and the remote assistance center

Devices & Frameworks

- Many devices useful for <u>Augmented Reality activities</u>:

  - Smartphones, tablets, smart glasses

- See-through smart glasses: Microsoft Hololens 2, Epson Moverio

Object & Scene Tracking
Recognize, track, and augment objects, rooms, and scenes.
Learn more →

Instant Tracking
Detect, track, and augment surfaces, no marker needed.
Learn more →

Image Tracking
Recognize, track, and augment 2D images.
Learn more →

Geo AR
Create geo markers to augment geographical points of interest.
Learn more →

Multiple Image Targets
Augment multiple images simultaneously and interactively.
Learn more →

Extended Tracking
AR experience continues beyond the recognized target.
Learn more →

Cloud Recognition
Cloud-based image target storage for large-scale AR projects.
Learn more →

3D Augmentations
Load, optimize and render 3D models in the AR scene.
Learn more →

<u>WIKITUDE</u>

- Extended tracking through SLAM technology
- Available for Android, iOS and Windows
- Optimized for some smart glass models
- Wikitude Studio: simplified development procedures
- Commercial solution, with a full trial version available

- Scene recognition – not present in the other SDKs

Scene design and app functionalities

- The <u>AR scene</u> is built from pictures acquired by a smartphone, via Wikitude Studio

- From the pictures, a point cloud of the scene is generated

- Once the point cloud is generated, the user can place AR objects directly on it
  - Types of AR content: <u>images</u>, <u>videos</u>, <u>3D objects</u>, <u>labels</u>, <u>buttons</u>

- Then, the AR scene created can be downloaded and integrated in a mobile application for the remote data recovery

- The AR contents can be <u>edited</u> for monitor and maintenance:
  - Labels can report real-time data
  - Interactive buttons can retrieve documents or maintenance assistance videos
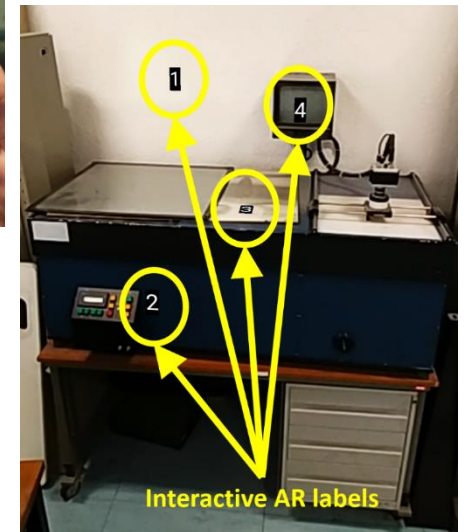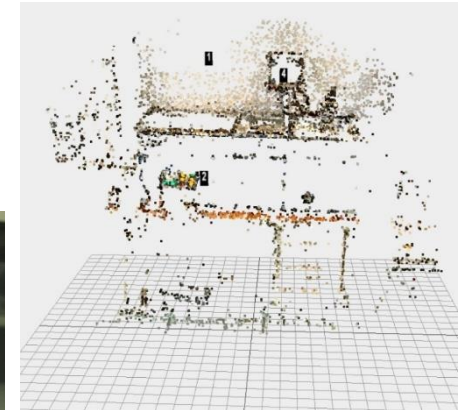
Controlled lab environment

- Two main components:
  - <u>Recognize the target</u> (Wikitude)
  - <u>Retrieve remote data</u> (i.e. Android)
- A tool for recognizing features of target objects and providing a set of AR content:
  - Interactive label
  - Multimedia files (videos, images, documents);
  - Real-time data
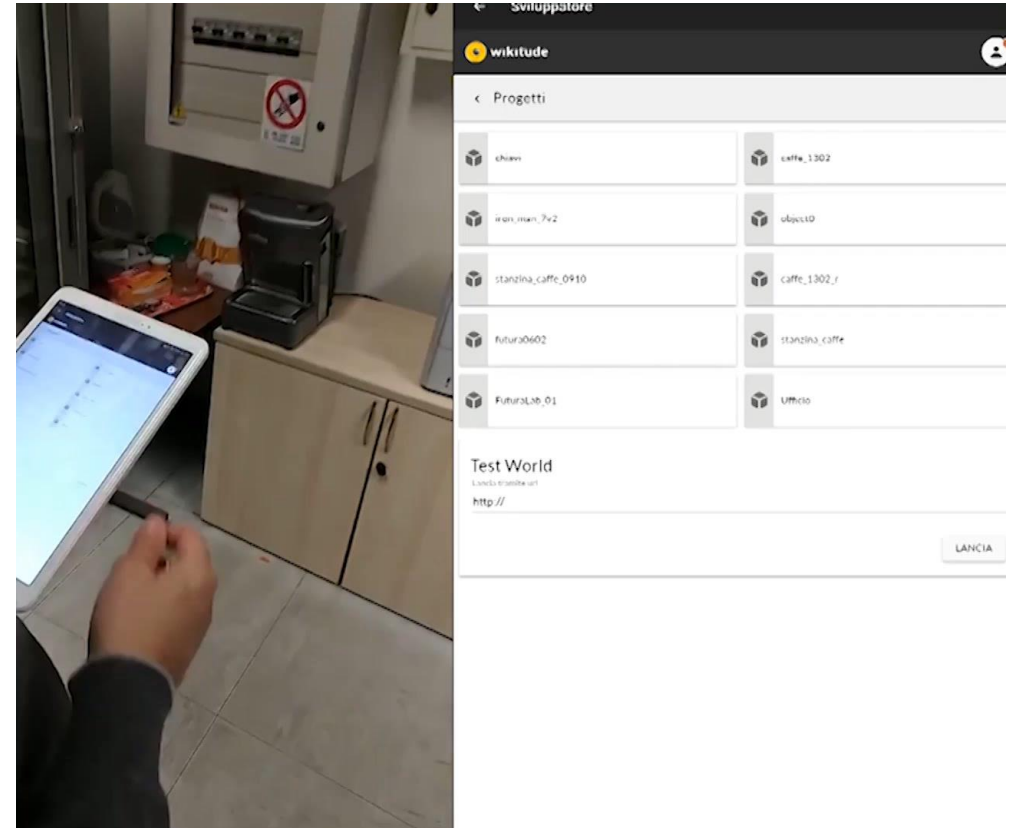
The factory scenario

