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Focus on IFA's work

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In virtual reality: recognizing sources of fall hazards during mail and parcel delivery

Problem

Accidents are known to occur frequently in companies caused by persons tripping, slipping or misstepping. Many such accidents also occur during mail and parcel delivery. Objects lying in the path of the delivery worker (such as e-scooters that have fallen over) often cause tripping. However, weather events such as rain and snow may also increase the hazard for workers.

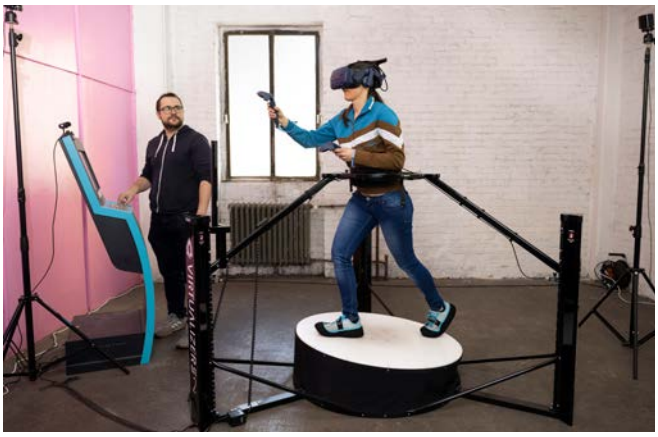
Precisely because the delivery workers do not only move around on their own company premises, but in public spaces and on other people's private property as well, their awareness must be raised of potential hazards.

Activities

The ENTRAPon project (FF-FP 0470), funded by the DGUV, aims to develop training elements using virtual reality (VR) applications to support the prevention of tripping, slipping and falling accidents.

Some of these training elements are based on the BGHW warehouse simulator developed by the IFA. Using an omnidirectional treadmill, the trainees must navigate through a virtual scenario, identify hazards and select a possible solution. They do so wearing a head-mounted display (HMD), also termed VR (virtual reality) glasses.

A further virtual scenario was developed in cooperation with the Department of Work and Organizational Psychology at Ruhr University Bochum and the Ergonomics and Virtual Reality laboratory at the RheinAhrCampus of Koblenz University of Applied Sciences. This scenario models specific hazard points for delivery service workers within a virtual city environment, allowing trainees to identify more closely with the virtual environment. Sources of hazards specific to outdoor work are also taken into account. These hazards are seasonal, but are often also caused by changing weather conditions or by external circumstances such as roadworks or traffic.



A test subject wearing VR glasses runs on a treadmill on which she is able to move in all directions. She must identify potential sources of hazard in a virtual scenario and propose solutions to the problem. During this process, she is observed by the person in charge of the test.

It is not always possible for delivery service personnel to eliminate hazards in public spaces immediately or by themselves. Leaves, puddles, loose steps and the like cannot simply be removed or replaced. However, even if a hazard cannot be eliminated, delivery service personnel can make their colleagues aware of it and adapt their own movements to the circumstances.

Where circumstances make a delivery too risky, the delivery staff may also cancel the delivery and make customers aware of the hazard. Such options for solutions are also implemented in the simulation training tool and are intended to make trainees more aware of hazard points.

In the course of the ENTRAPon study, the new city scenario was tested by Deutsche Post DHL employees and the training element was evaluated for the first time.

Results and use

A new virtual city scenario with slipping, tripping and misstepping hazards for delivery personnel was developed and tested in a study. The study participants completed questionnaires in which they assessed how well they coped with the application.

Evaluation of the questionnaires shows that the participants found it easy to understand the task and that the training simulation was perceived as being useful. Cybersickness (nausea that can accompany immersion in a computer-generated environment) occurred only rarely. The fun factor is very high and most participants believed that they would be able to integrate the experience gained into their work and would become more aware of hazards.

Street in the urban scenario

User group

Mail and parcel delivery companies

Technical enquiries

- IFA, Department "Accident Prevention – Digitalisation – Technologies"

Literature enquiries

- IFA, Department "Interdisciplinary Services"

Further information

- Lungfiel, A.; Nickel, P. und Zimmermann, J.: Use of the BGHW warehouse simulator to raise awareness of fall hazards (Focus on IFA's work No 0448). 11/2024
  https://publikationen.dguv.de › Webcode: p22707
- Accident prevention in the retail sector with the help of virtual reality. Project description of Project No. IFA 5173
- Development of additional training elements for the prevention of tripping, slipping and falling accidents supported by the use of virtual reality using the example of companies of steel production and postal and parcel delivery (ENTRAPon). Project description of Project No. FF-FP 0470

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