LYU1302

Perceptual Application Development using Intel Perceptual Computing SDK

We are going to implement a VIRTUAL string lion puppet

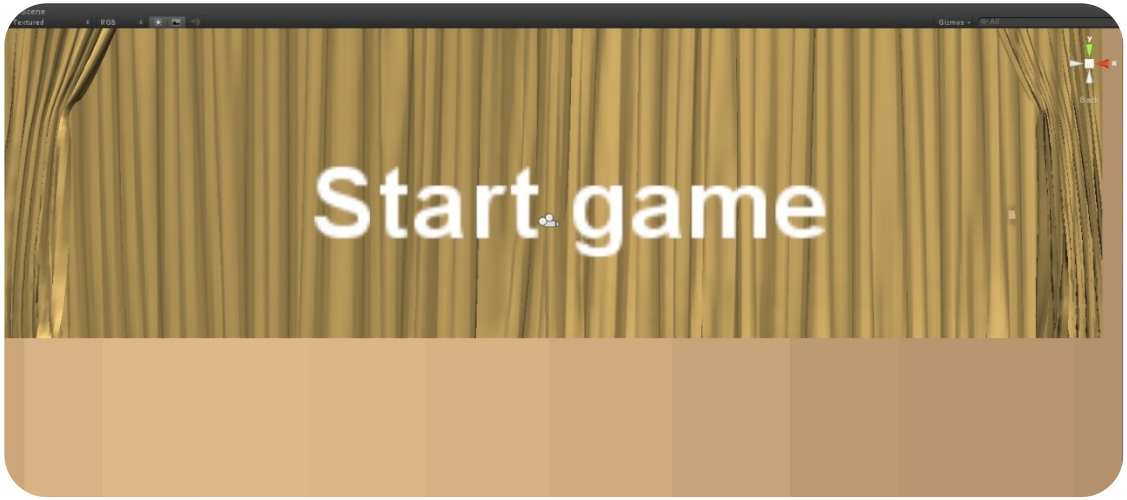
PROJECT OVERVIEW

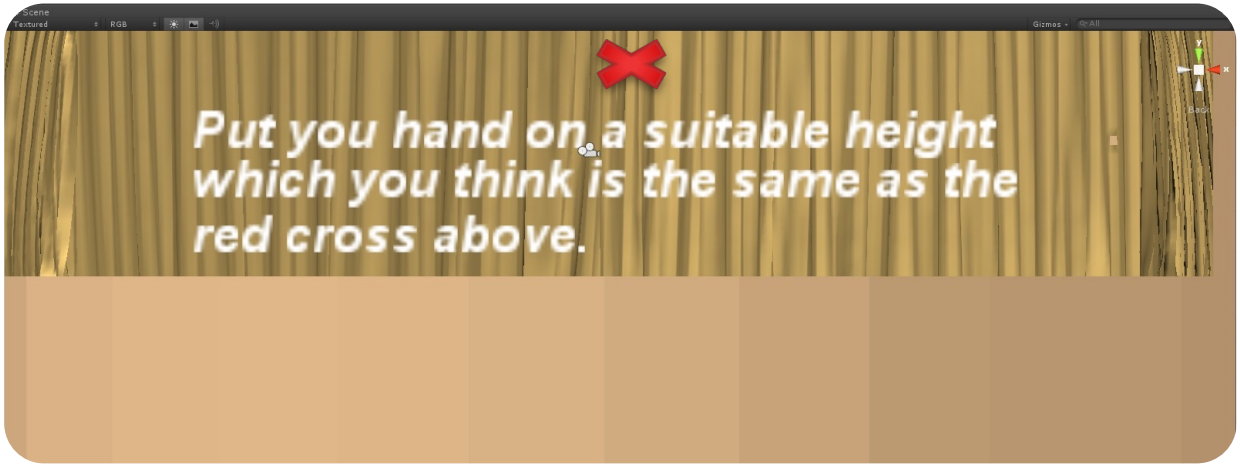
Running Scene

Key features

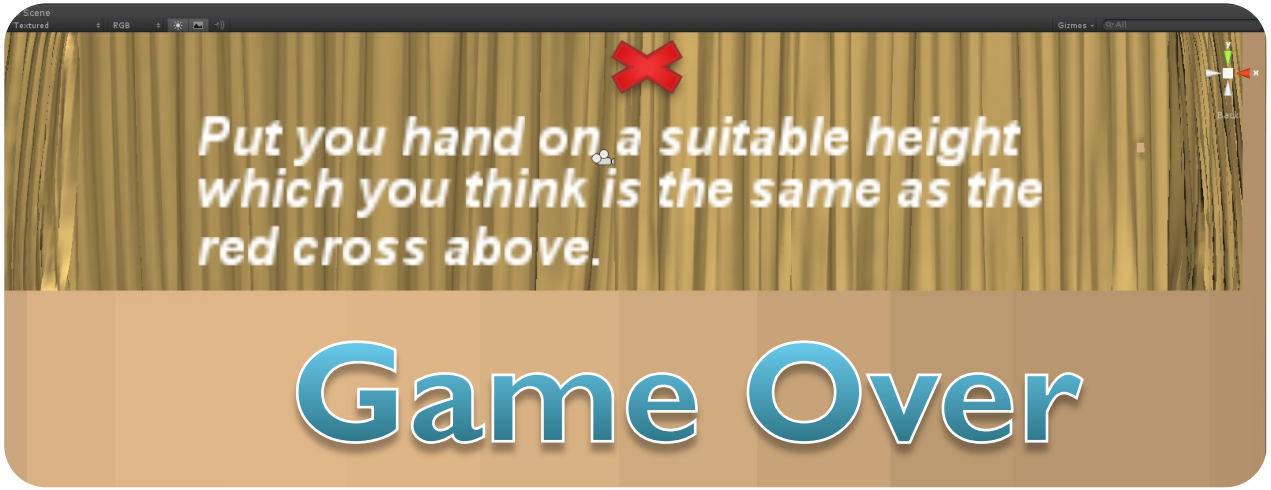
- Highly realistic physics environment
  - Traction effect
  - Collision
- Only hand control is needed
  - Gesture triggered animation
  - Movement mapping
- Background music and special event audio

