3D-Reconstruction and Localisation
Providing Location Sensitive Support to workers on the factory shop floor

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Pro2Future

MOTIVATION & GOALS

Provide **cognitive intelligence just in time and space for human**:
- **Digitalisation** of analog production areas
- **Localisation** of Worker (Self) on Shop Floor
- Semantic annotation of work area
- Process and workflow-sensitive, embedded, accompanied assistance
- Multi-modal, direct, unobtrusive user feedback
- Battery powered AI-wireless devices
- Providing Worker Path Tracing
- Enabling Work Space Optimisation

APPROACH

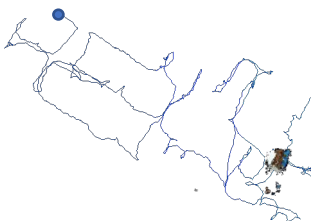Using **Structure from Motion** Principles
- Generate Features in Camera Frames
- Find Correspondence between Frames
- Remove Local Outliners
- Compute Trajectories to Reconstruction Camera Motion and 3D Environment

and further optimizations in our **Embedded SLAM AI Algorithm** in our **Cognitive Headgear** we trace enable workers to trace themselves on the factory shop floor

Localisation
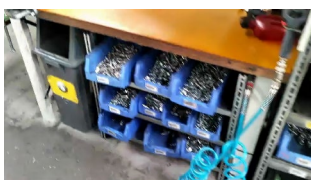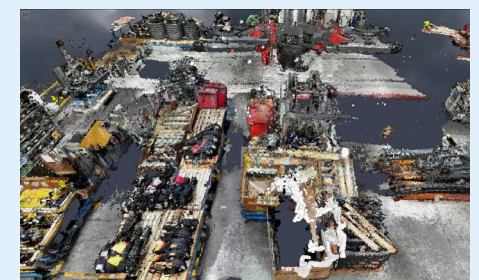

Current Camera Frame

2D Top Down Path on
Factory Floor

3D Path in on the fly created 3D-Model
On Shop Floor

Project FactBox

Project Name Guide/3D-Recon
Project ID DP1.2/MFP1.2-2
Duration 39 Months

Area 1
Perception and Aware Systems

Project Lead
Prof. Dr. Alois Ferscha

Cognitive Headgear

Head-mounted, cognitive assisting unit driven by NVIDIA Jetson TX2 embedding multimodal feedback and sensor data:
- Peripheral led stripes for minimal obtrusion
- 8 vibration motors evenly distributed around the head for haptic feedback
- Intel RealSense D435 RGB-D depth camera with 77° FOV
- High-speed mobile eyetracker @200 Hz

Embedded SLAM AI
RGB-D Depth Camera
FOV Camera
Mobile Eyetracker
Visual-Inertial Tracker
Vibro tactile cord
LED Stripes
Peripheral acrylic glass display

Reconstructed 3D-Model of Factory
Used for Localisation

RSA FG Research Studios Austria Forschungsgesellschaft
WACKER NEUSON all it takes!

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