ELLIPSIS: TRAJECTORY PREDICTION AND TARGET ACQUISITION SYSTEM

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INTRODUCTION

Educational Platform

Advanced Precision in Sports Training

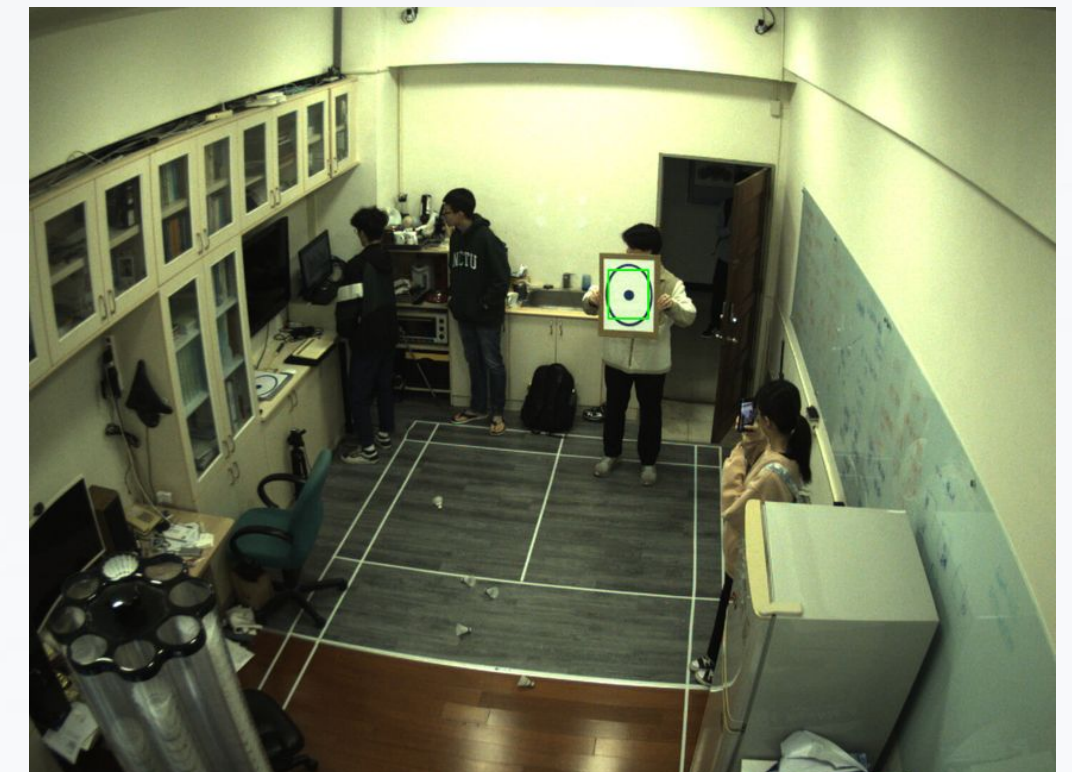Dual Camera Ellipse Detection

Trajectory Prediction

Shuttlecock Shooting Machine

Computer Vision (OpenCV)
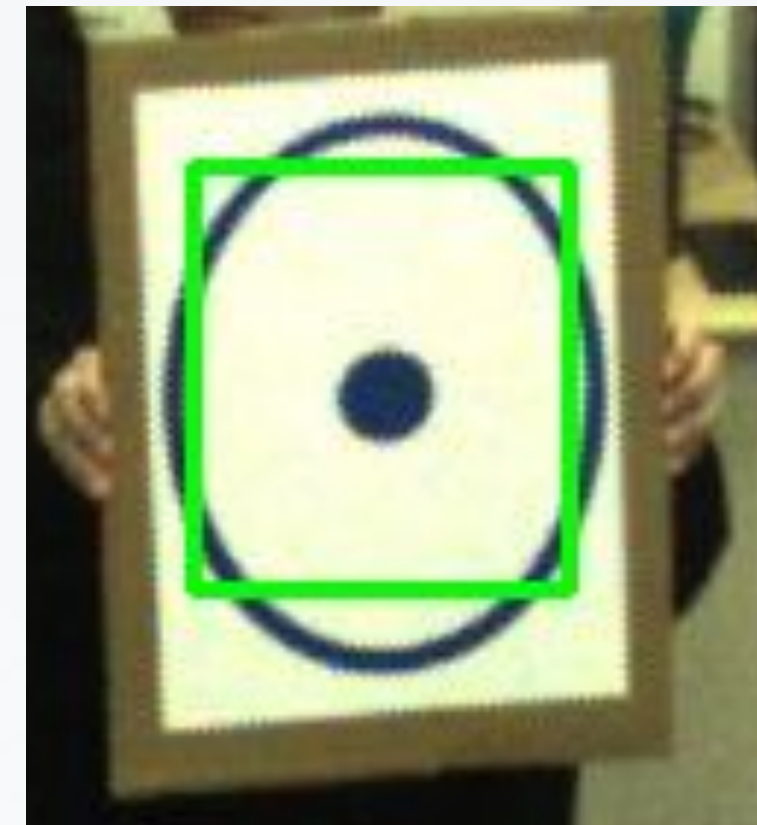
SYSTEM DESIGN

1. Dual Cameras Setup
