gAI-PCT:Generative AI Based Personalized Cyber-Security Tutor

Yu-Zheng Lin† , Maddie Grace Carlson∗, Juan Pedro Rivero∗, Hunter Gibbons Copening†, Muntasir Mamun∗, Enka Hysaj∗, Matthew William Redondo∗, Jaeden Wolf Carpenter† , Noel Hennessey‡, Soheil Salehi†, and Pratik Satam∗

†Department of Electrical and Computer Engineering, University of Arizona

∗Department of Systems and Industrial Engineering – Software Engineering, University of Arizona

‡ College of Engineering, University of Arizona

Email: {yuzhenglin†, mgcarlson∗, juanpedrorivero∗, huntercopening†, muntasir∗, ehysaj∗, mredondo245∗, Carpenterjaedenn†, hennessey‡, ssalehi†, pratiksatam*}@arizona.edu

FUSENANO 2024

Abstract and Introduction

- 4IR systems, relying on critical technologies like cloud computing, AI, and network connectivity, are vulnerable to cyberattacks, including networking attacks, data injection, and hardware compromises.
- The demand for 4IR cybersecurity expertise has led to a need for reskilling and training programs. Challenges include specialized hardware, online limitations, and ensuring higher student retention.
- Addressing obstacles in 4IR cybersecurity training involves tackling issues with online programs, labor shortages, and educational disparities for URMs.

Main Features

- **Learning Interface:**
  UI to access the labs and perform the learning
- **Course Personalization:**
  Optimize the observed student sentiments and knowledge understanding to course learning objectives
- **Micro services architecture:**
  Each micro-service connects and communicates with other services through Kafka messages

