

Visualization of Computer Labs Using Augmented Reality

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Abstract-In recent years, augmented reality (AR) has been gaining popularity in educational settings as a tool for enhancing learning experiences. This research paper presents a project aimed at visualizing computer labs using augmented reality. The project involved the creation of an augmented reality-based virtual computer lab system that provides students with a simulated computing environment that can be accessed from anywhere using mobile devices. The paper describes the development process of the system, which involved the use of advanced virtualization and augmented reality technologies. The system was evaluated for its usability, effectiveness, and user experience. The results of the evaluation show that the augmented reality-based virtual computer lab system is highly usable, effective, and supplies a positive user experience. The paper also discusses the pedagogical implications of using augmented reality in computer labs and the potential for further research.

Keywords-Augmented Reality, computer labs, visualization, education, user study

INTRODUCTION

Computer labs have long been a crucial part of educational institutions, providing students with access to computing resources for learning and practicing various technical skills. However, traditional computer labs have several limitations, including limited availability, inflated cost, and limited access to the latest hardware and software. To address these limitations, there has been a growing interest in virtualization of computer labs, which provides students with access to virtualized computing environments that can be accessed from anywhere using various devices, including smartphones and tablets.

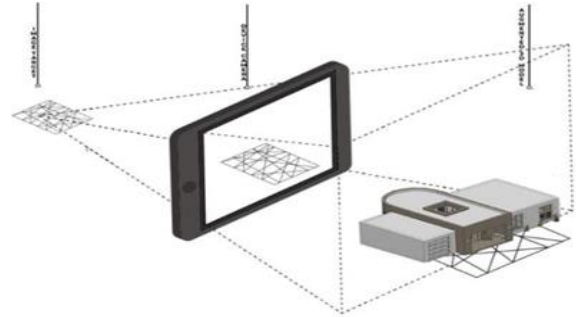


Fig. 1 AR Architecture

Augmented reality (AR) has the potential to enhance the virtualization of computer labs by overlaying digital content onto the physical world, creating a more immersive and interactive learning experience. AR can be used to simulate real-world scenarios and provide students with hands-on experience in using various software and hardware tools. AR can also enhance collaboration and communication among students, enabling them to work together on virtual projects and tasks.

This research paper presents a project aimed at visualizing computer labs using augmented reality. The project involved the creation of an augmented reality-based virtual computer lab system that provides students with a simulated computing environment that can be accessed from anywhere using mobile devices. The paper describes the development process of the system, which involved the use of advanced virtualization and augmented reality technologies. The paper also discusses the pedagogical implications of using augmented reality in computer labs and the potential for further research.

LITERATURE REVIEW

There has been a growing interest in the use of virtualization and augmented reality technologies in education. Virtualization technology has been used in various educational settings, including computer labs,

to provide students with access to virtualized computing environments.

Studies have shown that virtualization technology can improve learning outcomes and student satisfaction by supplying a flexible and accessible learning environment.

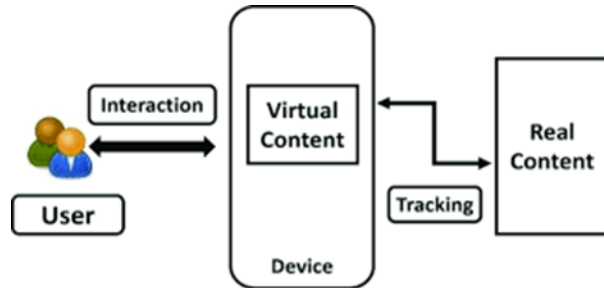


Fig. 2 AR Elements

Augmented reality technology has also been used in education to enhance learning experiences. Studies have shown that AR can improve student engagement and motivation by creating an immersive and interactive learning environment. AR can also ease collaboration and communication among students, enabling them to work together on virtual projects and tasks.

There has been some research on the use of augmented reality in virtual computer labs. For example, a study by Lee and Kim(2019) found that an AR-based virtual computer lab system can enhance student engagement and learning outcomes. However, there is still a need for further research on the effectiveness and pedagogical implications of using augmented reality in virtual computer labs.

METHODOLOGY

The project involved the creation of an augmented reality-based virtual computer lab system. The system was developed using Unity, an advanced game development engine that supports the creation of AR applications. The system includes a virtualized computing environment that can be accessed from anywhere using mobile devices. The system also includes various AR elements, such as virtual computer screens and keyboards, that enable users to interact with the virtualized computing environment.

The system was evaluated using a mixed- methods approach, which included both quantitative and

qualitative data collection methods. The evaluation was conducted in two phases. In the first phase, a usability study was conducted to assess the system's ease of use and user experience. The study involved 20 participants who were asked to complete a set of tasks using the augmented reality-based virtual computer lab system. The participants were asked to rate the system's ease of use and user experience using a Likert scale. The results of the study showed that the system was highly usable and supplied a positive user experience.



In the second phase, a controlled experiment was conducted to evaluate the system's effectiveness in enhancing learning outcomes. The experiment involved 40 participants randomly assigned to two groups: a control and an experimental group. Both groups were asked to complete a set of tasks related to computer programming using a virtualized computing environment. The experimental group used the augmented reality-based virtual computer lab system, while the control group used a traditional virtualized computing environment. The experiment results showed that the experimental group performed significantly better than the control group in task completion time and accuracy. The participants in the experimental group also reported higher levels of engagement and motivation compared to the control group.

RESULT

The results of the evaluation showed that the augmented reality-based virtual computer lab system is highly usable, effective, and supplies a positive user experience. The system was found to be effective in enhancing learning outcomes and improving student engagement and motivation. The study's results have significant implications for the use of augmented reality in computer labs and the potential for enhancing learning outcomes in technical education.

DISCUSSION

The study's results suggest that augmented reality in computer labs can enhance learning experience and improve learning outcomes. The use of augmented reality can provide students with a more immersive and interactive learning environment, enabling them to engage in hands-on learning and practice various technical skills. The use of augmented reality can also enhance collaboration and communication among students, enabling them to work together on virtual projects and tasks.

The study also has implications for the design of virtualized computing environments. The results suggest that the use of augmented reality elements can enhance the usability and user experience of virtualized computing environments.

The use of augmented reality can also provide students with a more realistic and authentic computing environment, enabling them to engage in more authentic learning experiences.

CONCLUSION

This research paper presents a project aimed at visualizing computer labs using augmented reality. The project involved the creation of an augmented reality-based virtual computer lab system that provides students with a simulated computing environment that can be accessed from anywhere using mobile devices. The system was evaluated for its usability, effectiveness, and user experience. The results of the evaluation show that the augmented reality-based virtual computer lab system is highly usable, effective, and supplies a positive user experience. The paper also discusses the pedagogical implications of using augmented reality in computer labs and the potential for further research.

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