   - Placed in a room to view a mimic badminton court
   - Cameras are calibrated to make the court have precise 3D coordinates

SYSTEM DESIGN

2. OpenCV for Ellipse Detection

- Hough Circle Algorithm
  - Edge detection, Mapping, Identification
- Identify ellipse within a given threshold in camera view
- Triangulation process to compute the 3D coordinates of detected ellipse
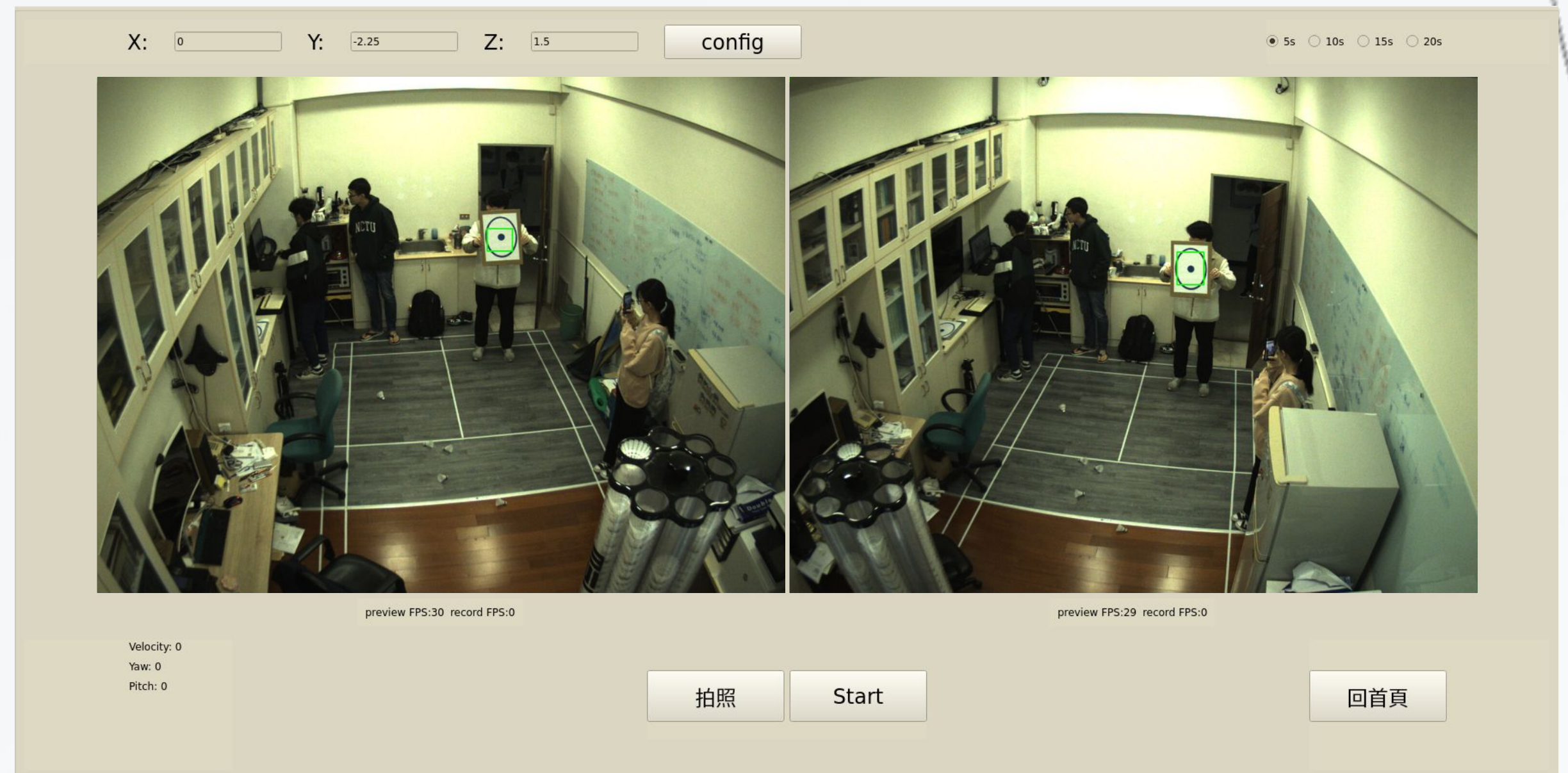
SYSTEM DESIGN

