USC Institute for Creative Technologies

Building Basic AI Competency for All: *Becoming Fei*

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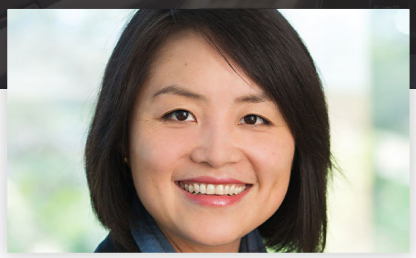
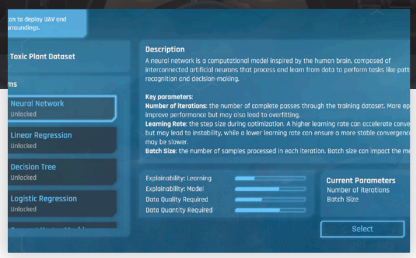
Project Leader: Ning Wang, PhD





Background

The Department of Defense (DoD) is investing $2 billion to create human-like AI to be the Soldiers' partners in problem-solving, working alongside the Soldiers on and off the battlefield, because Artificial intelligence (AI) is core to the future of Army technology. Understanding the decisions of the AI and the rationale behind AI's decisions is therefore key to the success of the human-AI team.

However, leaders in the military often do not understand the fundamentals of AI, including definitions, benefits, drawbacks, risks, and rewards. This lack of knowledge impairs the military decision-makers' ability to imagine what AI can do, thereby delaying the incorporation of AI into the military. This situation can only be resolved through education.

Building AI Competencies for All: Becoming Fei is a scenario-based role-playing game for AI and data science education, covering foundational concepts of machine learning, its applications and ethical use. In Becoming Fei, students play the role of Fei, part of a space force sent to investigate a mysterious planet in search of a missing scientist. Within the first hours of landing, Fei's situation rapidly deteriorates. In order to survive and continue the search-n-rescue mission, the student (as Fei) has to adapt the ship's AI systems to the mystery planet.

As an educational game, Becoming Fei aims to engage, entertain, and most importantly, educate. The gameplay is designed to go beyond simple gamification, but rather, to create a captivating experience that is a tight integration of game objectives and learning objectives through narratives. Within the game, students are guided through concept learning of the process of machine learning -- data, algorithm, and model. What truly leverages the gaming aspect of educational games is the subsequent concept illustration, where the game simulates in-game events to illustrate the impact of concept learning to allow the students to experience the meaning of the abstract concepts in machine learning. The game also includes gameplay that is designed for enriching gaming experience, building on evidence-based research on utilizing off-task behavior in educational games to engage and support the students' affective needs.

The research builds on two decades of Army-funded research at ICT on AI education and "explainable AI" for human-AI teaming, and is part of a long-range vision of USC ICT for AI-driven training solutions for building AI

competency for the future workforce. It is led by Dr. Ning Wang, Research Associate Professor of computer science, USC Viterbi, and Director of the Human-Centered AI Lab, ICT.

Objectives

This project aims to develop solutions for building basic AI competencies for the future workforce, particularly improving job performances for AI users in the Army. The project aims to address the following research questions:

- How to design an integrated learning experience to develop basic AI and data science competencies for novice learners?
- How effective is the training in developing basic AI and data science competencies?

Results

We are conducting pilot studies with Becoming Fei with participants recruited via an online crowd-sourcing website to evaluate the engagement and efficacy of the game in AI learning. The game will be released at the project's website https://www.BecomingFei.org (and https://www.AgeOfAIGame.org), accessible via a web browser and free to play, in spring 2025. Designs of the game and preliminary findings from the study will be published in summer 2025.

Next Steps

Understanding the lifecycle of data – from generating it to interacting with the AI built from it, is essential for the future workforce. Becoming Fei will be extended to include the development of data literacy, which is complementary to education on AI. We are leveraging the research in adversarial machine learning, particularly how flaws in the training data can create bias and expose the brittleness in machine learning models.

Published academic research papers are available from https://ict.usc.edu/research/publications
(Search engine keyword: USC ICT Publications)

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