PRESS RELEASE
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For immediate release

Rossini's RS4 Vision sensor stereo camera developed by Datalogic

One of the main objectives of the Rossini platform is to address the reduction of possible risk arising from mechanical hazard originated by movements of any part of the robot, during handling operations, by considering crushing, impact, or friction and abrasion as potential consequences.

A possible approach to minimize this risk is the implementation of Speed and Separation Monitoring (SSM), as described in ISO/TS 15066.

Datalogic, Rossini project partner, completed the development of a 3D camera prototype (**RS4 Vision sensor**) that monitors the area where human and robot collaboration occurs, to explore the possibilities of exploiting 3D vision sensor for SSM implementation.

Multiple 3D vision safety sensors can be integrated in the overall system with a safety controller. This will enable the monitoring of the moving objects inside this area, even in the presence of objects that can introduce occlusions.

Since the RS4 Vision sensor will be employed in an environment where collaboration between human and robot occurs, the focus has been centered on the human detection capability and on the latency of the complete image pipeline, in order to reduce the reaction time of the full system.

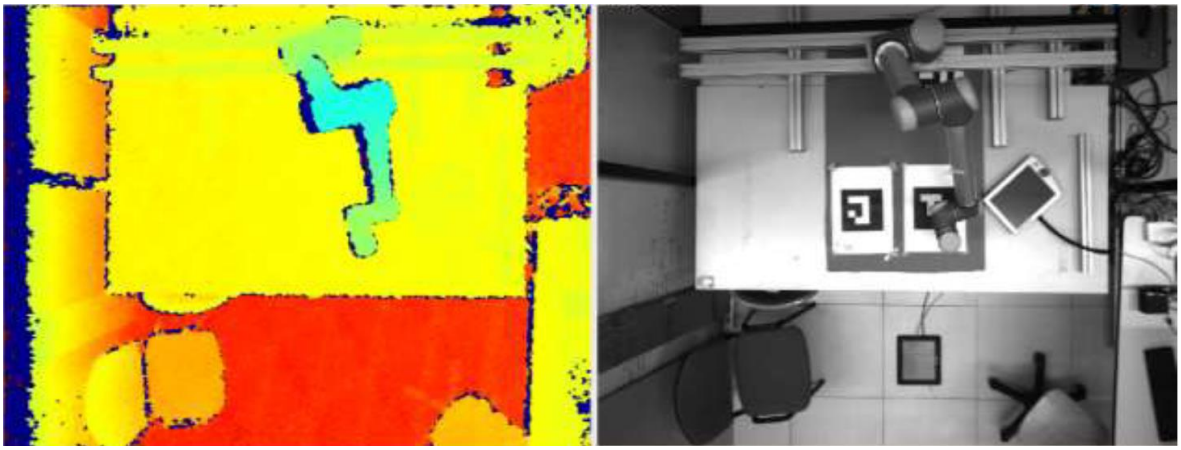

Figure 1: Depth and greyscale images from the RS4 Vision sensor

The main high-level features implemented in the RS4 Vision sensor are:

- **Onboard depth map creation**: typically, the creation of a depth map of the monitored environment is an intensive task in terms of computation. For this reason, this step is performed onboard on the RS4 Vision sensor. In such way, the device in charge of receiving images from the camera will not need to do further processing for retrieving 3D information of the monitored space. This solution will also allow to distribute the processing in multiple devices when more than one camera is used. A depth image acquired from the RS4 Vision sensor is presented in the picture above (on the left).
- **Grayscale image**: the camera can provide not only 3D information, but also a standard grayscale image at a wavelength within the range 400 nm to 1500 nm (visible). This will simplify many tasks such as marker detection and object identification. A greyscale image acquired from the RS4 Vision sensor is presented in the picture above (on the right).

- **High speed industrial communication interface**: a fast communication interface, able to transmit with low latencies the images coming from the camera, is needed. This interface needs also to ensure the distribution of the data to multiple receivers.
- **Synchronized triggering**: multiple cameras connected to a common controller need to be synchronously triggered, in order to be able to fuse the retrieved images related to the same exact instant.

Two different camera models have been developed, in order to address several issues expected in the Rossini Use Cases.

The first one has a short distance range but it can reach a detection capability up to the human arm on a reduced volume. This will be used in scenarios in which high detection capability needs to be ensured in a limited volume, where a close interaction between the human and the robot is expected. The Schindler use case can be an example, in which the human needs to work side by side with the robot.

The second one can detect the human body at a long distance range, covering a larger volume of the working area. These characteristics make it more fitting for scenarios, like parts of the Whirlpool use case, in which the primary focus is to monitor a large space to detect if a human is present in a forbidden zone. In the IMA use case, the need of monitoring a large zone is also required, since two robots are installed on a mobile platform instead of a fixed position. In this case the need of ensuring a wide coverage is mandatory, so multiple body cameras not completely overlapped could be employed.

About the project

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

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

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Project Consortium:

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