**LAB REPORT**

**#8**

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# PURPOSES AND GOALS

The purpose of this lab is to develop our coding skills in using YOLOv8 for object detection and recognition. We will work with at least 15-30 images per class for accuracy from various sources, and use tools like Roboflow to train the model on this data, and evaluate its performance through demonstrations. The demonstration video showcases the AI's ability to recognize the chosen objects accurately.

For this lab game, we chose to use “Balloon Flight” from the given Python games. While coding, we added elements and slightly changed the code to increase the difficulty and make the game flow more smoothly.

# HOW TO INSTALL THE PROGRAMS

## DEPENDENCIES

**Install Python**

* Download and install Python 3.10 or later from [python.org](https://www.python.org). Ensure you add Python to your system PATH during installation.

**Install YOLOv8 Framework**Open a terminal or command prompt and run the following commands to install the necessary libraries:

pip install ultralytics

**Install Additional Required Python Packages**

pip install opencv-python

pip install matplotlib

pip install pandas

pip install roboflow # For data annotation and integration

pip install torch torchvision

pip install tqdm

**Install Spyder IDE**

* Install the Spyder IDE, which is part of the Anaconda distribution, or as a standalone package.
* Spyder provides a Python development environment tailored for scientific computing and debugging.

# HOW TO RUN THE PROGRAMS

**YOLOv8 Object/ Person Recognition**

* Upload pictures of items you want recognized
* Run Program
* Use computer camera to give AI vision
* If trained correctly Ai will be able to recognize iteam

**Balloon Flight Game**

* Run the game: open Balloon Flight.
* Click the mouse while the cursor is in the window.
* Dodge Birds and Houses
* Scores are based on timing.

# PROCESS & WORKFLOW

**Dance Challenge Game**  
Process: Start the game script, click the mouse to raise the balloon, dodge obstacles, and view scores.  
Workflow: Launch game → Play → View scores.

# TEST DATA

**YOLOv8 Object/ Person Recognition**

* Blue Corvette Image: <https://drive.google.com/drive/folders/1MOMxUkTyvnd3U6prF38npx3OITaCHZ6K?usp=drive_link>
* Calvin Headshots: <https://drive.google.com/drive/folders/11-sS3fncR5hY2VhkJElLqLVUVM1zLnr1?usp=drive_link>
* Armando Headshots: <https://drive.google.com/drive/folders/1-8xITe5zUKXW5bJukqv64bh29PjliyHi?usp=drive_link>
* John Headshots: <https://drive.google.com/drive/folders/1l3Q8HcLjIX9qZLYXufc3oM4L40TVGCOL?usp=drive_link>

# VIDEO RECORDINGS

Below is the list of video recordings created for this lab, each demonstrating specific requirements and functionalities.

| **Recording Title** | **URL** | **Notes** |
| --- | --- | --- |
| YOLOv8 Object Recognition Corvette | <https://youtu.be/K49GiMjo_-s> |  |
| YOLOv8 Person Recognition John | <https://youtu.be/F8G7PGHp_gE> |  |
| YOLOv8 Person Recognition Calvin | <https://youtu.be/s60mY4NtkV0> |  |
| YOLOv8 Person Recognition Armando | <https://youtu.be/vExG9uWVTuk> |  |
| Balloon Flight | <https://youtu.be/7r7L7THAjg0> |  |

# CONCLUSIONS

Lab 8 provided hands-on experience working with and developing object recognition models using YOLOv8 and game design customization. Through the object recognition tasks, we explored machine learning applications by training and deploying a custom model to detect objects and individuals with high accuracy. The game development task tests your Python coding skills through creative programming challenges, allowing us to integrate unique features into an existing framework. Adding obstacles in Balloon Flight allowed us to influence the game's difficulty, giving the users a unique experience compared to the original. These activities also underscored the importance of combining technical knowledge with creativity to deliver practical and entertaining solutions.

Overall, this lab strengthened our Python programming skills, familiarized us with AI tools, and encouraged creative coding. Learning to train models and customize games enhanced our technical proficiency and demonstrates the potential of AI. This lab serves as a stepping stone for applying these skills to more complex and impactful projects in the future.

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# REFERENCES

* EE-104 Lab Manual. C. Pham.
* Microsoft. (n.d.). Bing. <https://www.bing.com/chat>