

# **DIGITAL FABLAB: JOIN THE VIRTUAL SHOE FABLAB!**



The virtual and digital Shoe Fabrication Laboratory (Fab Lab), an online tool providing e-learning solutions and training for actors involved in the shoemaking industry is ready! Students and workers from all around Europe can now experience the “learning-by- doing” experience from a distance, something very efficient and interesting for them and companies, in particular when they do not have the opportunity to practice on a factory or on a physical training centre. The Digital FabLab integrates high-resolution images of the machines or other relevant equipment used in the different manufacturing processes. The FabLab is also a demonstration platform for equipment and machinery used in the footwear industry, which makes it more attractive to students, who can take on online challenges similar to those in video games.

The contents developed by the consortium represent eleven training units, each divided into two or three lessons, covering different topics from the design to the marketing of footwear, such as the principles of pattern making, cutting or production processes. These lessons have been created in such a way that the images presented integrate augmented reality (AR) elements.

The principle is simple, and in order to have access to information, trainees have to scan the images with their phones or tablets and then follow the instructions given on their screens. By using augmented reality technologies in VET studies, the partners are fully embracing the “learning-by-doing” methodology that is at the centre of the project objective.

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In this newsletter, the Footwear Technology Center of La Rioja (CTCR) will enable you to learn more about the use AR and VR in a smart footwear warehouse. This article will be followed by the presentation of the use of collaborative robots in the footwear industry the Technical University of Iasi (TUIASI).



We wish you a pleasant reading and invite you to keep following the latest project news on our social media ([Facebook](#)) and on our [website](#) !

## Use of AR and VR in the smart warehouse in the footwear sector (by the Footwear Technology Center of La Rioja - CTCR)

New technologies are a challenge for companies in all sectors and especially in the footwear sector since 70% of the processes is manual. We all need to upskill ourselves to the new changes in order to adapt to the current society and opportunities of applying new technological solutions to our businesses. One of the processes that can face a successful digital transformation is the storage management of both raw materials and the final product.

As we already know, Virtual Reality (VR) and Augmented Reality (AR) have become key technologies to improve the daily life of many companies. Augmented reality is particularly useful for logistics control, as it streamlines maintenance and warehouse management, optimising the work to be done.

### How is Augmented Reality used in logistics operations for footwear production?



Thanks to Augmented Reality, warehouse logistics management tasks can increase production efficiency by 10 to 15%.

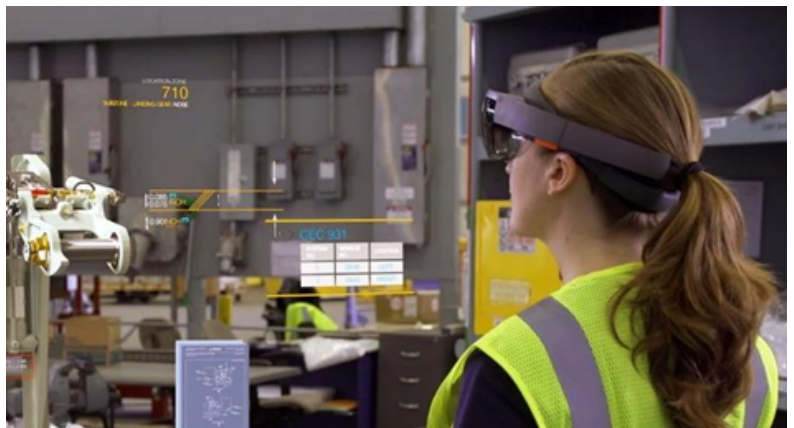
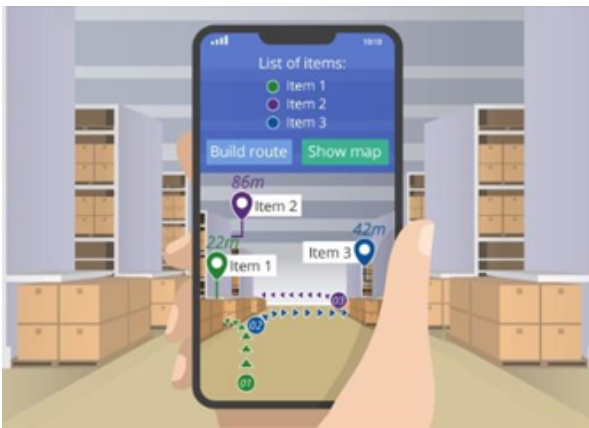


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Augmented Reality can help with many aspects of the tasks corresponding to the companies' logistics management that in the end have an impact on streamlining the overall process and help operators in the management of warehouses. AR can provide benefits, for example, in the picking process, which is the process of searching and selecting items in a warehouse to prepare or store orders. With a Virtual or Augmented Reality system, the operator can see in real time where in each floor, the last or pair of shoes are located, as well as receive information about the quantity of products in the warehouse, and therefore better visualise the space available for storing products.

