USBV-Inspektor

Motivation

Suitcases, bags or backpacks left lying around unsupervised are part of daily life. Even most abandoned luggage items turn out to be harmless, they can be the cause for a large-scale police operation. The objective of the USBV-Inspektor project is to develop a sensor-suite, which can be mounted on the end effector of a remotely operated robot to enable local forces to inspect suspicious objects without placing themselves in danger. The operator remotely controls the robot from a save distance to get a 3D visualization of the environment. Furthermore, the data of the sensor-suite can be used to preserve evidence for criminal proceedings and to facilitate threat assessment of suspicious items by providing additional 3D information of the crime scene and the content of the object.

Challenges & Highlights

The sensor-suite consists of a millimetre wave scanner, a 3D rangescanner and a high-resolution camera system. All these devices are included in the case of the sensor-suite and mounted on a remote controlled robot platform. Current techniques are limited to two-dimensional information of cameras and X-ray devices. The new sensor-suite captures the three-dimensional content of the improvised explosive devices and makes it possible to visualize the spatial relationship of identified parts. The three-dimensional environment is perceived with reference to the sensor-suite to help the operator to navigate remotely. All data will be transmitted to a control station and visualized for disarming and legal evaluation. Besides processing each sensor individually, all sensors have to be externally calibrated and synchronized to get a merged interpretation of the data.

Potential Applications & Future Issues

The presented approach can be used to support the local action force and preserve evidence for criminal proceedings. Based on the data generated by the sensor-suite, the rescue forces are enabled to assess the risk level faster compared to the data generated by conventional solutions. The solution results in a compact approach, enabling the examination of less accessible items. In contrast to existing approaches, the resulting 3D model includes the inside of the model and is not limited to the outside of the suspicious object.

Responsible:

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Project abstract:

As part of the USBV-Inspektor project, L3S develops a multimodal sensor-suite together with the North Rhine-Westphalia State Office of Criminal Investigation, Fraunhofer FHR, ELP GmbH and Hentschel System GmbH. This sensor-suite consists of a millimetre wave scanner, a 3D rangescanner and a high-resolution camera. The system perceives the internal and external geometry and generates high definition images of suspicious objects to support the local action force and collect additional
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Project manager:
Prof. Dr.-Ing. Bernardo Wagner

Project duration:
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Project research areas:
Robotic, 3D Perception, Forensic

Project type:
BMBF

Research Area:
Next Generation Internet

Status of the Project:

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1

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1