1

1 Apron terminals at Hamburg Airport
2 Real-time baggage classification from check-in to the aircraft

At Hamburg Airport, PSI Logistics implemented a pilot project for the integration of artificial intelligence (AI) processes into the airport software for the coordinated control of automated baggage handling. The solution increases efficiency and optimizes processes, supports archiving and documentation requirements, and reduces investment costs for recording technology.

2

With artificial intelligence PSI Logistics optimize the automated baggage handling at Hamburg Airport. The software specialist implemented a pilot project in which the solution PSIairport/BHS takes over the higher-level system control. The integration of AI increases efficiency, optimizes processes, supports archiving and documentation requirements and reduces the investment costs for recording technology.

Neural Network for AutoID

When the pandemic subsides and the previous traffic levels are reached again, around 17.5 million passengers per year will use Hamburg Airport for their vacation and business trips. This makes Germany's oldest airport one of the largest airports in the country. The key service and quality features of Hamburg Airport are the reliability, efficiency and security of the handling processes at and behind the 90 check-in counters. In baggage handling, the basis for this is an end-to-end IT infrastructure from PSI Logistics GmbH, Berlin, Germany. The IT systems installed in Hamburg range from check-in at the self-bag-drops or airline counters to loading by the handling service provider GroundSTARS. It includes management, flight information and monitoring systems as well as software for the coordinated control of operational processes: the baggage handling system (PSIairport/BHS), the baggage reconciliation system (PSIairport/BRS), the modern master computer, the "brain" of the baggage system, and the PSIairport/Connection Suite, which handles the distribution of all airline, airport and security communication information. "The airport systems of PSI Logistics support

all interfaces attached to baggage handling systems and control the areas involved in the process," summarizes Angela Lipinski, Project Manager Passenger and Baggage Logistics at Hamburg Airport.

At Hamburg Airport, PSIairport/BHS takes over the superordinate system control as well as the targeted distribution of baggage items and integration of results of the baggage control levels. Together with their sister company PSI FLS Fuzzy Logik & Neuro Systeme GmbH, PSI Logistics has now integrated AI instruments into the functional spectrum of airport systems for baggage handling with a neural network for AutoID, documentation and tracking with surveillance camera systems, CCTV (Closed-Circuit Television).

The conveyor belts of the sorting and conveyor system in Terminals 1 and 2, which are several kilometers long, transport up to 30,000 suitcases per day. On the conveyor and sorting line, 200 high-resolution cameras continuously record the baggage items linked to the flight and passenger data and their barcodes. "The AI application of the PSI software makes it possible to directly process the camera images in real time," says Lipinski. The ultra-HD cameras installed at baggage counters, feeding conveyor belts and baggage handling system track and monitor the transport of each bag. At all reporting points, up to five images from each HD camera are cut out of the video stream through triggers and saved in the database of the sorting master computer. In parallel, automated real-time analysis starts.

For deep learning, such neural networks must be 'fed' with several thousand manually captured images of luggage in different positions and from different perspectives in conventional methods. Based on computer graphics algorithms, PSI Logistics has continuously developed this system. The system now recognizes all types of baggage – including their individual characteristics – fully automatically, without phases of training and without creating separate labels. With the expansion to automated, autonomous learning of the system, not only the lead time for the commissioning of such systems has been significantly reduced. CCTV is also associated with performance increases by a factor of 10 and process quality improvements by more than a factor of 10. Result: Investments in additional scanner technology can be eliminated, the error rate falls, resources for rework, which in conventional processes at airports affect up to 10% of the baggage volume, are no longer required, and the service level increases. In addition, baggage handling and the condition of the suitcases can be seamlessly documented and archived.

Terminal 2 at Hamburg Airport

PHOTOS: Hamburg Airport/Oliver Sorg/PSI Logistics

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