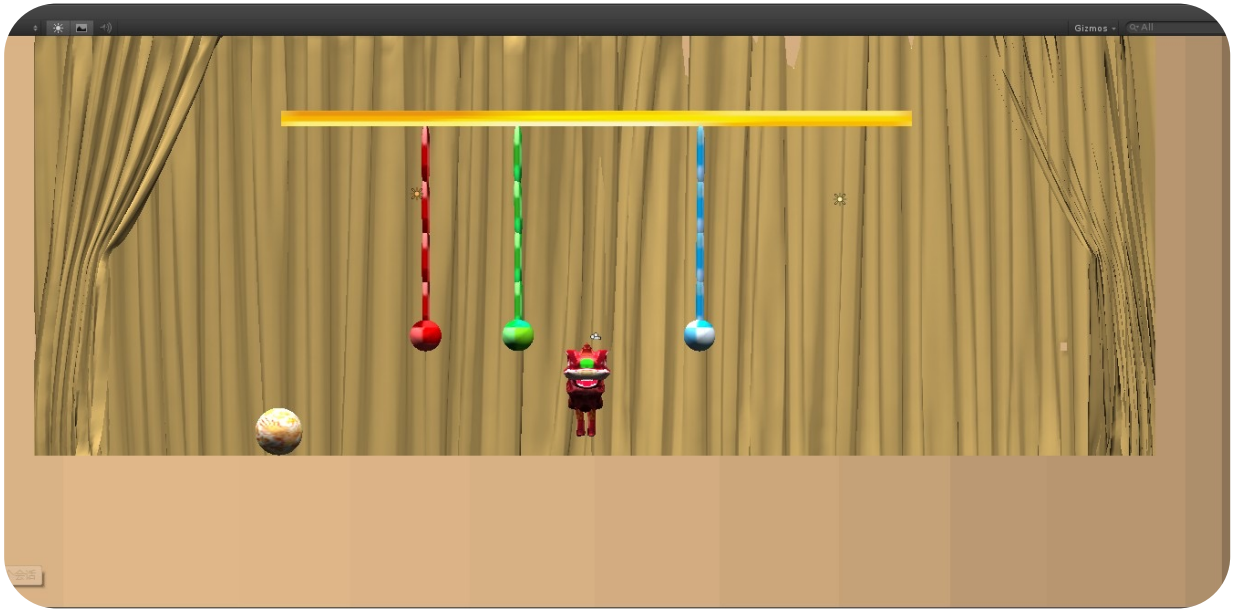
Working flow





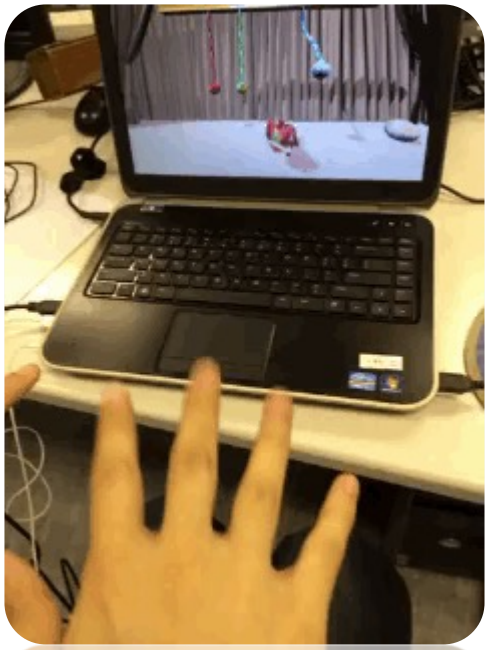
Working flow

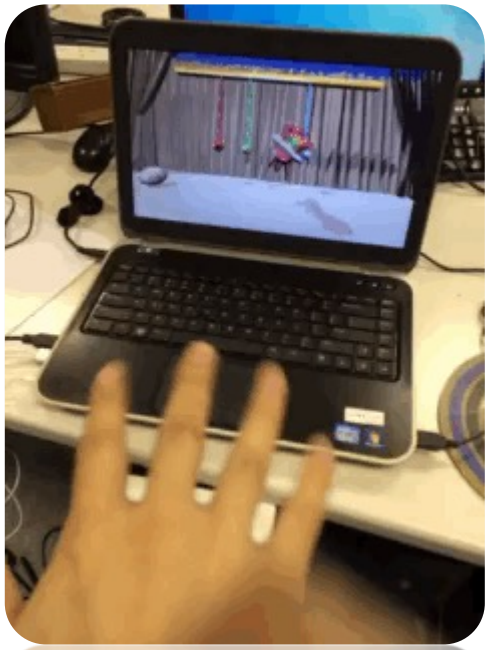


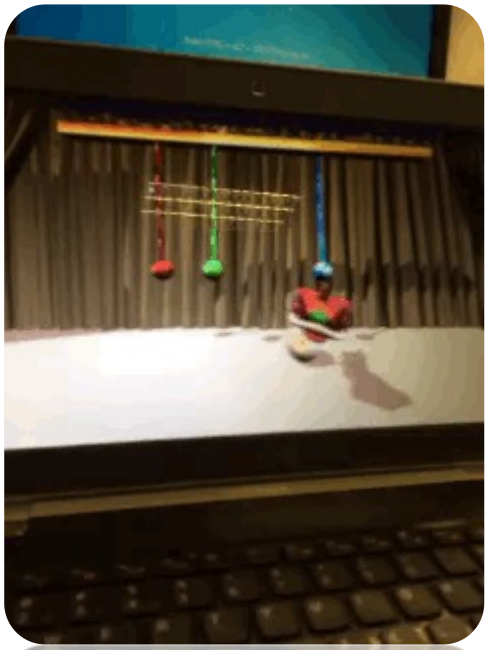


Working flow

Now, play with it.







What we did before? What we have done now?