Augmented Reality accompanied by simulation is not only used during picking and other selection tasks, but it also helps choose the most efficient and optimal routes without the need for prior planning. This advantage can be applied both in the transport of products, to calculate the best routes depending on the distance and the state of our various warehouses, and within the same warehouse, to reach the point where the item is located through the quickest route.



When it comes to training, virtual reality and augmented reality are key technologies to train future operators and help them learn the optimal working methodologies to improve the productivity of their work.

### Benefits of applying Augmented Reality to logistics tasks in the footwear sector:

As already mentioned, the main advantage of applying Augmented Reality in logistics management tasks is productivity: selection tasks, order preparation, transport, and warehouse management and even training processes are carried out more quickly than in a purely manual way. Thus, Virtual and Augmented Reality solutions for the logistics process and warehouse management focus their benefits around increasing and improving productivity.







Productivity improvement can be reflected in the following aspects:

- Increase of the picking processes speed
- Empowerment to make better decisions
- Less margin errors
- No loss of material
- Time maximisation by reducing the number of unnecessary movements within the warehouse
- Facilitation of the tasks of workers and more comfort

### Collaborative robots in the footwear industry (by Gheorghe Asachi Technical University of Iasi - TUIASI)



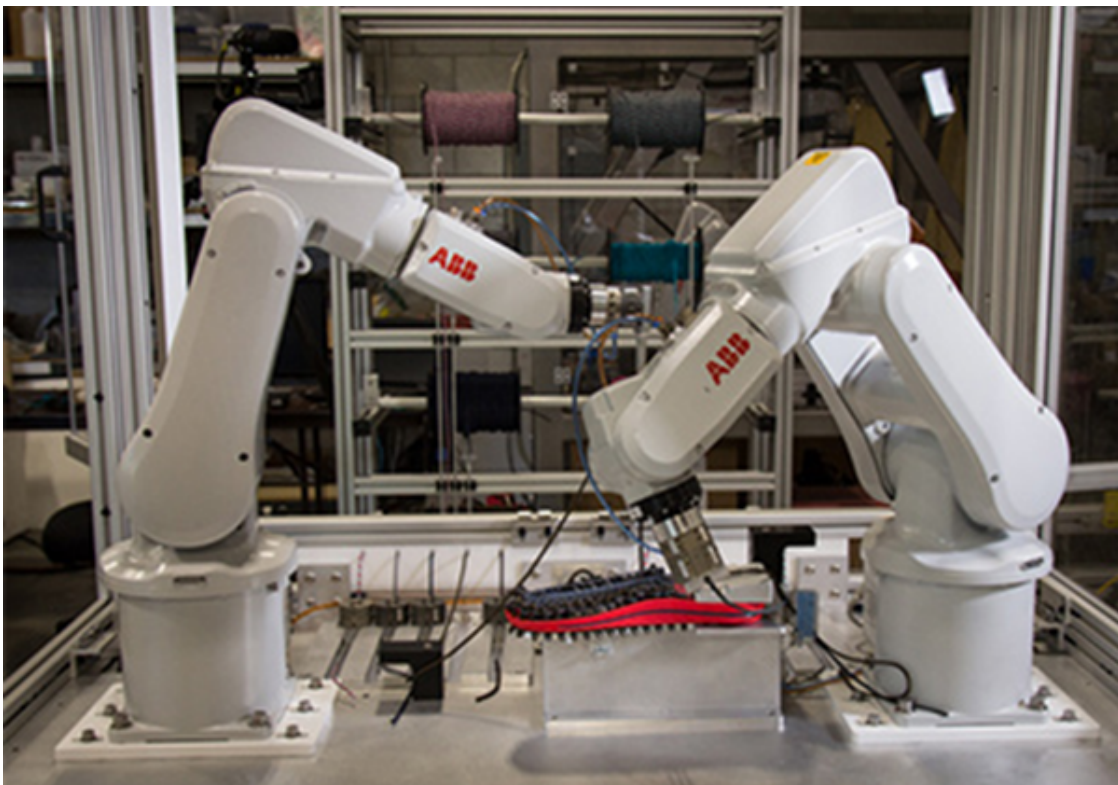
The manufacturing process in the footwear industry has always been a highly manual endeavour. Due to the complex geometry of the last, automation processes in the field have been slow to develop and costly to implement. In the past years however, collaborative robots also known as “cobots” have received unprecedented attention as part of the Industry 4.0 technology revolution and they have become a common sight on the plant floor.

