Human Robot Collaboration

Niloofar Zendehdel

Advisor: Dr. Ming C. Leu

Mechanical Engineering

MISSOURI S&T

Introduction:

Assembly / Disassembly Tasks

High Flexibility

low Efficiency

High labor cost

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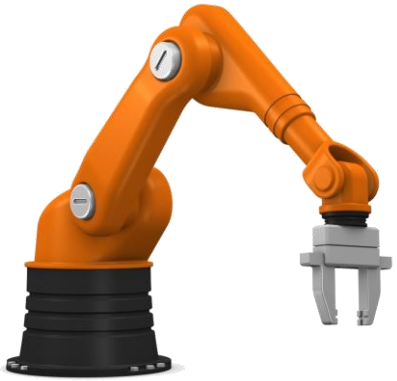
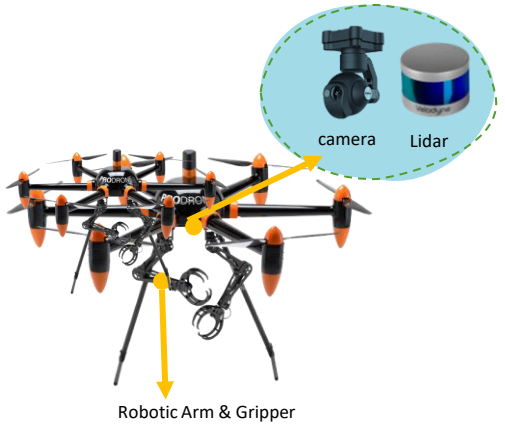


