Center of Excellence for Spatial Computing (COESC)

Spring 2025: Interactive Learning with Virtual Reality & Machine Learning

Time and Location

Class Dates and Hours:

Instruction times will be from 9 AM to 12 PM, with potential extended hours if any students require additional help.

- **Session 1**: January 25, 2025
- **Session 2**: February 1, 2025

If you have your own equipment, you are highly encouraged to bring it (see requirements in Student Preparation)

Location:

- Flarsheim Hall #460
- Zoom (only for MU students): Zoom Link (Passcode: UMKC)

Materials:

- All materials are available on the course GitHub.

Logistic Support:

- For issues such as the computer lab setup or light breakfast arrangements, please reach out to Mr. Preston Sands at pdsands@umkc.edu.

For further information, students can contact:

- Dr. Lee: leeyu@umkc.edu
- Mr. Luke Miller: ljmbm5@mizzou.edu

Course Overview:

Welcome to **Interactive Learning with Virtual Reality and Machine Learning**, a hands-on course exploring the integration of AI and deep learning within spatial computing, with a focus on developing AR/VR applications. Participants will gain a comprehensive understanding of spatial computing concepts, deep learning algorithms, and their practical deployment in AR/VR environments.

Course Objectives

1. Understand spatial computing foundations and the role of AI and deep learning.
2. Develop AR/VR applications with Unity integrating AI.
3. Enhance problem-solving, creativity, and communication skills through spatial computing.

Instructor Information:

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PhD Student
University of Missouri - Kansas City
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Preparation:

Students are encouraged to read the Student Preparation readme. This document provides essential instructions for setting up accounts and preparing your equipment for the course. Bringing your own equipment (computers, headsets, cables) is recommended, and staff will assist with setup to ensure a smooth learning experience. Minimum hardware requirements and setup details are included. **If you are bringing your own hardware** you need to follow the directions in the Student Preparation **before** coming to class.

Lesson Topics:

Session 1: **Setting Up and Unity Basics**

- Introduction to Unity:
  - Overview of Unity and its role in AR/VR development.
  - Navigating the Unity interface.
  - Installing and configuring Unity.
- Building Your First Scene:
  - Adding and transforming 3D objects.
  - Using physics components like rigidbodies and colliders.
- Basic Scripting:
  - Adding interactive behavior using C# scripts.
- - Day 1 Tutorial

Session 2: ML Basics and Oculus Integration

- Introduction to Machine Learning:
  - Key concepts of supervised and unsupervised learning.
  - Applications of ML in AR/VR.
- ML Models for AR/VR:
  - CNNs for image recognition.
  - GANs for generating realistic textures and environments.
- Integrating ML into Unity:
  - Using pre-trained models for real-time object detection.
- Oculus Integration:
  - Setting up Oculus Link for live testing.
  - Best practices for performance optimization in VR.
- Day 2 Tutorial

For any questions or further guidance, please contact the course staff.