

Referent:

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Thema:

„Implementation and Evaluation of a Tracking-by-Detection Algorithm for a Camera based Monitoring System“

Abstract:

“In this paper, I design, implement, and test a special surveillance camera system based on a combination of classical image processing algorithms. It is considered to be „special“ due to its particular implementation as well as the limitation of its sub-objective which in turn detects and tracks experimental vehicles driving on defined trajectories (Rail) in real time. The system is also able to further analyze the scene and provide additional information such as, estimating the direction of the vehicles, reconstructing the world coordinates of the vehicles through finding the planar holography between the world and sensor plane, and recognizing the status of railroad switches which are parts of a demonstration plant called, germ: “Asynchroner Transport-, Logistik- und Automatisierungsmodus auf der Schiene” (ATLAS). The camera system uses a distributed network of cameras, each of which provides a bird’s-eye view. It then exploits all of the above-mentioned information in order to reach its main-objective which confines oneself in independently detecting potential or inevitable collision caused by malfunction on the ATLAS-level. Consequently, I propose a hybrid method to detect and track ATLAS-vehicles efficiently. To detect the vehicle at the beginning of the video , periodically every n-frame, and in the case where the tracked vehicle has been lost, I use the Histogram Back-Projection approach (HBP), which provide one of the best trade-offs between speed and accuracy compared to its competitors. To track the detected vehicles in real time, a kernelized correlation filter (KCF) is used. Combining these two methods provides high accuracy and speed even on a single CPU-core. The performance of the proposed method has been compared with three different candidate-approaches on a custom dataset. Experimental results show that the proposed hybrid tracker achieves the best performance.”