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List of people involved in project and equipment for laboratory

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Project name: **Intelligent avatars for digital heritage applications**

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Project no: **09I03-03-V04-00495**

Authors:

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Other authors: **RNDr. Ján Lacko, PhD., doc. RNDr. Eugen Ružický, CSc., Ing. Juraj Štefanovič, PhD.**

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SLOVENSKEJ REPUBLIKY
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List of people involved in project

The implementation of the project involves staff from the Faculty of Informatics of the Pan-European University, who are directly involved in the project and are part of the team under the contract. At the same time, the topic and its solution also require the involvement of other human resources, who participate in some tasks arising from the project as volunteers. They are part of the activities, and their outputs are implemented for the needs of education, research and the implementation of final theses. The list of staff (except for key researchers directly involved in the project) can be continuously updated regarding the expected outputs in the next phases of the project.

List of researchers and other staff:

No.	Name and surname	Role in the project	Country of origin
1.	Prof. Dr. Selma Rizvić	Lead researcher	Bosnia and Herzegovina
2.	RNDr. Ján Lacko, PhD.	Researcher	Slovakia
3.	doc. RNDr. Eugen Ružický, CSc.	Researcher	Slovakia
4.	Ing. Juraj Štefanovič, PhD.	Researcher	Slovakia
5.	Aya Ali Al Zayat	Researcher (external)	Bosnia and Herzegovina
6.	Bojan Mijatović	Researcher (external)	Bosnia and Herzegovina
7.	Mgr. Viktor Kamenický, PhD.	Production (external)	Slovakia
8.	Edita Kyselá	Production (external)	Slovakia
9.	Bc. Ondrej Hudcovič	Student (ext. researcher)	Slovakia
10.	Bc. Samuel Kostúr	Student (ext. researcher)	Slovakia
11.	Ing. Ladislav Kmeť	Expert advisor (external)	Slovakia
12.	Ing. Imrich Hermann	Expert advisor (external)	Slovakia
13.	Mgr. Zuzana Palicová	Expert advisor (external)	Slovakia

Within the project, we pay attention to the international dimension of cooperation, therefore the project includes workers not only from Slovakia, but also from the country of origin of the main researcher of the project, while we focus on mutual cooperation at the level of universities or associations that are professionally oriented towards the issue being addressed and have experience in the use of virtual and augmented reality in the field of cultural heritage.

List of equipment for laboratory

Within the Faculty of Informatics of the Pan-European University, a Virtual and Augmented Reality Laboratory has been built, which deals with research into the use of these technologies in



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industry, healthcare, education and cultural heritage. The laboratory provides its services to staff of the faculty and the university and cooperates with external partners. It is part of the worldwide network of VR FIRST laboratories. The laboratory is equipped with technologies for data acquisition and display using various sensors. If necessary, it is used for data capture and display. The Media Center is in the same building, which provides services for data capture using camera and photographic equipment together with a fixed lighting park. The Media Center also provides options for recording audio data and processing image and sound data in the director's office. The Media Center has camera equipment and accessories for using chroma-key when shooting real actors as potential avatars. The Virtual and Augmented Reality Laboratory is headed by RNDr. Ján Lacko, PhD. and the Media Center is headed by Mgr. Viktor Kamenický, PhD. For the needs of the project, the following types of devices can be used within the VR Laboratory, through which research into methods for implementing intelligent avatars will be carried out:

VR headset:

HTC VIVE

HTC VIVE XR Elite

HTC VIVE Pro Eye incl. wireless communications

Samsung gear VR

OSVR2

Oculus Rift

Meta quest 2

Meta quest Pro

AR headset:

MS Hololens 2

MagicLeap 2

Motion capture system:

Rokoko –full body tracking

Rokoko – gloves – hand tracking



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Rokoko – facial tracking

Haptic rendering system:

bHaptics TactSuit X40

360° video acquisition:

Insta360 Pro II + Farsight

Samsung gear 360°

Sensors:

Leap motion sensor

Running belt + speed tracker

Balance board

Aerial photogrammetry data acquisition:

DJI Phantom 3 professional

The Laboratory and Media Center have computing technology for individual devices and additional devices for the production chain for the acquisition, processing and display of the obtained data.



Figure 1: Virtual and augmented reality lab



Figure 2: Virtual and augmented reality lab





Figure 3: Media center

For the needs of the project, it is necessary to create conditions for the mobility of multiple devices, especially acquisition devices, for the needs of data capture in real terrain. For the methods of using artificial intelligence, it is necessary to create a computing cluster and resolve the licensing conditions for the individual artificial intelligence models used for avatars. In terms of data display, it is necessary to expand the laboratory with the latest commercially available headsets to be able to use the potential of new techniques for capturing faces, expressions and gestures of users using controllers or using hand capture. Within the scope of headsets, it is necessary to focus on devices that use inside-out tracking, to allow more natural movement of the user in space. The project plans to acquire some devices that will suitably complement the production pipeline for the implementation of the new methodology, to be able to meet the research goals set in the project.



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