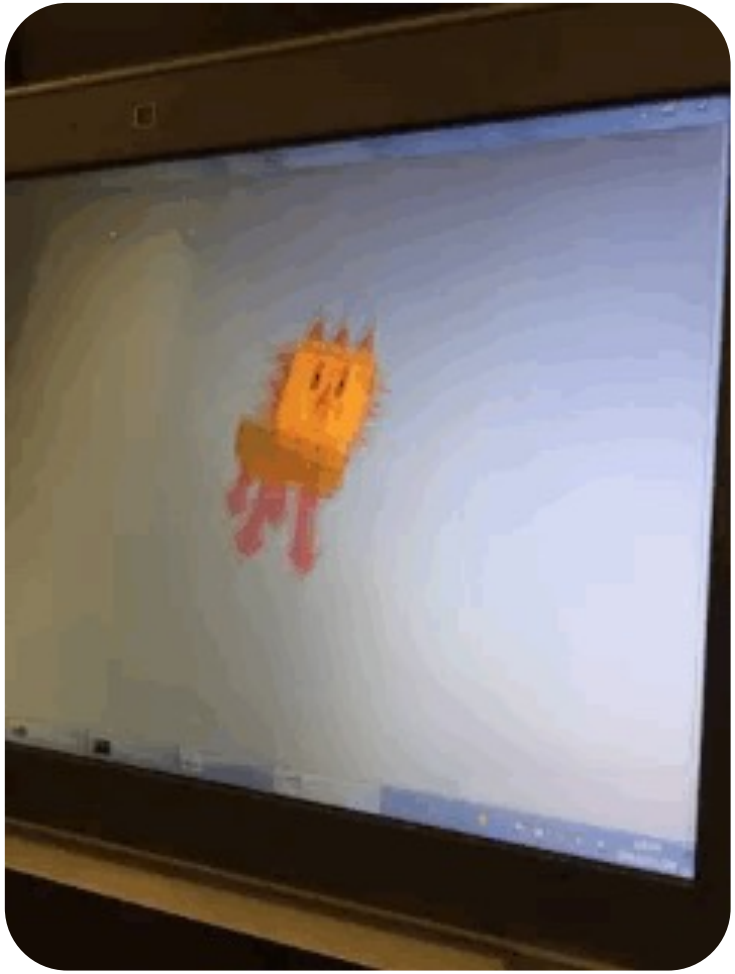
LAST SEM VS. THIS SEM

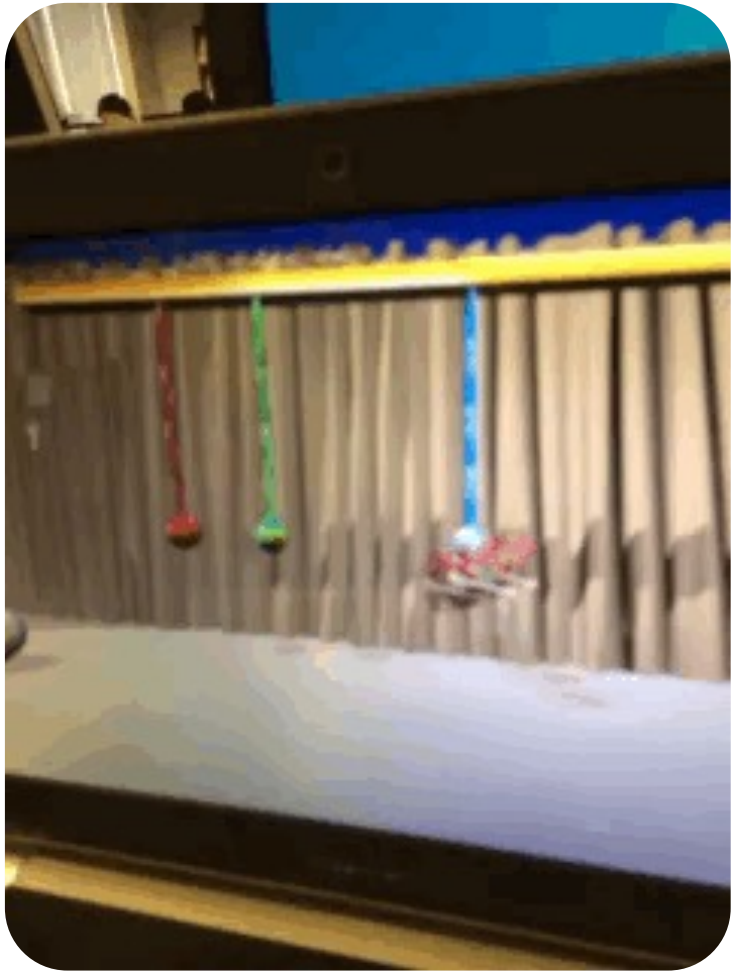
Last semester's Future plan

Conclusion

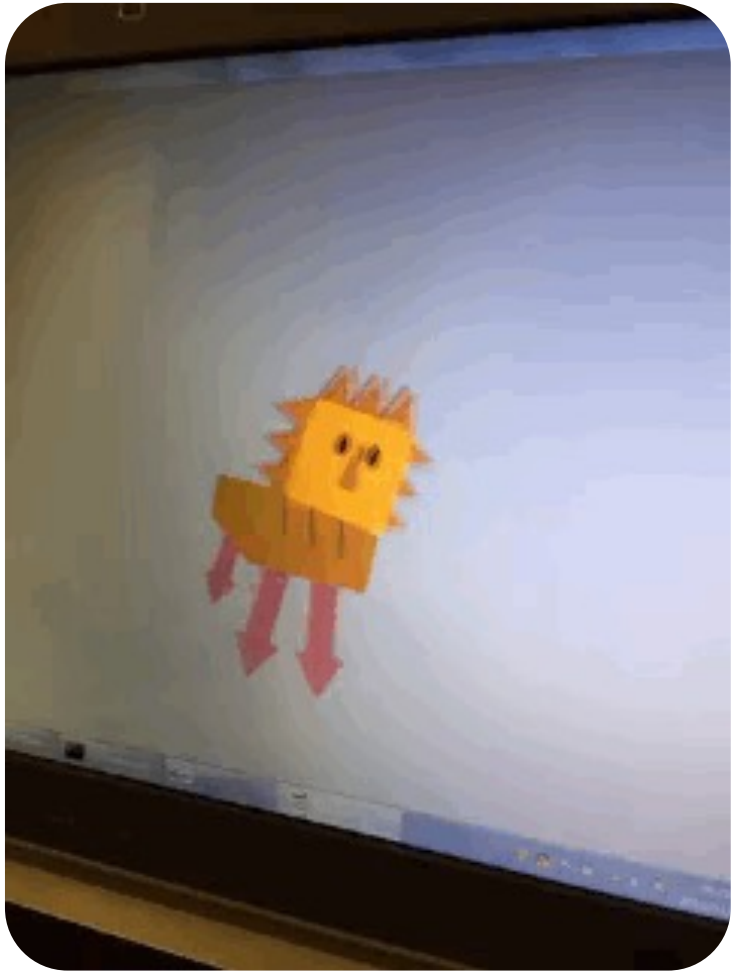
- *Future plan*
  - Introduce realistic physics engine, make the string lion puppet's behavior more realistic.
  - Algorithm optimization on solving lost-tracking problem; try to reduce and minimize system inherent error.
  - Pay more effort on lion puppet model rendering; make lion puppet's appearance has high similarity as real string lion puppet
  - Optimize the structure of code and data structure, improve code's efficiency, and reduce resource costs.

