# PhyCV for Real-time Object Tracking using PTZ Arducam and Jetson Nano

## Goal

The goal of this project is to leverage Jetson Nano to control the PTZ Arducam and achieve real-time object tracking in light-constrained environments with PhyCV algorithms.

## Introduction

The ability to track and monitor objects in real-time has become an indispensable requirement for a wide range of applications, from surveillance and security to automation and robotics. This project responds to the challenges posed by low-light environments by combining the computing prowess of the Jetson Nano, the precision of the PTZ (Pan-Tilt-Zoom) Arducam, and the sophistication of PhyCV algorithms to achieve real-time object tracking.

## Task 1: Setup the PTZ Arducam with Jetson Nano

Establish basic control functions, such as pan, tilt, and zoom, to enable seamless communication between the PTZ Arducam and Jetson Nano. Connect to the technical support if needed.

## Task 2: Deploy PhyCV-Enhanced object detection with the PTZ Arducam

Reproduce the results of PhyCV-enhanced object detection on the PTZ Arducam.

## Task 3: Explore object tracking with PTZ Arducam

Integrate PhyCV-enhanced object detection with PTZ Arducam using feedback control to realize object tracking in light-constraint environments. When an object is detected, Jetson will send control signals to the PTZ camera to zoom in and focus on the detected object. When the object is moving, the Jetson will control the camera to track and follow the moving object. You can start from detecting and tracking a single person in a dark room.

## Deliverables

PowerPoint slides, final presentation, YouTube video, and GitHub repository.

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