

Publisher: IEEE





<< Results

Dinali Nelushi Jayawardana; Ruth Agada; Jie Yan All Authors •••



Alerts

Manage Content Alerts Add to Citation Alerts

Abstract



PDF

Document Sections

I. Introduction

II. Related Work

III. Methodology

IV. Conclusion

Authors

Figures

References

Keywords

More Like This

Abstract: This paper introduces a mobile augmented reality (AR) platform aimed at training first and second-year STEM majors in college, specifically focusing on the identification... View more

▶ Metadata

Abstract:

This paper introduces a mobile augmented reality (AR) platform aimed at training first and second-year STEM majors in college, specifically focusing on the identification and usage of laboratory instruments. The platform addresses the challenges faced by students in introductory STEM courses and utilizes computer vision and AR technologies to create an engaging and learner-centric teaching environment. The platform incorporates features such as a knowledge test, guided navigation using Google Map API, and the ability to build a library of laboratory instruments through augmented reality. Developed using the Unity 3D Game engine and ARkit-XR plugin, the platform currently identifies six laboratory instruments in the biology department, with plans for expansion. The target audience comprises freshman biology majoring and minoring students at the university. The application will be integrated as a pre-lab activity during the semester, requiring the use of specialized equipment. The effectiveness of the platform will be evaluated through a user study conducted within introductory biology courses. This mobile AR platform caters to a specific market niche, addressing the existing resource gap at the university and aiming to enhance the learning experience for biomedical students. Future research will focus on expanding the platform to include chemistry and physics labs while incorporating additional functionalities to deepen students' understanding of laboratory instruments and improve the overall learning environment.

Published in: 2023 8th Asia-Pacific Conference on Intelligent Robot Systems (ACIRS)

Date of Conference: 07-09 July 2023 **DOI:** 10.1109/ACIRS58671.2023.10239781

Date Added to IEEE Xplore: 07 September 2023 Publisher: IEEE

▶ ISBN Information: Conference Location: Xi'an, China

Funding Agency:

Contents

I. Introduction

In recent years, the potential of VR and AR technologies in education has become evident, leading to innovative teaching methods and enhanced learning experiences. The increasing availability of AR-capable smartphones and devices has further expanded the reach of this technology [1]. AR technologies offer a learner-centric teaching environment and have proven effective in explaining concepts and providing instructions [2]. Leveraging computer vision and AR, object detection combined with augmented reality yields efficient results across different technology platforms [3] [4]. In STEM courses, such as Introduction to Biology, visualization capabilities play a crucial role, especially when it comes to identifying various lab instruments, which has been a challenge for first and second-year bio-medical students based on initial surveys. Additionally, students often struggle in physics and other introductory courses, which affects their pursuit of STEM fields. To address these issues, this research aims to develop an educational tool using computer vision and augmented reality to train first and second-year STEM majors on laboratory instruments specific to their field. The mobile AR platform incorporates a knowledge test feature to assess students' recall and comprehension of instrument functionality for specific lab experiments. It also includes a guided navigation system to help users locate different laboratory locations on campus. The system can build a library of laboratory instruments, evaluate users' comprehension through pre-lab activities, and provide directions to physical locations for each instrument. In this paper, we developed a mobile augmented reality application that can assist the students and visitors on campus to efficiently navigate the campus and learn laboratory instruments as seen in fig. 1 and fig. 2. The system can (1) build a library of various laboratory instruments, (2) access the recall factor and comprehension of users in pre-lab activities and (3) direct users to various physical locations for each laboratory instrument.

Authors	•
Figures	~
References	~
Keywords	•

Back to Results

More Like This

Real-time systems education: what is really essential?

Proceedings Real-Time Systems Education III

Published: 1998

A new frontier for real-time systems - Lessons from molecular biology

Proceedings 2007 IEEE SoutheastCon

Published: 2007

Show More

IEEE Personal Account

CHANGE USERNAME/PASSWORD **Purchase Details**

PAYMENT OPTIONS VIEW PURCHASED

DOCUMENTS

Profile Information

COMMUNICATIONS **PREFERENCES**

PROFESSION AND **EDUCATION**

TECHNICAL INTERESTS

Need Help?

US & CANADA: +1 800

678 4333

WORLDWIDE: +1 732 981 0060

CONTACT & SUPPORT

Follow







About IEEE *Xplore* | Contact Us | Help | Accessibility | Terms of Use | Nondiscrimination Policy | IEEE Ethics Reporting 🗹 | Sitemap | IEEE Privacy Policy

A not-for-profit organization, IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

© Copyright 2023 IEEE - All rights reserved.

IEEE Account

- » Change Username/Password
- » Update Address

Purchase Details

- » Payment Options
- » Order History
- » View Purchased Documents

Profile Information

- » Communications Preferences
- » Profession and Education
- » Technical Interests

Need Help?

- » US & Canada: +1 800 678 4333
- » Worldwide: +1 732 981 0060
- » Contact & Support

About IEEE Xplore | Contact Us | Help | Accessibility | Terms of Use | Nondiscrimination Policy | Sitemap | Privacy & Opting Out of Cookies

A not-for-profit organization, IEEE is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity.

© Copyright 2023 IEEE - All rights reserved. Use of this web site signifies your agreement to the terms and conditions.