Collaborative robot technology is successfully integrated into the footwear industry and with significant productivity benefits in the manufacturing process. For example, the footwear company Nike has been employing around 1,000 cobots in its distribution centres to help employees sort, pack, and change products, thus reducing shipping times [1].



## Collaborative robots in the footwear industry (by Gheorghe Asachi Technical University of Iasi - TUIASI)

Collaborative robots are designed to complete tasks side by side with their human counterparts in a shared work environment. [2]. The cobots are placed in the work-designated area assisting the other workers in performing menial, repetitive tasks that have an increased level of difficulty and cannot be fully automated. For example, gluing and sealing are the types of tasks suited to a cobot on the production line for footwear. A sealant or glue syringe is mounted on the end of the cobot and as the automated arm moves along the indicated path it distributes the sealant evenly [3].



Another top feature of collaborative robots is their specific intuitive design. The smooth edges, reduced motive power, and the high number of sensors that can assimilate the surrounding information make these machines a reliable work partners aimed to offer ease of mind and reduce the risks of injury [1], [4]. Thanks to these characteristics they can be successfully used for tasks such as picking and placing, sanding, polishing or deburring surfaces polishing, de-moulding, visual inspection, and palletising [5].

Adding to the benefits of cobots in the industry is that they can be easily programmed directly by the workers, even without any prior knowledge of robot programming and automation. There are automation options where the robot is shown practically how to perform a task by moving the robot arm to the correct places. This flexibility and ease of programming makes the cobots adaptable tools in many industries and especially in the footwear field.



## Collaborative robots in the footwear industry (by Gheorghe Asachi Technical University of Iasi - TUIASI)

Innovation in the footwear industry has also led to experimental collaborative robots being programmed to perform specific tasks to help showcase their capabilities. Such is the case of Maxwell Ashford, a design student at ECAL university of art and design from Renens in Switzerland, where he used a single-arm ABB YuMi cobot as part of his sustainability and recycling project called "Robotically Recyclable Concept Shoe". His vision was to demonstrate that products can be designed with recycling in mind from the start and thus minimising the environmental impact of waste materials. [6].

From practical uses to investigational procedures, the cobots have become indispensable collaborators in the footwear industry and can be considered somewhat extensions of human beings designed to solve problems, increase productivity and reduce production costs.

### SOURCES:

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2. <https://www.mobileautomation.com.au/what-are-collaborative-robots/>
3. <https://wiredworkers.io/cobot-applications/gluing-and-sealing-with-a-cobot/>
4. <https://www.automate.org/a3-content/what-are-collaborative-robots>
5. <https://wiredworkers.io/cobot-applications/>
6. <https://www.youtube.com/watch?v=NfsouZib5Vc>

The next newsletter will focus on the last phase of the project, namely the elaboration of a common methodology for training, teaching, and coaching based on augmented reality. The objective is to prepare trainers, teachers, and coaches to become facilitators in the joint international course for digital "Learning-by-doing" on Footwear manufacturing planned for the second term of 2024. Moreover, for all the training itineraries that they wish to develop based on augmented reality (AR).

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ACTIVITIES ON THE PROJECT WEBSITE AND SOCIAL  
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## PROJECT PARTNERS



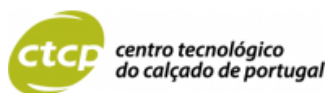
**HeartHands**  
— SOLUTIONS —  
HANDS ON KNOWLEDGE



Gheorghe Asachi  
Technical University of Iasi  
(TUIASI)

Politecnico Calzaturiero

## PROJECT COORDINATION



### Project Leader

CTCP – Centro Tecnológico do Calçado  
de Portugal  
[www.ctcp.pt](http://www.ctcp.pt)  
Rua de Fundões – Devesa Velha 3700-  
121 S. João da Madeira (Portugal)



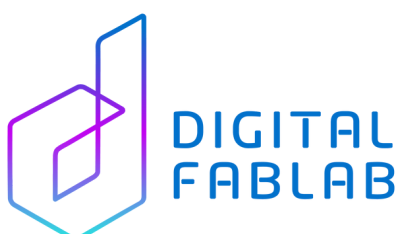
### Communication

CEC - European Footwear  
Confederation  
[www.cec-footwearindustry.eu](http://www.cec-footwearindustry.eu)  
Square de Meeûs 37  
1000 Brussels (Belgium)

### ERASMUS+ Digital FabLab

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