



LEAPDRONE

GESTURE CONTROL OF DRONE USING A MOTION CONTROLLER

HUMAN COMPUTER INTERACTION

YEAR 2018 | SEMESTER 1



GROUP #3

LAIZEN PAPITI 59090008
POONYAWEE VISETPUTTASART 59090023
SITINUT WAISARA 59090030

PROUDLY PRESENTED BY

GROUP #3



LAIZEN PAPTI

59090008



POONYAWEE
VISETPUTTASART

59090023



SITINUT WAISARA

59090030

1.

INTRODUCTION

Let's start with
the overview

“

Why is it **SO HARD** to learn how
to fly a drone?



OUR CONCEPT

Drone should be easy to fly. No more spending days learning how to fly a drone.



INTRODUCTION

- ▶ This project aims to supply an **intuitive control scheme** toward the end-user who wishes to control a drone but are intimidate by the complex controls.
- ▶ To achieve this, the project based the controls of a drone on the **orientation of a human hand**.
- ▶ This open the project up for use by those with **special needs** so long as they did not lost control of their entire arm.

2.

METHODOLOGY

Hardware,
Structure,
Process Flow,
Screenshot

HARDWARE: LEAP MOTION



LEAP
MOTION

Leap Motion by
LEAP

HARDWARE: **TELLO DRONE**

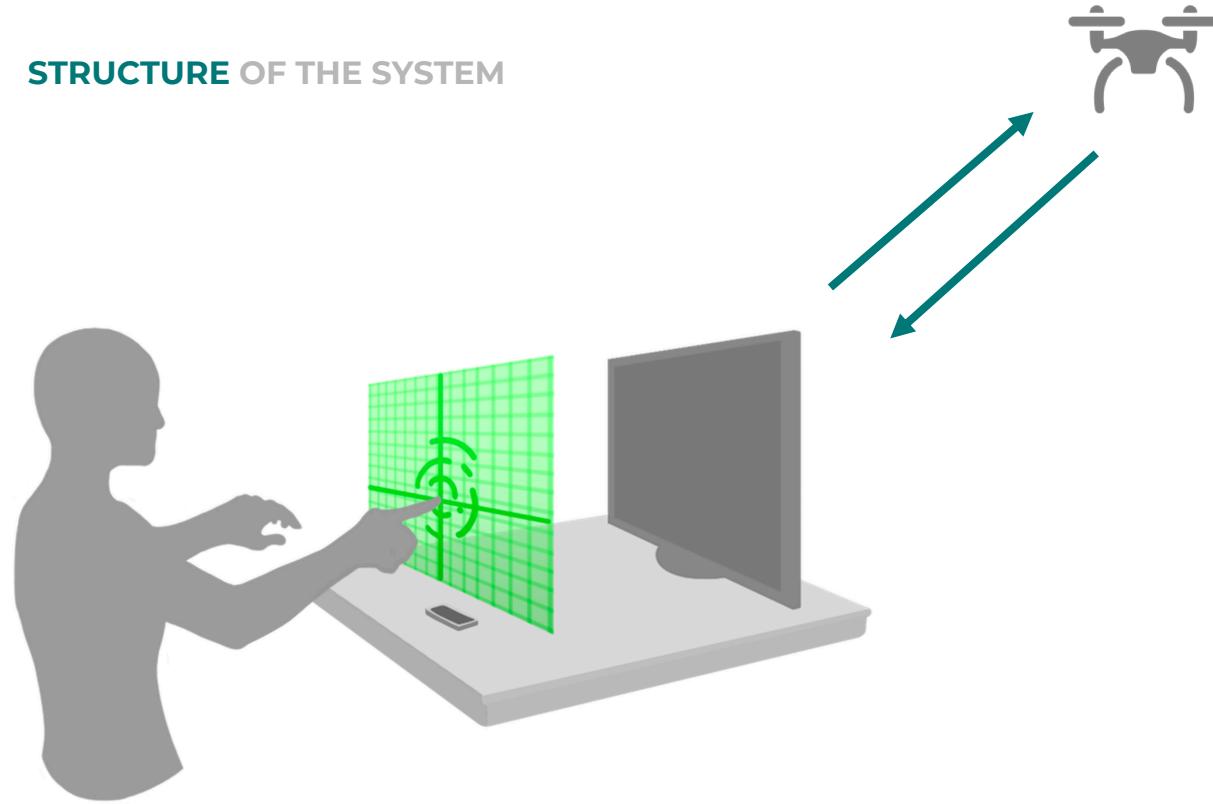


TELLO



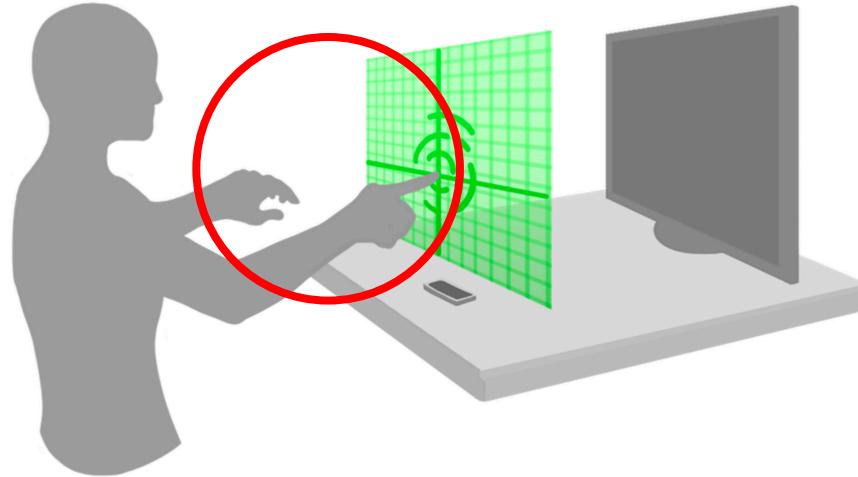
Tello Drone by
DJI

STRUCTURE OF THE SYSTEM



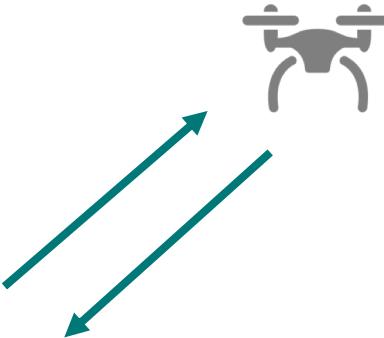
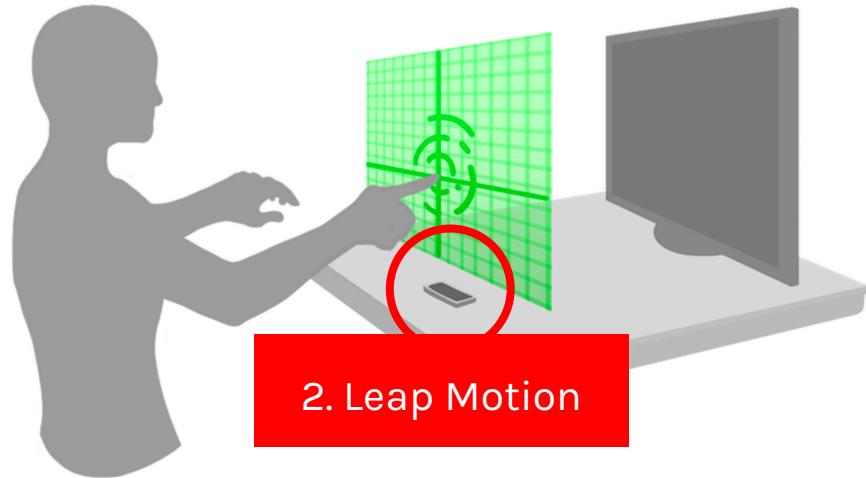
STRUCTURE OF THE SYSTEM