Acknowledgement

This effort is supported by NSF Award- 2335046

gAI-PCT Framework

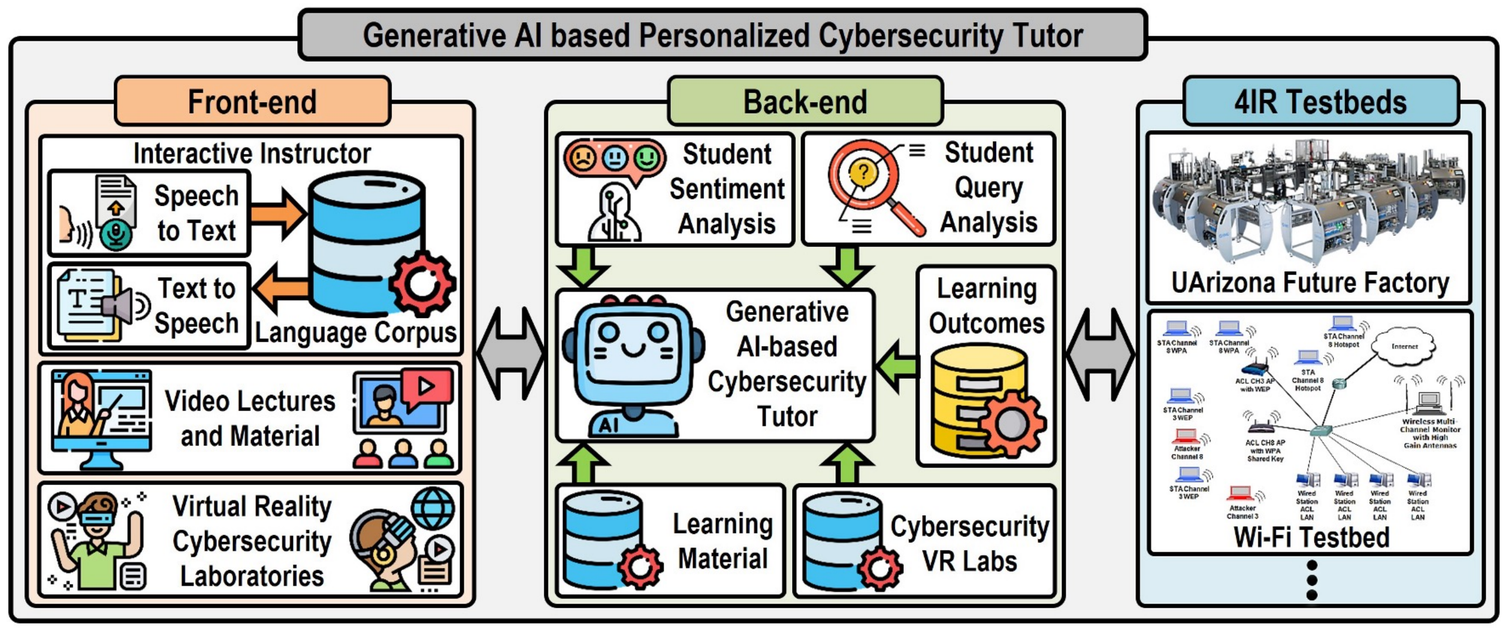


Fig1. gAI-PCT Implementation

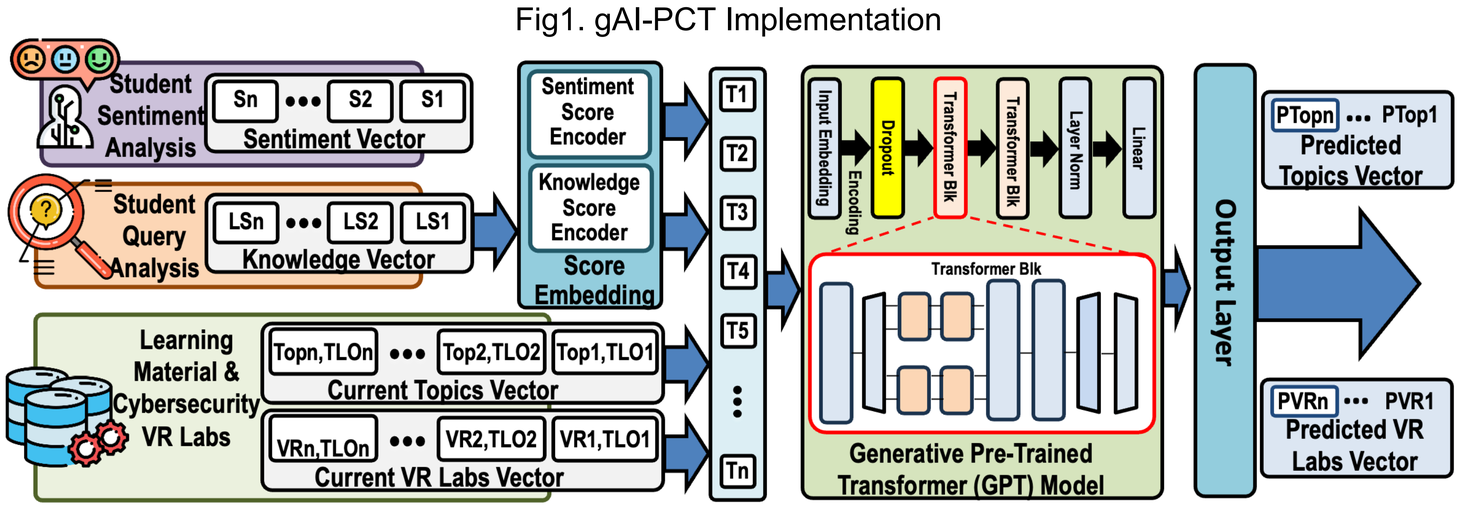


Fig 2. Course Personalization

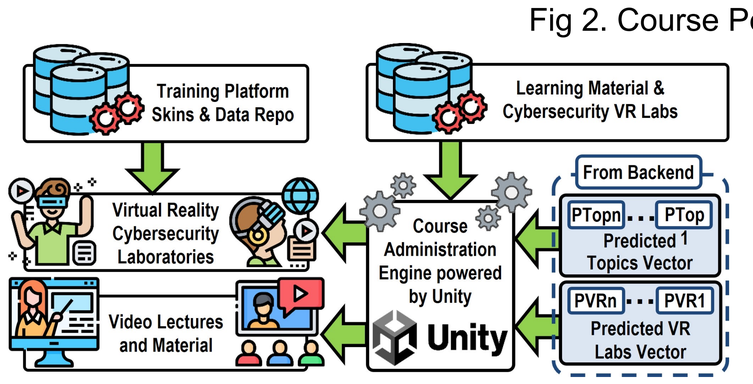


Fig 3. Learning Interface

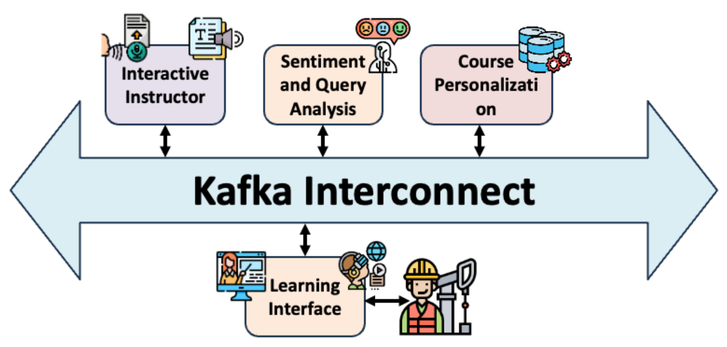