3. 3D Plane Trajectory Prediction

- Aerodynamic model (gravity, air drag)

- Search algorithm

- Check target landing location

- Optimal setup for directing shuttlecock
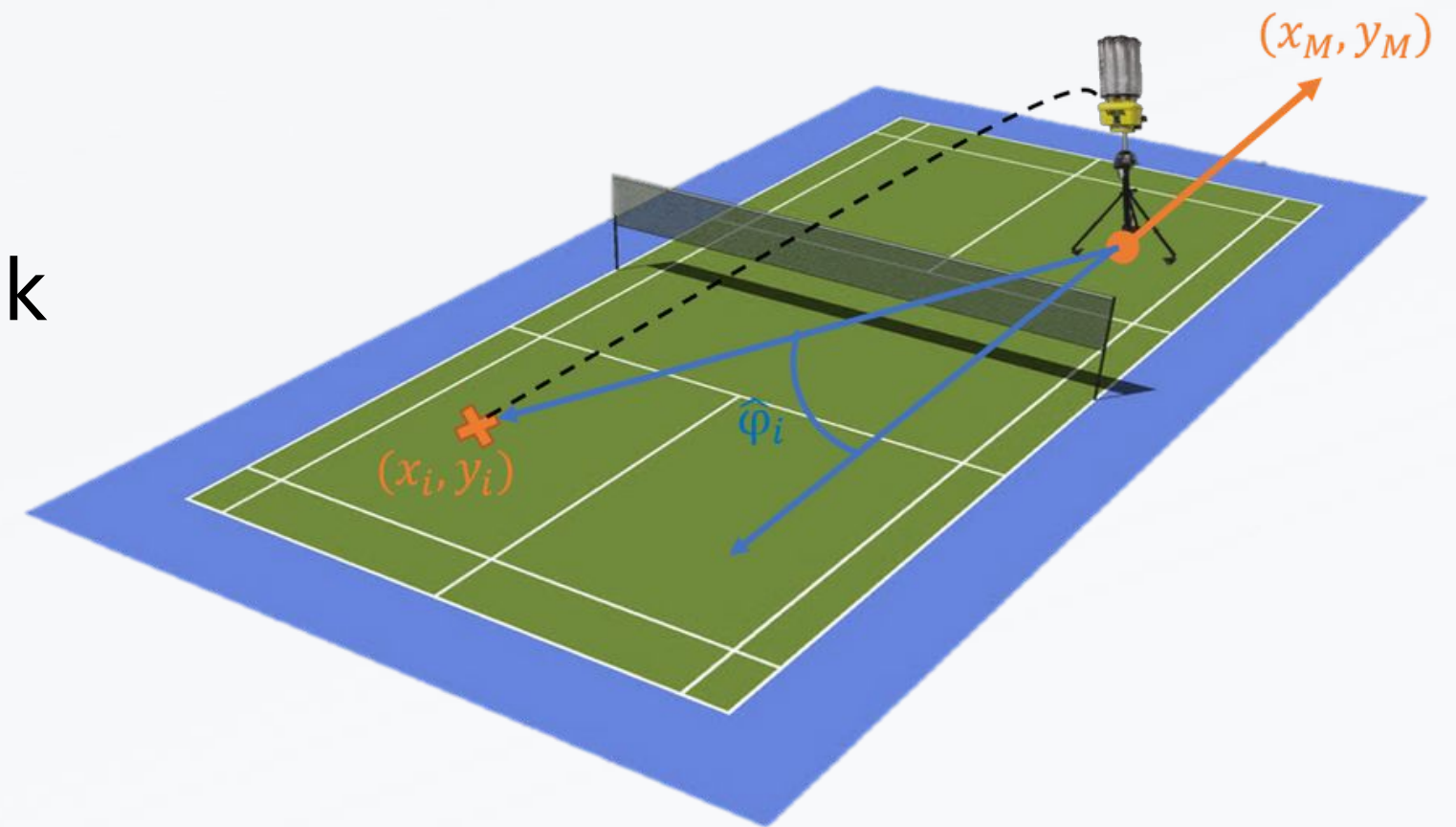
RESULTS