1. Hand Gesture



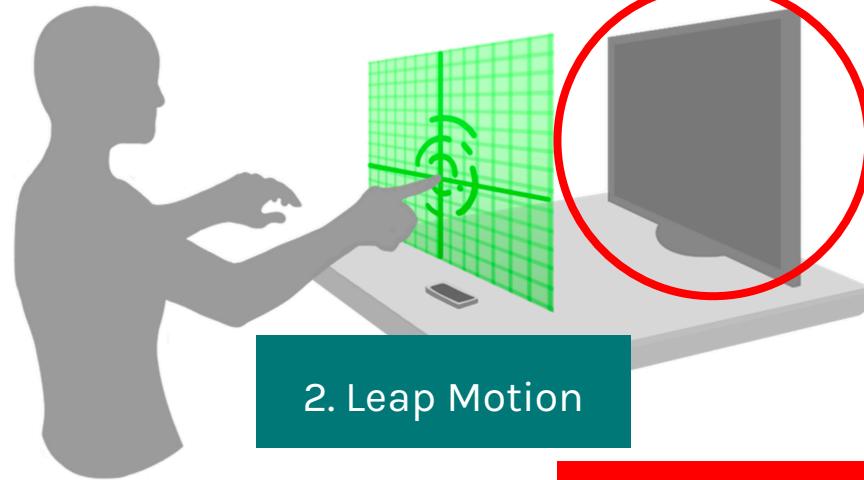
STRUCTURE OF THE SYSTEM

1. Hand Gesture

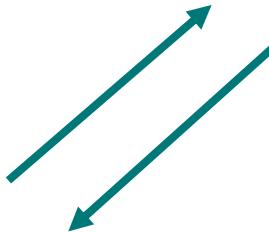


STRUCTURE OF THE SYSTEM

1. Hand Gesture



2. Leap Motion

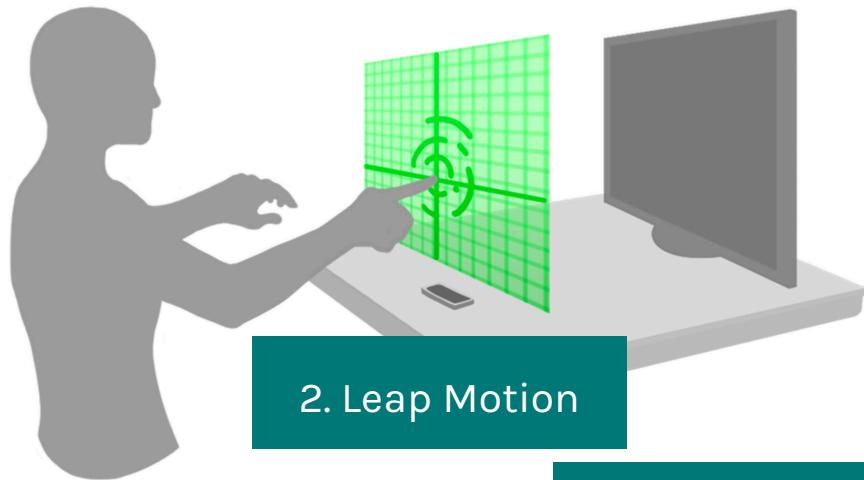


3. LeapDrone
Software

4. Tello Drone

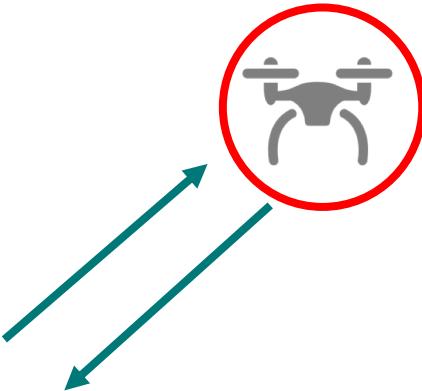
STRUCTURE OF THE SYSTEM

1. Hand Gesture



2. Leap Motion

3. LeapDrone
Software





OVERALL PROCESS

- Interface for sending command to drone
 - Receive drone status
-
- Handle raw data from input before send it to drone
 - Display necessary information through GUI
-
- Retrieve the data from Leap Motion controller

TelloPy



LeapDrone Software



Leap SDK



CODE AND STRUCTURE

Hardware API

- Leap Motion
(Leap Python SDK)
- Tello Drone (TelloPy)

Language and Tools

- Python 2.7
- Pygame



DESKTOP APPLICATION

LeapDrone Software
(Windows)

The screenshot shows the LeapDrone software interface on a Windows desktop. At the top, there's a header bar with the text "GND SPD: 0", "HEIGHT: 8", a hand icon with arrows indicating movement, the "LEAPDRONE" logo, and "GESTURE CONTROL OF DRONE USING A MOTION CONTROLLER". To the right of the logo is a battery icon showing "BATTERY 80%" with four blue bars. Below the header, on the left, are three lines of text: "ROW (X) -0.0", "PITCH (Y) 0.56231790781", and "YAW (Z) 0.0". On the right, there are two status lines: "ACTIVE CONTROLLER Leap motion" and "LEAP ENABLE? True". In the center, there are two 3D models of a quadcopter drone: a "Rear view" on the left and a "Side view" on the right. At the bottom, a message box displays the text "<Event(11-JoyButtonUp {'joy': 0, 'button': 5})>".

3.

DISCUSSION

Problems,
Solutions
Pros & Cons,
Conclusion



PROBLEMS

- ▶ Leap Motion is **obsolete and outdated**
- ▶ Leap Motion only support **Python 2.7**
- ▶ Problem with Leap SDK on **MacOS**
- ▶ Drone is **hard to control**



SOLUTIONS

- ▶ Leap Motion is ~~obsolete and outdated~~ → Accept the truth
- ▶ Leap Motion only support ~~Python 2.7~~ → Learn Python 2
- ▶ Problem with Leap SDK on ~~MacOS~~ → Use Windows instead
- ▶ Drone is ~~hard to control~~ → Practice makes perfect



PROS AND CONS

<u>PROS</u>	<u>CONS</u>
<ul style="list-style-type: none">• No control of fingers needed• Controls easy to figure out• Built-in collision detection	<ul style="list-style-type: none">• Extremely difficult to control drone's flight level• Easy to accidentally displace hand• Hard to keep track of the direction the drone is facing



CONCLUSION

- ▶ We were able to produce a **fully functional controls** for the drone by mapping hand orientation information from the Leap Motion and map that information to the drone flight path and flight level.
- ▶ This result eased all doubt with regards to the **feasibility** of the project.
- ▶ This project could be used with AR and VR devices in order to **enhance the user experience**.

WANT TO FLY?
Just Try
LeapDrone





THANKS!

Any questions?

You can ask me anything!