eCOLAB 4.0

"Innovative, collaborative and interoperable tools for improved higher education curricula on sustainable Industry 4.0 manufacturing"

Collaborative Exercise Proposal

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VNiVERSiDAD D SALAMANCA

DEX Desarrollo de Estrategias Exteriores

PK Politechnika Krakowska im. Tadeusza Kościuszki

ipb

VIK VILNIAUS KOLEGIJA

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1. The Challenge

The challenge is to **develop the scenario for Virtual Reality (VR) application to celebrate 80th Anniversary of Cracow University of Technology**. The application scenario should include a description of how the application works. The project can also include the propositions for the graphic appearance of the objects, sample models in CAD format and tests of selected functionalities in Unreal Engine development platform. However, the most important thing is your idea!

Additionally, this app will be presented during Researchers' Night. This annual event attracts numerous visitors to the university's laboratories, especially parents with children aged 6 to 13. This app is intended for these children.

Virtual reality is one of the technologies oaf Industry 4.0 and should be popularized. Applications used in industry are usually very complex to use. Training is required to use them. During the presentations commemorating the 80th anniversary of the Krakow University of Technology and during the Research Night, there is no time for this. Therefore, an application thematically related to the topics studied at the Faculty of Mechanical Engineering is needed, characterized by very simple operation and a short usage time (ideally under 3 minutes). This will allow for the application to be presented to many show attendees.

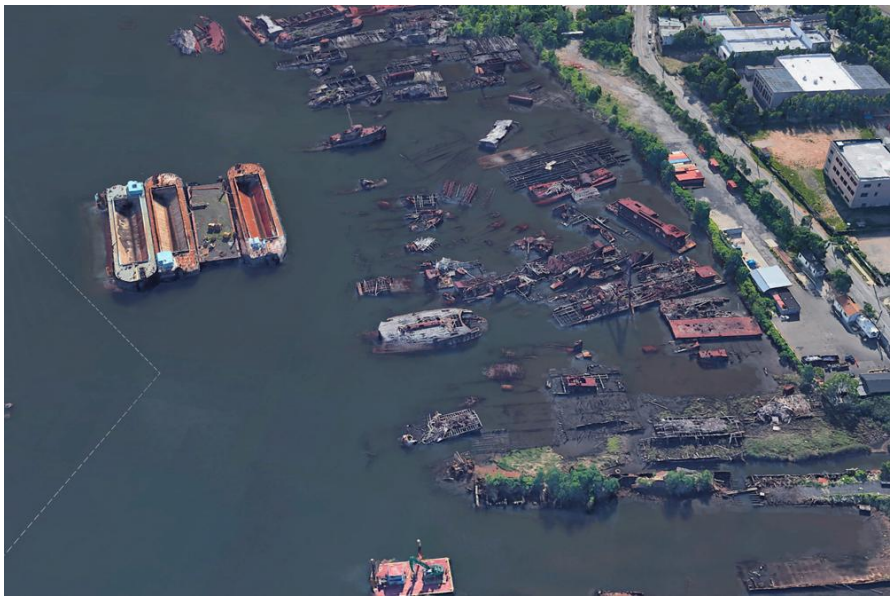
Figure: Virtual Reality application for engineering

Remember, the most important thing is the idea!

2. Preparation

Before starting the project, each team will familiarize themselves with sample VR applications. This will allow everyone to understand the experiences and functionalities that Virtual Reality applications can provide. You'll get a glimpse into the world of virtual reality. Each university will give you the access to FabLab, where you can use Virtual Reality glasses and test the applications mentioned below.