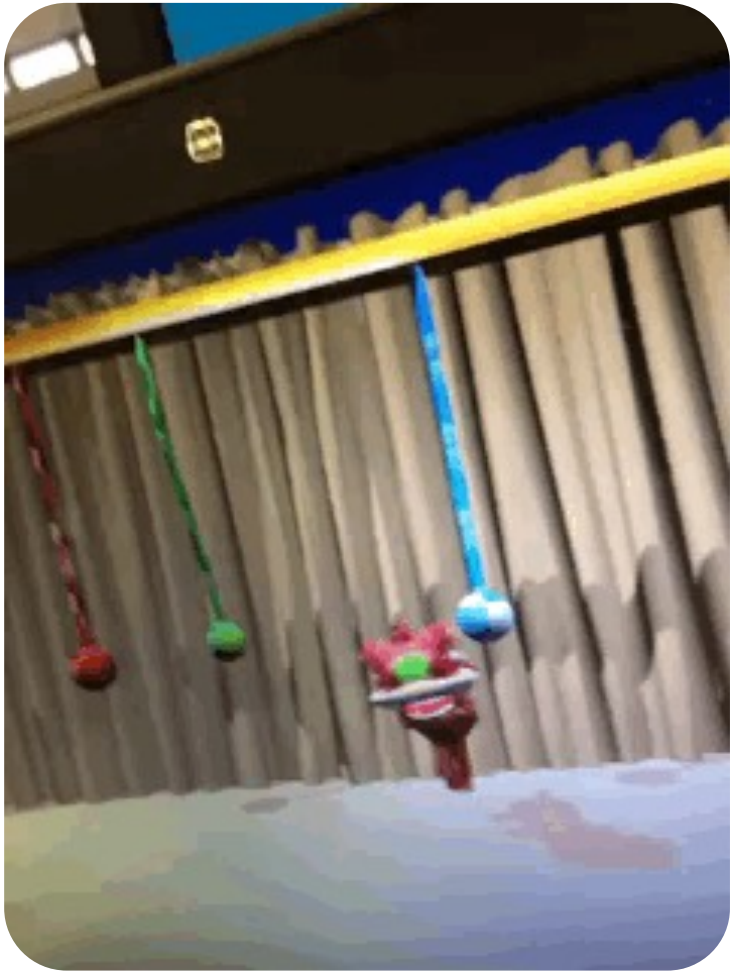
Last sem vs. This sem---Simple move



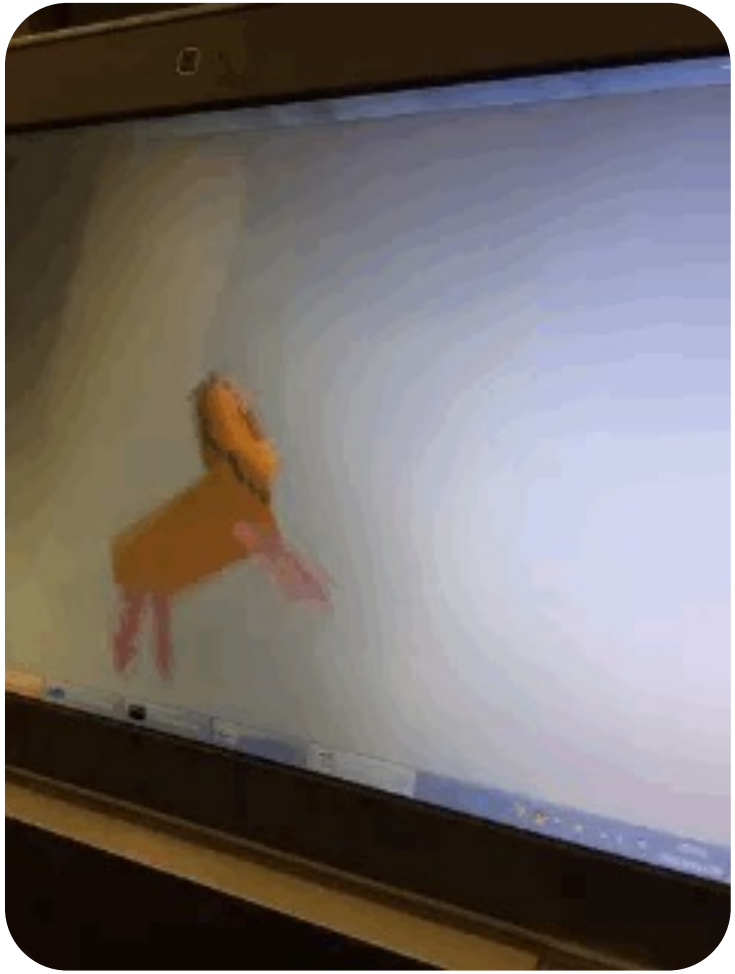


