PRESS RELEASE

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For immediate release

Rossini's recent advances in the perception layer for collaborative robot control

Fig 1. Depth

The *Rossini* project aims to develop a collaborative robot platform, with human safety and work quality as a priority. Making it possible for robots to work in proximity with human operators in overlapping space requires solving and guaranteeing a lot of safety measures.

Traditionally, industrial robots must be confined in restricted areas away from humans, in order to avoid contact and accidents. Project partner IRIS, an advanced engineering & technology SME, specifically focuses on the "perception layer" of the platform, which receives a data stream from a diversity of different sensor types (the "sensor layer"), and from this data identifies where the key objects are (humans, robot, products and components being assembled) and what they are doing.

This requires a diversity of data processing techniques, such as deep learning for object recognition and labelling, data fusion, skeletonization of the human form and defining capsules around the human parts, as well as the robot components. All of this must be done in real time at about 30 frames per second. As an integrated platform, it embodies state of the art SLAM technology like that being used in the automobile industry for the future generation of self-driving vehicles.

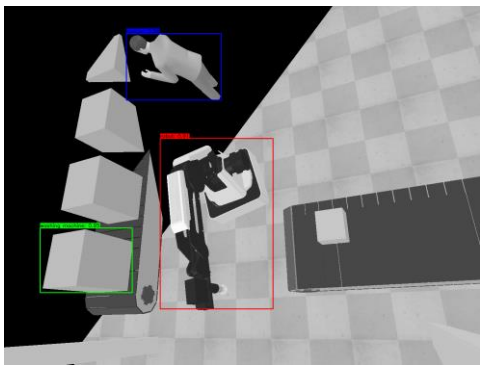

Fig 2. Convolution Neural Network identifies the key objects and labels them

The following figures show the current software simulation of the human-robot work area for one of the use cases being implemented in the project. The data processing software is "ROS" enabled so that it can be switched from the simulation to the real sensors when they go online. In the processing, each human is recognised and skeletonized in real time. The robot picks up counterweights from the bin and takes them to the human operator in front of the washing machine assembly line. The "perception layer" of the Rossini platform passes the key situation awareness

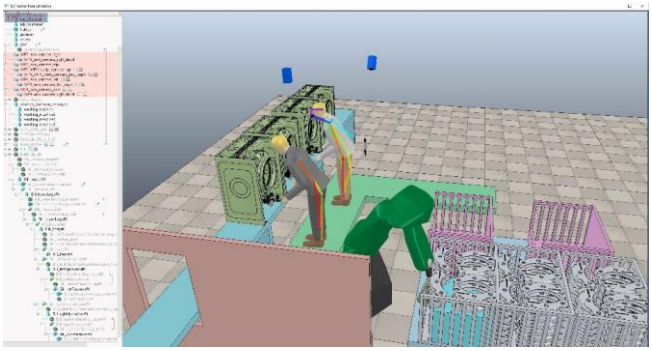

Fig 3. Video Simulation is post processed to define skeletons (1)

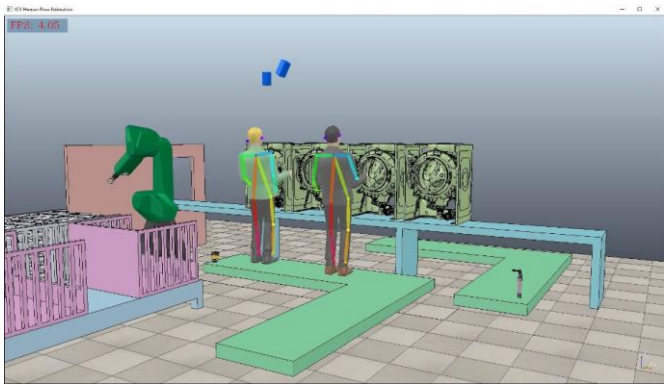

Fig 4. Video Simulation is post processed to define skeletons (2)

information up to the next layer of the platform (the "cognitive layer") which is responsible for deciding what to do (revise action list) based on the situation.

For example, the robot could pick up the weight and describe its habitual trajectory to move it to the human operator who should be in front of the washing machine.

However, if the human for some reason is not there, or is much closer to the robot than expected, the system must detect this and re-plan the robot's actions – for example, taking a different movement trajectory to avoid colliding with the human, or waiting until the human is in the expected position.

About the project

ROSSINI is a project funded by Horizon2020 EU's research and innovation programme, with an aim to design, develop and demonstrate a modular and scalable platform for the integration of human-centred robotic technologies in industrial production environments.

Project title: RObot enhanced SenSing, INtelligence and actuation to Improve job quality in manufacturing

Project ID: 818087

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Project Duration: 42 months

Project Consortium:

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