Dependable Person Detection

Our Dependable person detection algorithms Help to enable humans and robots to work safely together in cobot scenarios Who want to collaborate, without the need to physically separate humans and robots By reliably identifying objects and humans even if they are partially covered or have unusual body postures at runtime And unlike current person detection methods we combine different methods to enhance the safety of human workers and increase production performance.

Problem / Challenges
Robots have been an indispensable part of our industry for decades. They help in industrial assembly, as driverless transport systems in logistics and generally in manufacturing. But high safety requirements often keep robots and humans physically separate, so currently robot systems are usually fenced in production. Protective fences and doors as well as light barriers ensure the safety of human workers, but also limit the efficiency of systems. But this is to change in the future, such that it would be possible to have collaborative robots with a reliable person detection system based on AI that can work with humans directly in the same workspace, for example in manufacturing industry. While AI algorithms already achieve great accuracy in the detection of persons, in certain situations their performance degrades or fails completely, e.g., due to occlusion of a person or unusual body postures. Furthermore, while the design and usage of robots underlie strict safety standards, there are no clear regulations for the application of AI algorithms in such an industrial setting yet.

Solution / Results
To ensure a safe integration of AI for person detection in all kinds of situations we offer a variety of solutions. For example, we developed a runtime monitor based on body parts to enhance the person detector. By considering both the holistic person as well as individual body parts, this monitor allows for the detection of humans even in cases of strong occlusions. Additionally, we provide other monitors, which are based on human-interpretable prototypes for better reliability of such AI algorithms. Moreover, we create a systematic safety analysis for such person detectors in production with reasonable guarantees.

Benefit / Offer
- **Enhanced Accuracy:** Minimize detection errors using additional data like body part information, ensuring precise human recognition
- **Optimized Efficiency and Flexibility:** Achieve maximum operational efficiency and adaptability, eliminating unnecessary delays caused by false alarms
- **Increased Safety in Production:** Enhance safety for human workers in production environments, facilitating a smoother and safer collaborative workspace.

USP Fraunhofer IKS
- Adaptive solution in dynamic situations and changing environmental contexts with prototype learning
- Assured person detection for cobot applications via body part detection
- Extend industry safety standards for safe person detection e.g. with functional safety requirements

Anna Guderitz
Business Development Industrial Sensing Systems
+49 89 547088-354
anna.guderitz@iks.fraunhofer.de

Poulami Sinhamahapatra
Industrial Sensing Systems
+49 89 547088-362
poulami.sinhamahapatra@iks.fraunhofer.de