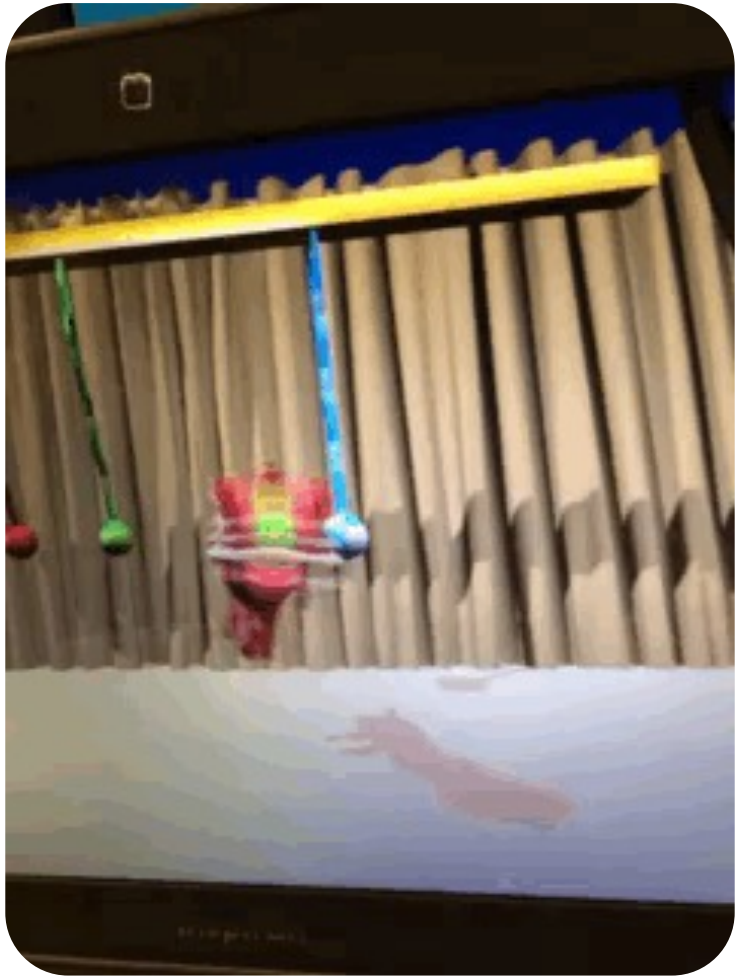
Last sem vs. This sem---Shake head



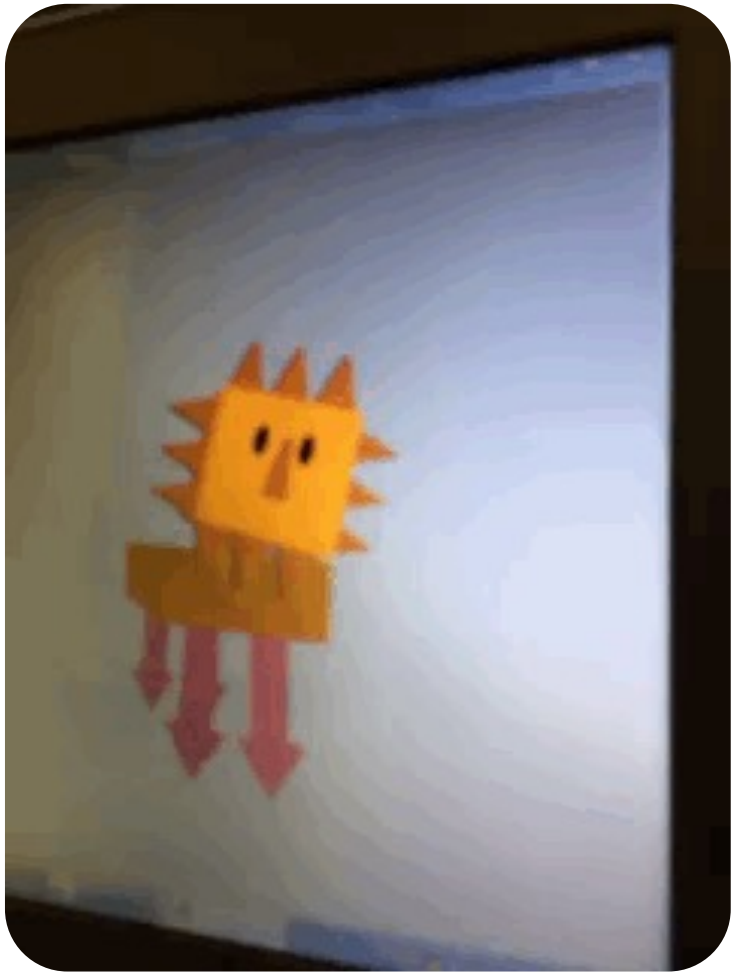


