# University of Southern Maine

Dubyak Center for Digital Science and Innovation

# Tell Me What You See in an Image, Then I Will Show You Where It Is!

## 2022 Summer School on AI-Powered Object Detection

**Summer 2022 | June 20th – June 24th**

The USM HexAI Research Laboratory is proud to present the **2022 Summer School** on **Real-Time Object Detection using Artificial Intelligence (AI)**. Computer vision as a subfield of AI has been around for several years dealing with how computers can understand from digital images and video sequences, and it has already demonstrated successful applications in a variety of domains, including medical image interpretation, remote surgery, surveillance systems, security and biometrics, autonomous vehicles, and scene reconstruction, purposing to name a few. There is a list of fascinating problems in computer vision, with real-time object detection being one of the most interesting ones. Object detection is now widely associated with self-driving cars where automatic systems combine computer vision, LIDAR, GPUs, and other advanced technologies to generate a multidimensional representation of the road with all its participants. It is also commonly used in medical image analysis, video surveillance and monitoring, counting people for general statistics, and computationally analyze customer experience with walking patterns within shopping centers.

In this summer school, you will learn -from scratch- about YOLO ("You Only Look Once") which is a precise and effective real-time object recognition algorithm. We will discuss an object detection mechanism in practice with several hands-on-practices starting from manual image annotation to programming and implementation to make YOLO up and running. We, together, will explore what YOLO computational vision algorithm is, what is does, and how.

The USM 2022 Summer School on AI-Powered Object Detection program is structured such that besides attending lectures, the students will be also working in

teams on a project assignment. The team projects will be evaluated by a committee of the summer school, and there will be three awards in the end of the summer school. Half of each day class will be devoted to lectures, with the remaining time used for practical work in teams on solving object detection in digital images.

**Topics included but not limited to:**

- Introduction to Object Detection in Computer Vision
- Python Installation / Installation of Essential Packages
- Manual Annotation of Images using the LabelImage Toolset
- Sliding Windows and Bounding Boxes in Object Detection
- Non-max Suppression
- YOLO (You Only Look Once) and SSD (Single Shot Detector)

**Camp Leaders:**

- Ahmad P. Tafti
- Nickolas Littlefield

**Target Audiences:**

- High School Students (K-11 & K-12)

**Number of Seats:**

- min: 8, max: 12 Seats are available.

**Date/Time:**

- June 20th to June 24th, 2022
- 9:30 am to 3:30 pm EDT (1 hour at lunch)

**Room:**

- USM Science Building

**Registration:**

- The registration is free for the Maine students.