Two models:

- Single shot
- Continuous shot(s) with interval

3D coordinate of shuttlecock machine relative to (0,0,0) of mimic court

configuration button to start single shot

Interval selection for continuous shot

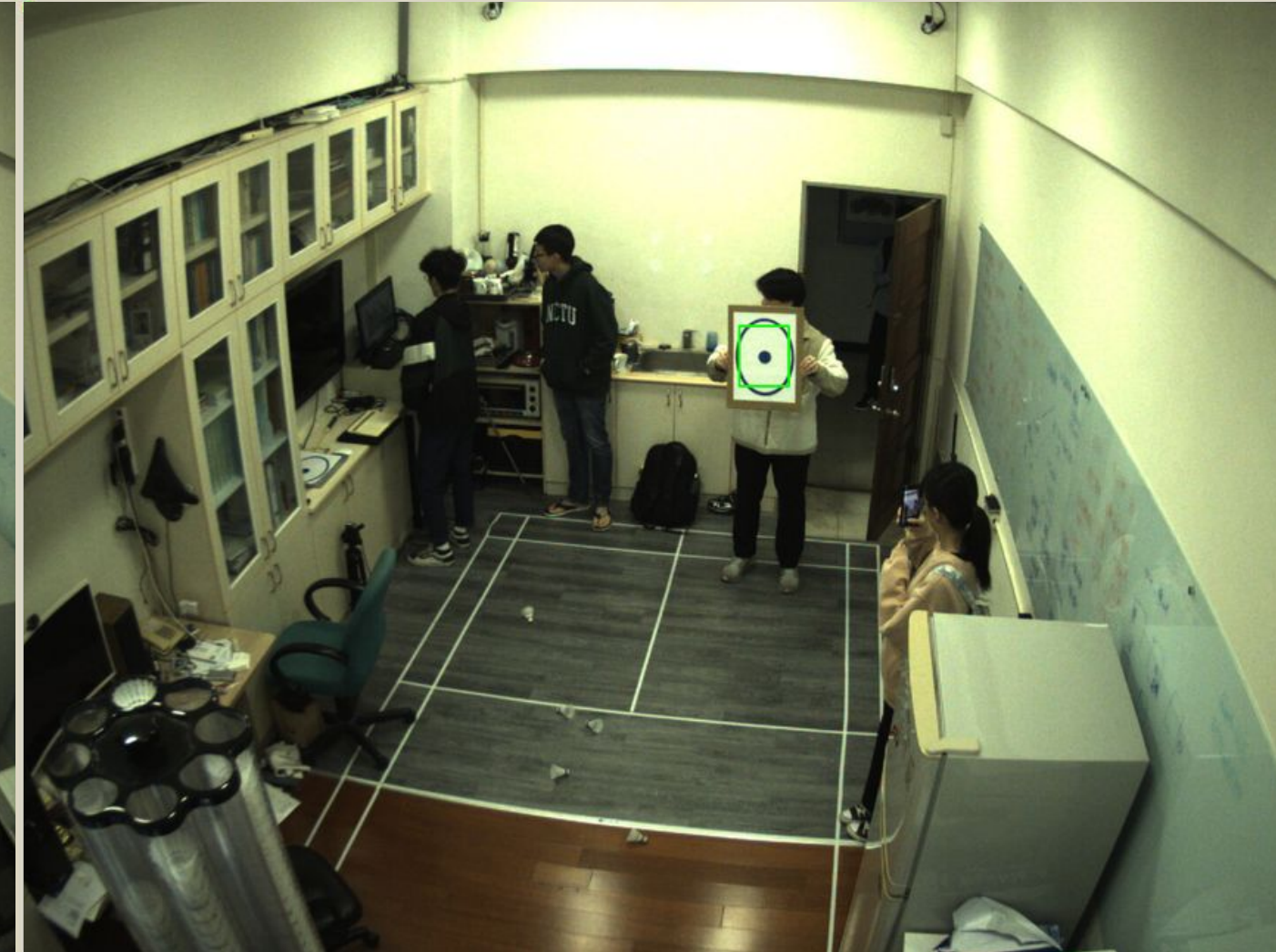X: 0   Y: -2.25   Z: 1.5   config   ● 5s ○ 10s ○ 15s ○ 20s