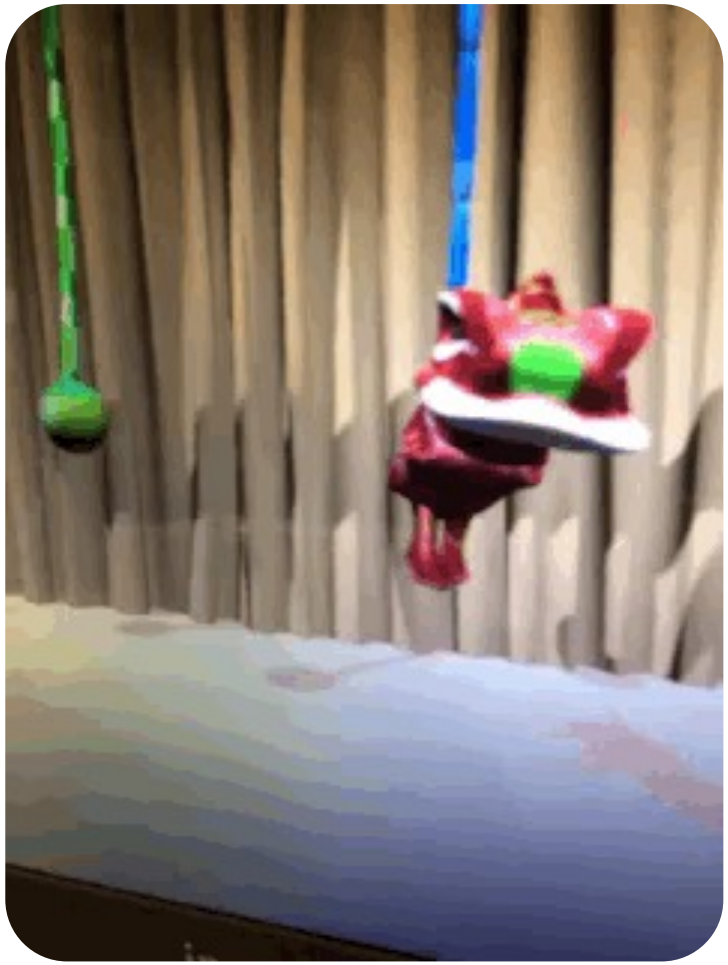
Last sem vs. This sem---Up & down





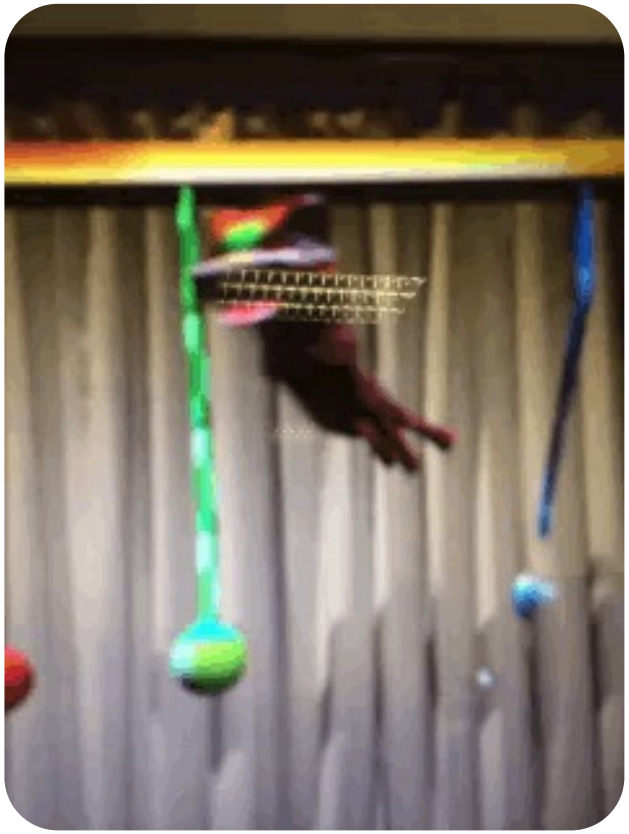
Last sem vs. This sem---Animation

