

Scanning the wagon number with the smartphone



App zedas®cargo Train Check

Content Partner: ZEDAS GmbH

ZEDAS offers proven standard products for the planning, operation and invoicing of rail freight transport (zedas®cargo) and the asset management of rail vehicles and railway facilities (zedas®asset).

The advantages of AI-assisted train dispatching

Everyone is talking about artificial intelligence (AI) as a technology of the future. On the basis of self-learning algorithms, useful tools can also be created in rail freight transport.

Despite the advancing digitalisation of rail freight transport, many processes still require a great deal of manual input. This is where a new software function supported by artificial intelligence comes in, with the aim of simplifying and accelerating complex selection and entry processes.

ZEDAS has developed an AI-supported wagon number recognition system that automatically recognises the position of the wagon number (UIC number) on the freight wagon, decodes it and uniquely identifies the wagon.

As a key technology, wagon number recognition has been integrated into the zedas®cargo app Train Check for train control and shunting. Train Check is an easy-to-use app for paperless train dispatching, which was already awarded the German Mobility Prize in 2020.

The process of learning

The basis for teaching the AI model is a collection of photos of freight wagons with UIC wagon numbers. Here, care was taken to ensure that there was sufficient photo material of each type of the various notations, of the most varied positions on the wagon and of all wagon types.

Wagon number recognition is a multi-stage process. First, an object detector finds the wagon number among the other wagon markings. Then individual characters in the number are localised and identified by OCR recognition. Finally, the recognised number is broken down into its components, including text recognition and decoding of the recognised components.

As a result of the development, the wagon number recognition is available as a software library and can thus be integrated into different applications.

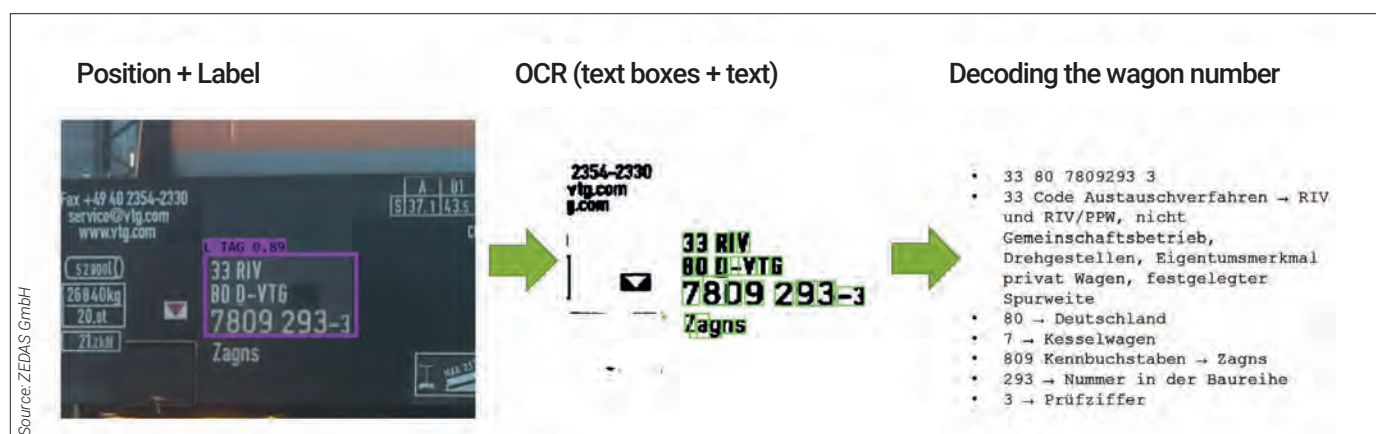
Train dispatching with integrated artificial intelligence

Train dispatching via app, with numerous standardised interfaces, accelerates the exchange of data between employees of the railway undertaking (RU) and between RUs and external parties. Train Check automates manual, recurring work within the scope of train control. The workload of the RU's employees is significantly reduced.

During the train check, the scanner for the wagon number is available in the area of the app where the wagon number can also be entered manually. If the camera is pointed at the wagon area with the UIC wagon number, the AI automatically recognises the position and marks it in the preview image with a coloured frame. The AI recognises and analyses the text characters and checks the recognised UIC wagon number for correctness using the check digit. If a digit of the wagon number is not readable or is incorrectly readable, the app gives a corresponding hint.

If the wagon number has been recognised, the technical wagon master data and any existing commercial load data are retrieved from the central database and displayed for checking. If no data is available, the current wagon master data of the keeper is queried via the broker of the GCU (TAF interface). Thus, data is mostly only confirmed, manual entry is the exception. The information that the wagon technician needs for the train control is clearly shown on the display.

Wagon number recognition process



Automated brake calculation and document creation via app

Once the train control is complete, possible brake positions are determined and braking weights and braking hundredths of the train are calculated. The software automatically takes into account the requirements of the planned train paths. The automated calculation saves time and costs.

To fulfil the documentation obligation, the weighing list and braking slip can be called up at any time. Thanks to the central data storage in zedas®cargo, the driver can download these documents as PDF files in his app.

Conclusion

Train Check is part of the zedas®cargo system and, unlike stand-alone apps, can take over all data from previous processes and use it for all downstream steps. The app solves everyday challenges faced by rail transport companies and makes targeted use of the new possibilities offered by artificial intelligence. It enables faster and more efficient processes, especially in data entry and selection for train dispatching, which improves data quality. Digitalisation and artificial intelligence accelerate train dispatching and thus increase competitiveness.

The UIC wagon number is not the only decodable object that is important for train dispatching in rail freight transport. Container or locomotive numbers and others could also be recognised and used on the same basis.



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