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<th>Title</th>
<th>Intelligent control &amp; navigation of octocopter</th>
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<td>Author(s)</td>
<td>Yuan, Shenghai</td>
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Project Title: Intelligent Control and Navigation of Tilted Octocopter
Supervisor: Prof Er Meng Joo
Collaborators: Ms Zhang Yixin
Co-supervisor: Prof Xie Lihua

**Methodology**

1. Vision Sensor Unit
   - Hacked KINECT sensor output RGB & Depth image to Mini-PC. Both image are in 640*480 resolution

2. Vision process Unit
   - Vision tracking program is written to Process vision data. Output yaw pitch roll & altitude command to Ardupilot board
   - Duo core Windows 7 based Mini PC
   - Visual studio C++ configuration
   - OpenCV & OpenNI plug-in
   - Apple device wifi control enabled

3. Ardupilot Mega Receive Yaw Pitch Row Alt cmd and process
   - Ardupilot Mega Microcontroller 2560
   - IMU include 3 axis GYRO & ACCELEROMETER

4. Driver receive Processed PWM from Ardupilot mega to each Actuator @ 8 corners
   - 20A ESC, 20A Bell brushless out runner motor & 10 * 3.9 propeller

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**System introduction**

Project is about building autonomous UAV Vision guidance system & exploring various vision process method

Originally designed to
Compete in indoor flying competition
Enhanced function include
Tracking & Explore

**Future Work**

- Stability Improvement
- Program optimization
- Aircraft carrier and navigator
- Weight Reduction
- Multi user & layer access control

**Specs**

- Dimension: 1m*1m
- Weight: 2kg
- Max take-off Weight: 5.4kg
- Speed: 20km/h
- Max Flying time: 15 min

**Future Work**

- 3D Skeleton Command recognition
  - With OPENNI plug-in
- Object/Car tracking
  - With OPENCV plug-in