High Efficiency

Low flexibility

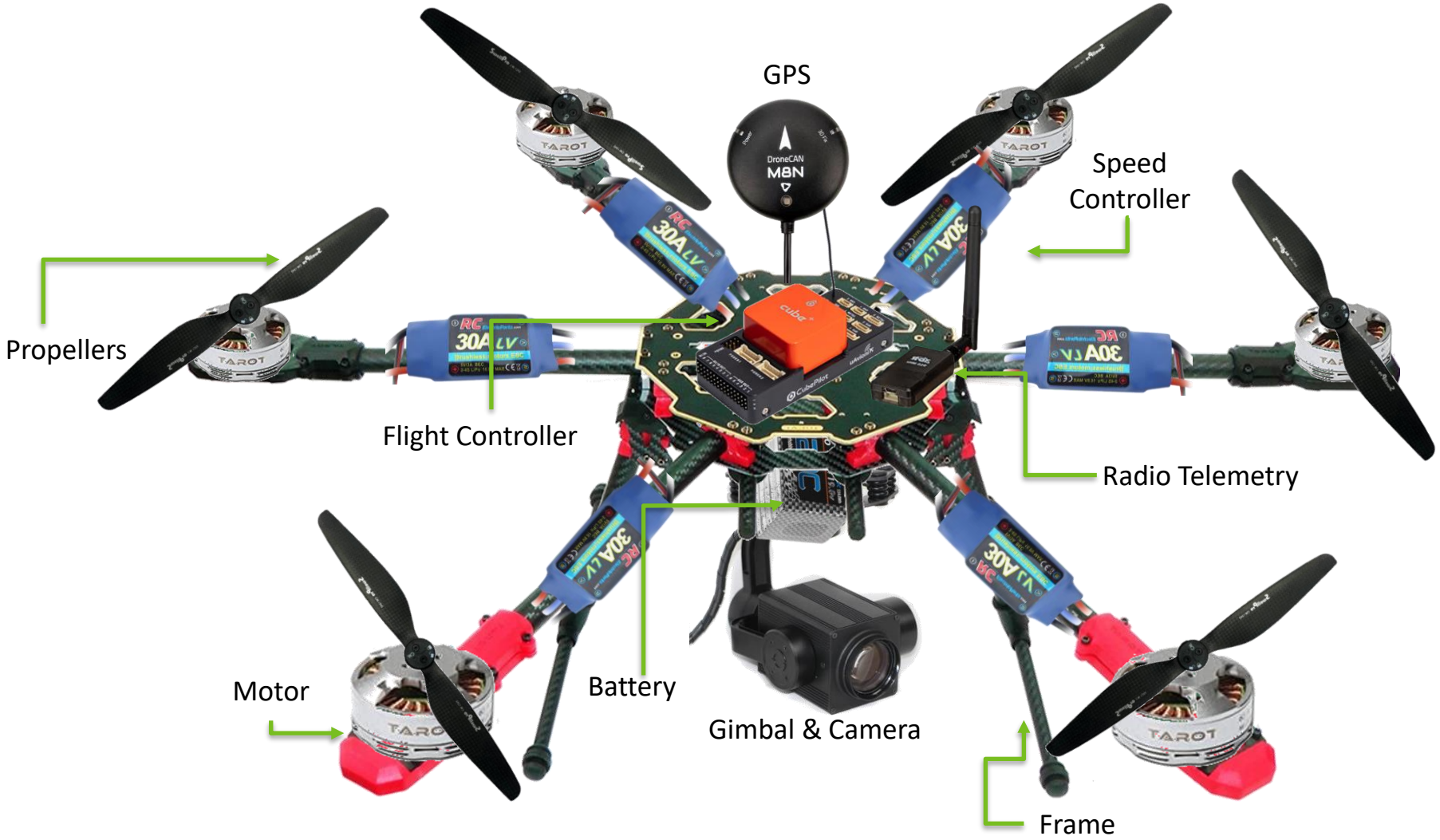
High capital cost

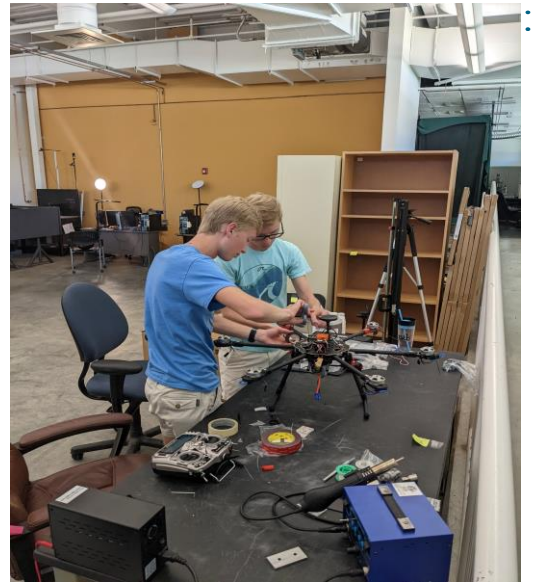
Conceptual Framework:



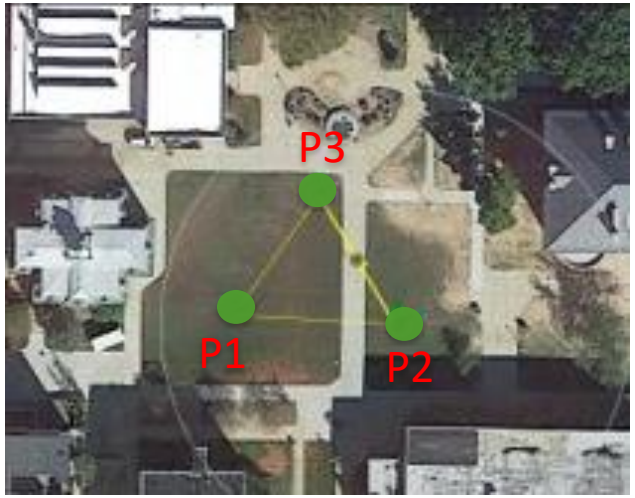
1- Action Recognition/Intention Prediction
2- Localization & Path Planning
3- Object Detection
4- Grasping

Drone Design:





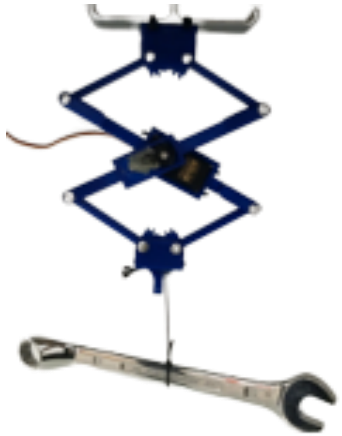
Autonomous Flight:



Mission:
1- Go Up
2- Position 1 (P1)
3- Position 2 (P2)
4- Stay for 5 sec
4- Position 3 (P3)
5- Return to Position 1
6- Land

Grasping Mechanism

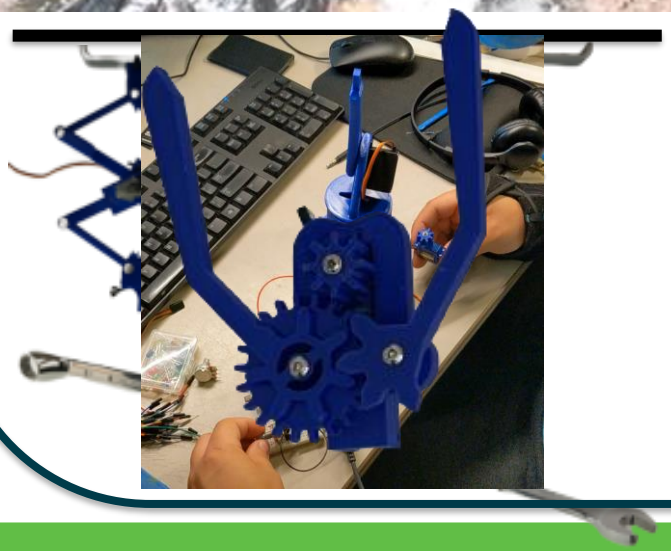
Ascension Mechanisms:
Scissor Lift Mechanism



