


CSL Lab 02 Report

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Video link: <https://www.csie.ntu.edu.tw/~b10902067/CSL-lab2/>

1. Summarize what you have learned in this lab

- Unity:
 - Basic Stuff:
 - Became familiar with the Unity editor window and how to navigate in the scene.
 - Learned how to use C# scripts to control objects and interact with each other.
 - Learned how to use canvas in Unity and apply custom fonts.
 - Learned how to apply sound effects on different events.
 - Learned how to use sockets and wireless connection in Unity.
 - Other Stuff:
 - Learned how to import new models to the project and assemble them in the scene.
 - Learned how to use shader graph to enhance visual performance and how to apply them on materials.
 - Learned how the animation system works in Unity.
 - Tried out many particle effects.
- Arduino:
 - Learned how to use digital / analog read to input the signals read from the sensors (the  sign for analog on the arduino board).
 - Learned how to use the I2C protocol to send signals from the gyro to the Arduino board and use Wifi to send signals from the Arduino board to the client (Unity).
- Wiring:
 - Use Dubon wires and the breadboard for development, and soldering wiring and the perfboard for the final product.
 - Learned how the potentiometer, resistors, the switch, and the IMU gyro sensor (GY-521) should be connected to the Arduino board.
- Laser Cut Case
 - Learned how to use Autodesk fusion to do 2D designing, for example, using rectangle grids to create finger joints.
 - Learned that laser cutting has a width, so when designing finger joints, the width of each tooth needs to be increased.

2. How you can improve your device and tell us what you did

- What we did

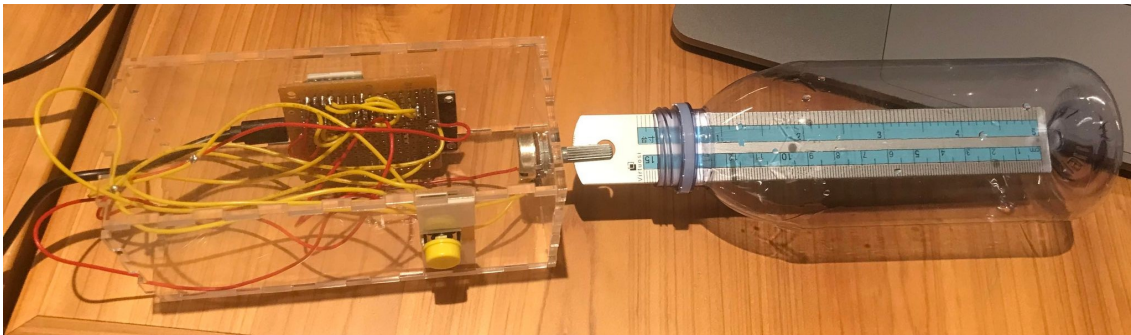
- Structure design

Our design is mostly based on the handle of the motorcycle. It consists of:

- A case (left) with a switch for **drifting** and a gyro for **rotational motion sensing**.
- A handle (right) for **acceleration** (just like twisting the throttle on the motorcycle).

Some user friendly designs:

- The handle: The plastic bottle is much easier to grip compared to the potentiometer. The size of the ruler also fits perfectly in both the potentiometer and the plastic bottle!
- The case on the left hand side is designed to be of the same size as the handle on the right for more balanced user experience.



- Arduino / Wiring

- Tested the wiring on the breadboard and used the perfboard for the final product.

- Unity

- Designed a new course map
- Dropping animation and respawn mechanics
- Drifting and boosting after enough drift charge
- Drifting effects
- More in video description

- How we can improve

- The appearance of the laser cutting case and the plastic bottle can be more beautiful.
 - Have more personalized controls for different reading values and user habits.

3. Some feedback for this lab to let us know what we can improve

- It might be better if the deadlines of Labs 2 and 3 do not overlap, so we can focus on one lab at a time.
- Thanks TA for spending time checking our sketches and helping us laser cut. :)