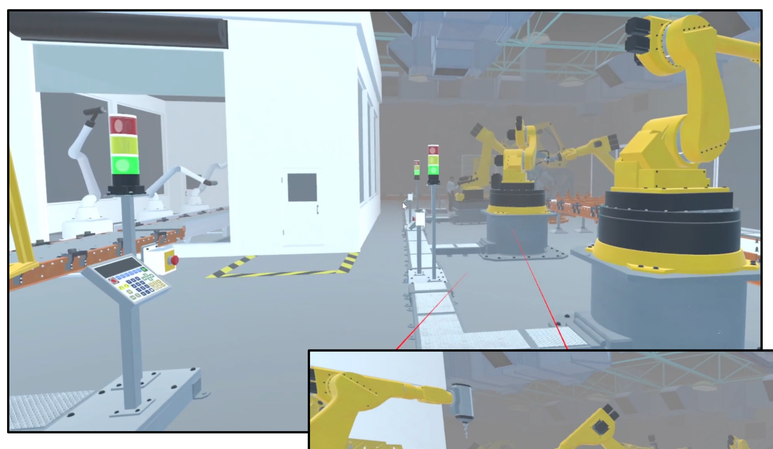
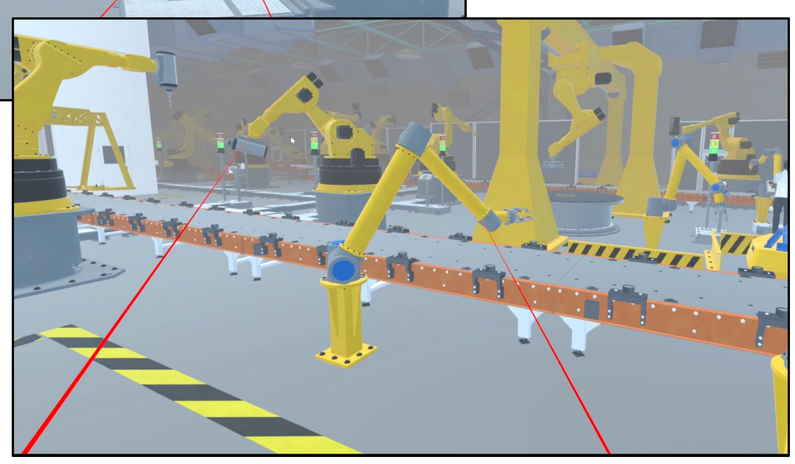


Fig 4. gAI-PCT Implementation

Learning Interface

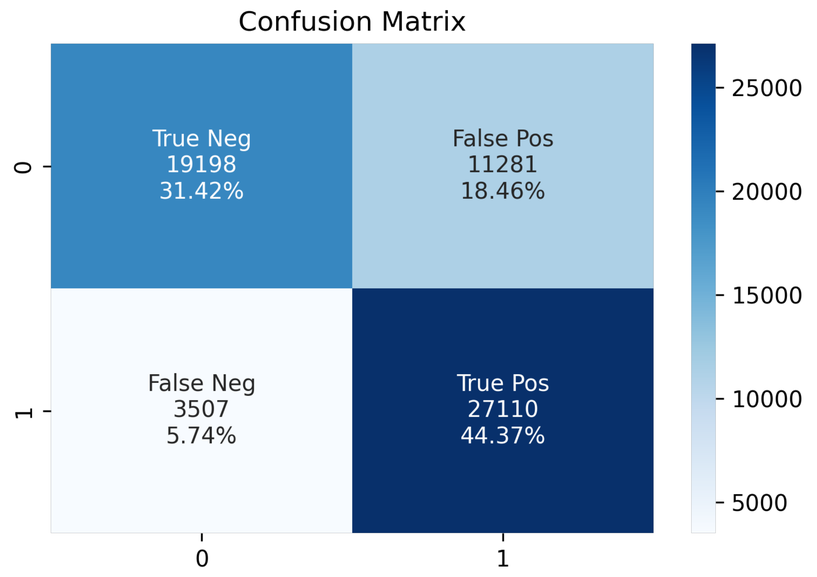
Unity kafka





Video Demo

Sentiment Analysis with LLM



Performance Matrix	
Accuracy	75.80 %
Precision	70.62 %
Sensitivity Recall	88.55 %
Specificity	62.99 %
F1_score	78.57 %