DigiEduHack Solution
Lappeenranta - Digital Twins & Raw material sustainability - Global better future for next generations
Challenge: Lappeenranta - Digital Twins & Raw material sustainability - Global better future for next generations Challenge 2020

Digital twin process development with Ainak AR

Service for planning changes based on equipment's characteristics

System allows solving problems of optimal distribution of production facilities based on such characteristics of equipment as noise, dust, vibration and consumption, their changes and user actions.
In terms of digital experience, we studied the prospects for integrating DT and AR.

Team: Generation4.0

Team members

Stoianova Antonina, Valnev Vladislav, Boltov Maksim, Grigorev Maxim, Grigorev Maxim

Members roles and background

We are students of Saint Petersburg mining university.

Stoianova Antonina - 1st year master student, Information systems and technologies

Valnev Vladislav - 1st year master student, Automated control systems in oil and gas processing

Grigorev Maxim - 4th year bachelor student, Operating and maintenance of gas production facilities

Grigorev Maxim -2nd year master student, Development of oil and gas fields

Boltov Maksim - 4th year bachelor student, Information systems and technologies

Contact details

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Solution Details

Solution description

What is your final product/service/tool/activity?

As a final product, we present a service that combines the use of digital twin technologies and augmented reality. Our service provides several functions: library of models; reference and environment-adaptive models.

Library of models is a service for storing and using ready-made models.

The solution itself is an integration of DT and AR technology. One of the directions of the solution is the optimization of the arrangement of objects in accordance with the trajectory of users, device parameters and impact on the environment.This decision is especially relevant for office and personal reference models.

Another direction that allows you to fully unleash the potential of using digital twins is environment-adaptive models for manufacturing. It allows to plan changes in technological processes based on dynamic data from the IIoT. The solution allows you to simulate critical situations when placing equipment and planning trajectory of users. Service offers three variants: effectiveness, optimal, safety. Optimal variant provides compromise between safety and efficiency. We take into account such technical characteristics of devices as noise, dust, vibration and consumption, the system defines dangerous areas around objects in accordance with these characteristics.

How could the solution be used to enhance digital education in your challenge area?

It is possible to use the solution as a model for training. The solution can be used to consider real production processes.

How could the success of the solution be measured?

There are two ways to measure the success of a solution. First, an indirect way, that is, an assessment of the effectiveness of related solutions. Now it is the only option available to us. Another variant is an assessment of effectiveness after the first steps of the project. At this stage, adjustments should be made and solutions improved according to the needs of the customer.

How will the solution provide benefits to the challenge owner?

- *Consider Higher education unit (like university) and company collaboration.*

Students and university professors can be involved in developing the solution. The company can, at an early stage, use technologies that are considered promising in science.

- *How this sort of hackathon / outside education unit based challenges can be used to improve digital education?*

Through hackathons like this, students are exposed to the real challenges facing companies in digital technology. Participants master competencies in the field of digital education, which they can use in the future to solve production problems.

- *Use your own experience from the event, what did you learn?*

We learned better about the complex application of DT and AR technologies. We also got acquainted with the production cases of the Ainak company.

- *How do you think teachers could compare / measure the success of this sort of digital education vs. traditional class room education?*

We suppose that this sort of digital education should be in addition to traditional classroom education. It allows you to consolidate the knowledge gained in practice.

- *What sort of benefits hackathon and challenge like digital education can provide for*
  - *Teachers*

It is an opportunity to increase interest in education among students, help them to choose the field of interest.

  - *Partnering companies*

For companies it is an opportunity to get original solutions and talk about their activities.

  - *For students of education unit?*

For students it is an opportunity to practice their knowledge, learn a lot and work in a team.

Solution context

What problem are you facing? What challenge(s) are you solving?

Limitation of only AR tool, possibility to integrate technologies of digital twins and augmented reality. The goal of our challenge is cost efficient and visual tool to document /digitalize part of the process.

Solution target group

Who is the target group for your solution?

We offer two options, the first for offices and home users, the second for industrial enterprises

Solution impact

What is the impact of your solution? How do you measure it?

Our solution makes technological process/enterprise/office more effective and safe. We can measure its effect analysing related solutions, which have already shown good results.

Solution tweet text

Service that combines the use of digital twin technologies and augmented reality for placing objects based on their technical characteristics, changes in state, user actions and impact on the environment.

Solution innovativeness

What makes your solution be different and original? Can anything similar be found on the market?

Our solution is distinguished by its focus on changing objects, we plan to read data from IIoT sensors, take into account changes in the state of equipment when planning production. We also pay attention to load characteristics such as power grid load, ventilation and lighting.

There are many solutions on the market today for augmented reality, digital twins and the Internet of Things, we provide a smart integration of these solutions in one system.

Solution transferability

Can your solution be used in other contexts? What parts can be applied to other contexts?

Our solution has a wide range of applications in light and heavy industry, architecture, science. One of the advantages of our solution is working with various tasks.

Solution sustainability

What is your plan for the implementation of the solution, in the mid and long terms?

We calculated the stage of solution implementation. At the first stage, it is planned to implement a model library. Next stage is the design of digital twins. After that we move on to creating static models for home and office. And the final stage is creating environment-adaptive enterprise models.

Solution team work

How well did you work as a team? Could you continue to work as a team in the future?

During the solution of the hackathon, we constantly worked together. Yes, we can continue to work as a team in the future.