Robotic Arm

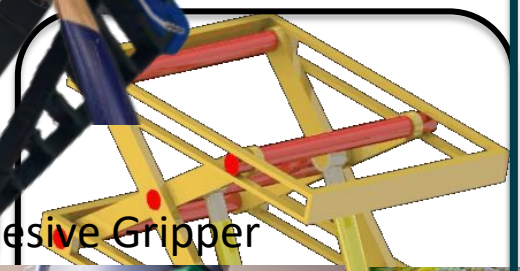
Gripper Mechanism:
Mantis Claw

Two Finger Gripper



Fin Ray Gripper

Lift Mechanism:



Gecko Adhesive Gripper

Tool Detection:

Define Classes

Dataset Preparation

Annotation

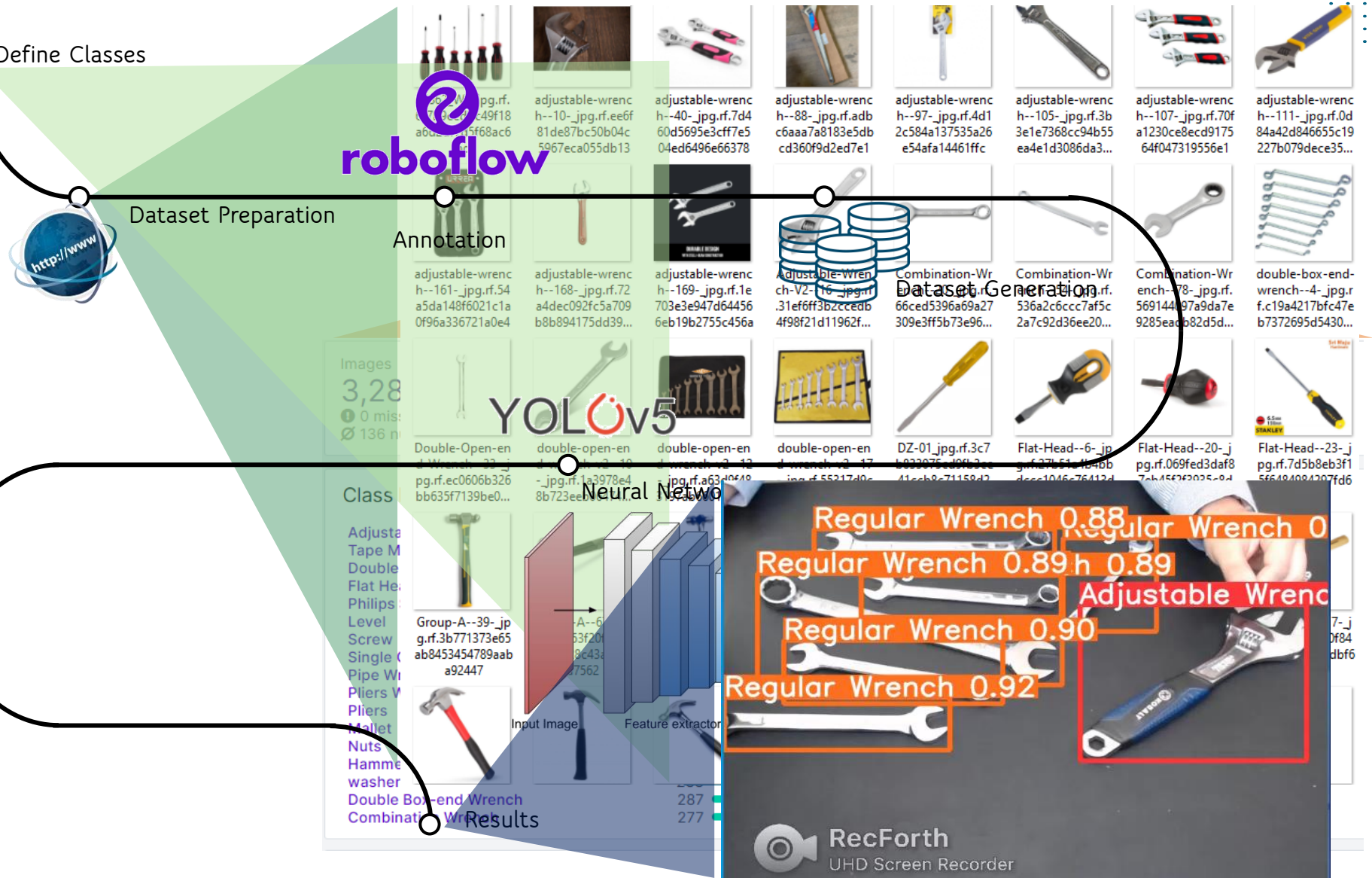
Dataset Generation

Neural Network

Results

roboflow

YOLOv5



Future Works:

1- Camera Integration

2- Grasping Mechanism Integration

3- Indoor Localization

4- Path Planning

5- Indoor Testing

105 Toomey Hall

Thank you!