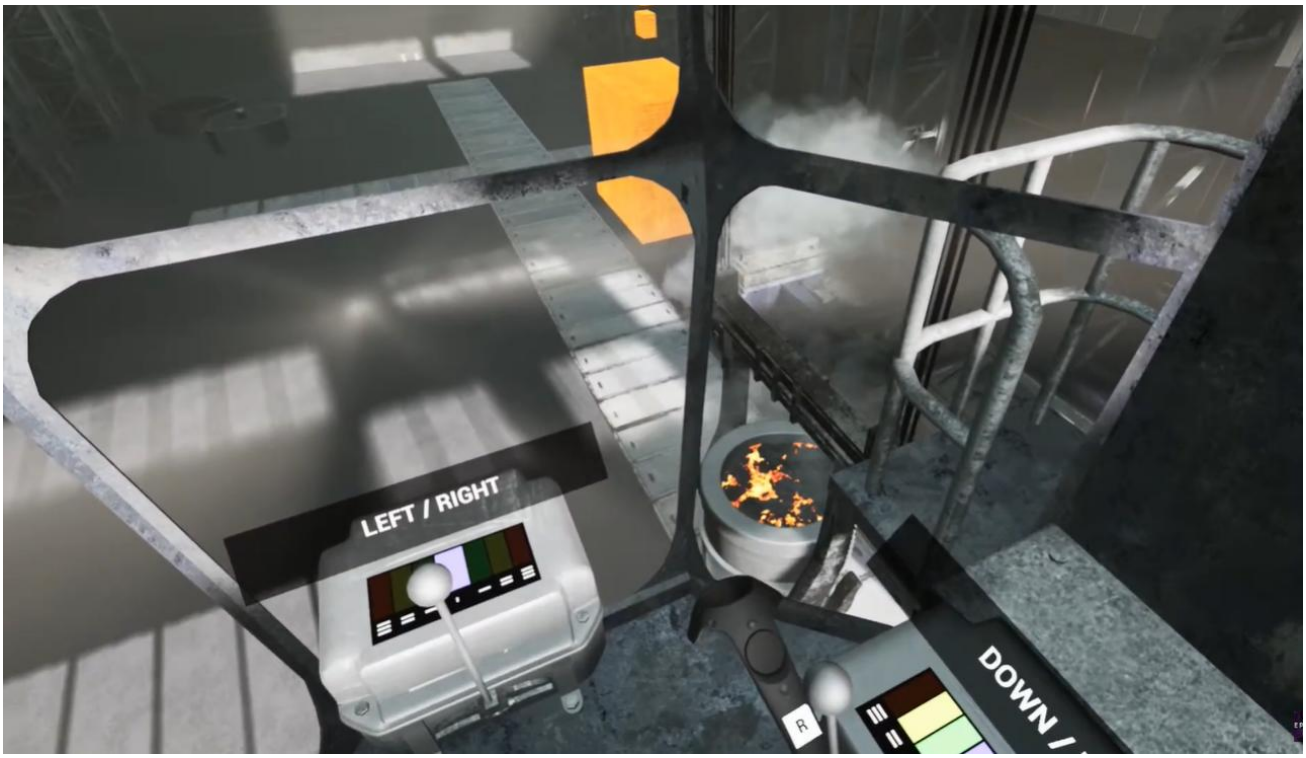
- Google Earth VR



This is a free application available on Steam. It will show you the experience of observing large objects with interesting graphics (perhaps assignment for industrial design students). The mechanical industry includes many facilities, such as processing plants, energy-generating turbines, rail and sea transport stations, and so on. Perhaps this could be one of the elements of your VR game scenario?