preview FPS:30 record FPS:0

preview FPS:29 record FPS:0

Velocity: 0
Yaw: 0
Pitch: 0

拍照   Start   回首頁

Velocity, Yaw(X-angle), and Pitch(Y-angle) of Trajectory

"拍照" function to take a screenshot of current screen

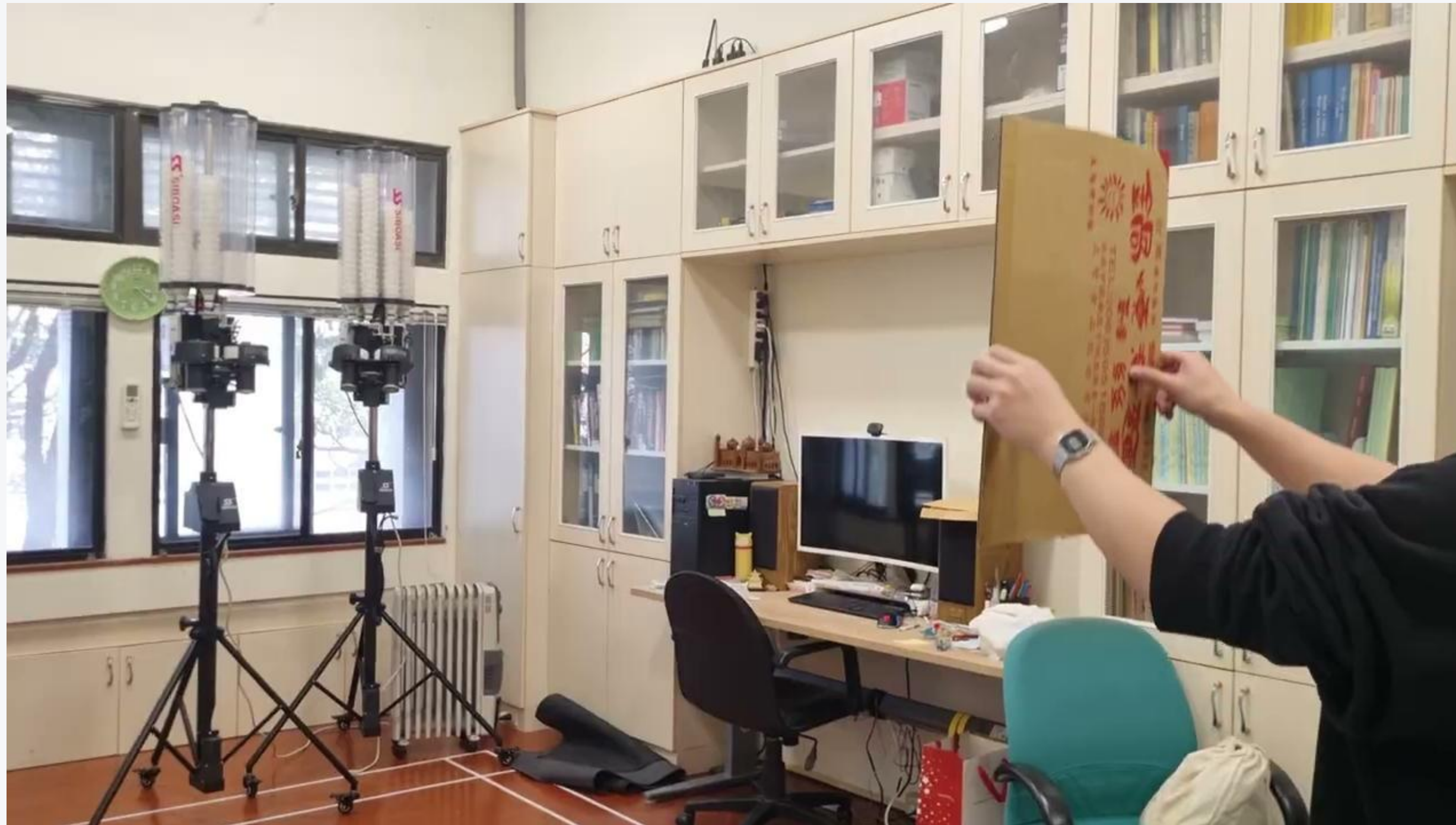**Start button to start continuous shot**

RESULTS

SINGLE SHOT

RESULTS

CONTINUOUS SHOT
(INTERVAL 10S)

THANK YOU FOR LISTENING