- Three main macro-categories of intervention:
  - <u>Monitoring line parameters</u> and live view of the cameras
  - <u>Ordinary maintenance</u> with documentation and video access
  - <u>Troubleshooting</u>

- Real-time access to the machine parameters

- Monitoring performances

- Data can only be obtained through the PLC
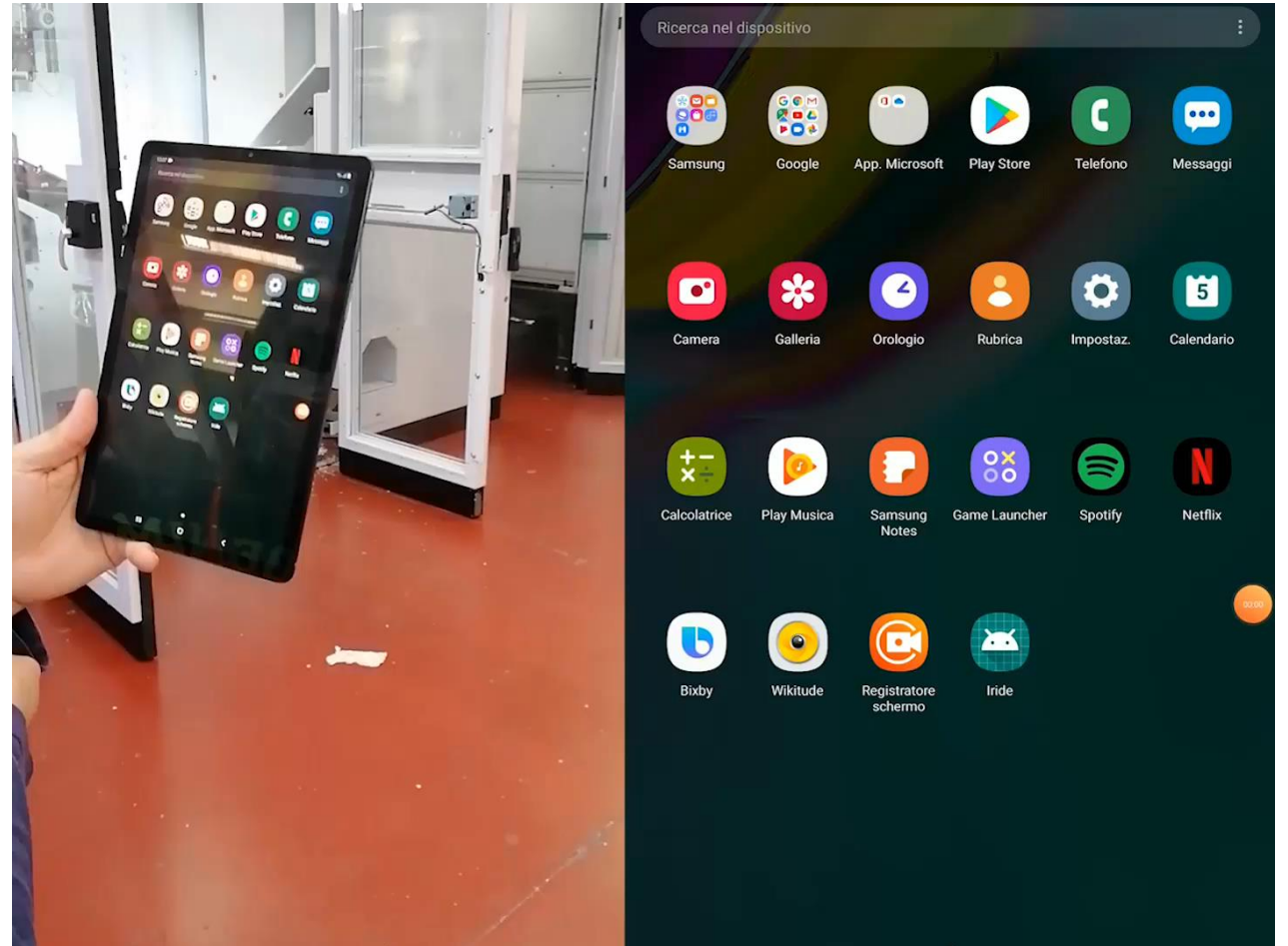
Conclusions and future releases

- A software prototype to perform scene recognition in an Augmented Reality system, to support the maintenance and control of a <u>tissue converting factory line</u>

- Extended implementation in the real factory environment

➢ Predictive maintenance through:

- ➢ <u>Big Data analysis</u> integration
- ➢ <u>Machine vision</u> for live monitoring of the production process

➢ Proactive system for troubleshooting

➢ Smart glasses integration