- Metal casting factory

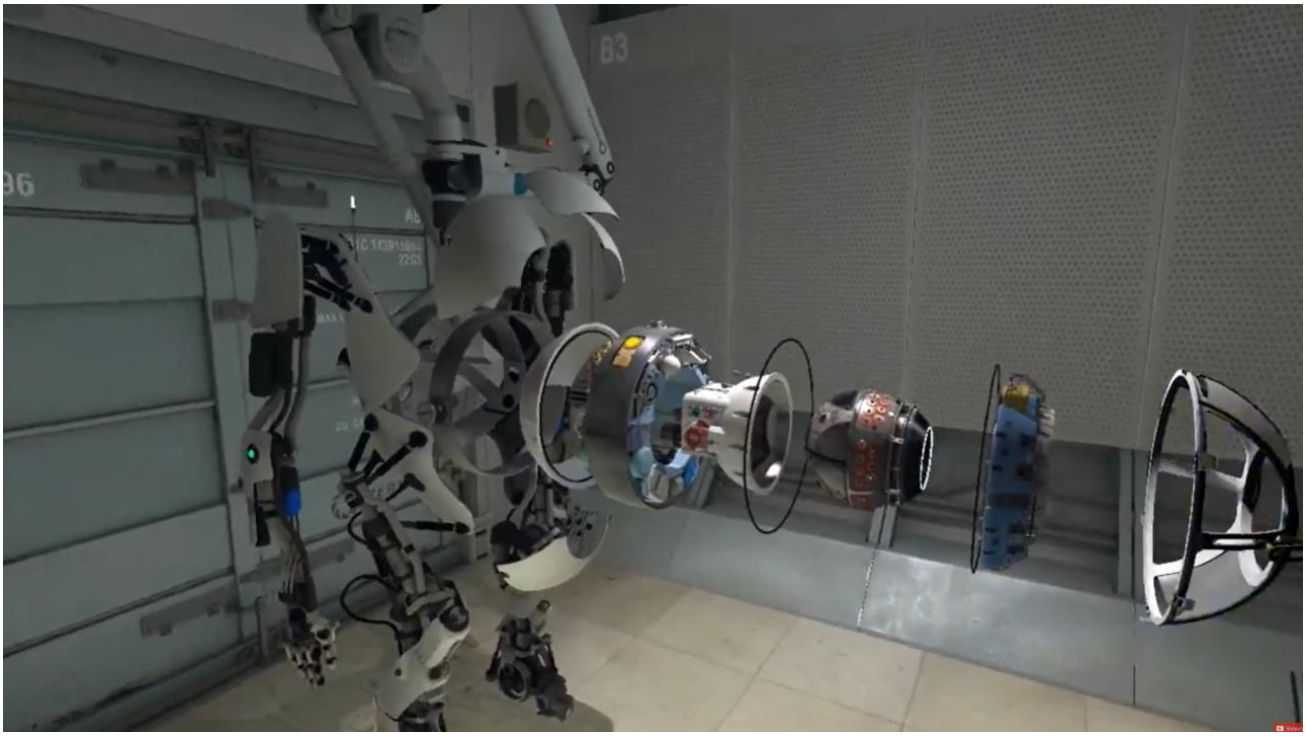
This application was developed for KrakOdlew, the large foundry in Cracow by the software house cooperating with our Faculty of Mechanical Engineering. The user's task is to operate an overhead crane and deliver a ladle of molten metal to a designated location. The user has access to manipulators. This application perfectly recreates the interior of a production plant and simulates the operator's work. Additional information is provided in the video https://youtu.be/SO3X9FDbKns. This application will be made available to each of the project partners.



VR application simulating operator work in casting factory

- The lab

This app is available for free on STEAM. It includes several short games and demonstrations, including even virtual robot repair.



Many of the techniques used in this app can be used in your project.

3. Requirements for the scenario of applications

- The application should be thematically related to the Faculty of Mechanical Engineering at the Krakow University of Technology. The main areas include automation and robotics, production engineering, including industrial robots, CNC machine tools, production lines, product assembly, automated devices, etc.
- The application can have several tasks. It can be used to train operators of robots or machine tools, familiarize users with the design and operation of machines, provide training in operation, etc. Remember that the intended audience is children aged 6 to 15.
- The time to complete each task should not exceed 3 minutes. Many people will want to see your application.
- The application should be relatively easy for implementation. There are people in your group who will evaluate this.

4. Scope of your works

It's impossible to develop and implement a VR application in a few meetings. We know this. However:

- It is required to develop an application scenario, describing what will happen within it.
- It is recommended to indicate why the user will be delighted with this application (the experience of being near a large machine, completing a task, e.g., assembling or starting a device). Always remember the user's age!
- A description of how the manipulators usage shall be given.
- The sample objects in CAD format or visualization are welcome.
- The estimation of the feasibility (how difficult will be implementation) shall be discussed.

5. Evaluation

- Teamwork dynamics and individual contributions.
- Problem-solving process

- Achievements in
- Collaborative work

Remember, at this stage the most important thing is the idea.

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