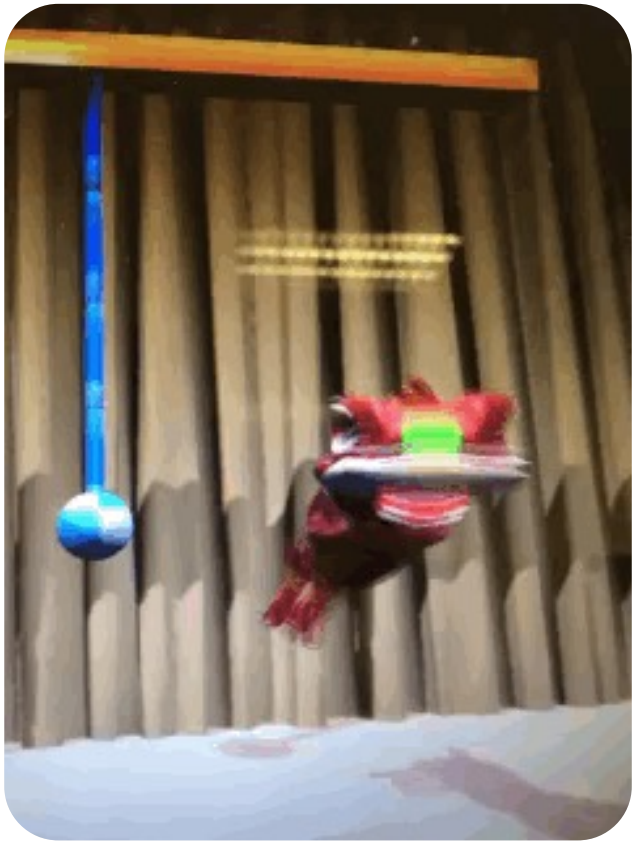




New on This term

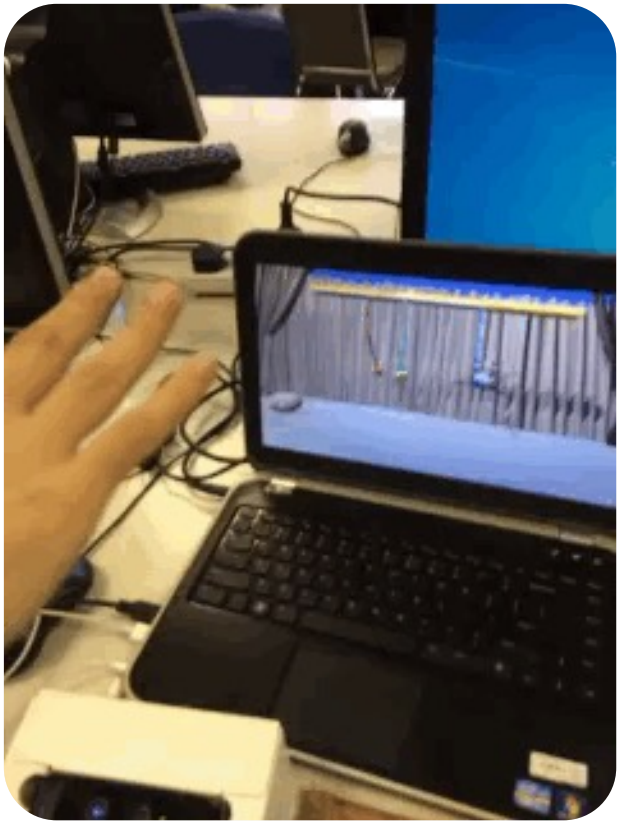
- Legs' nature waggling

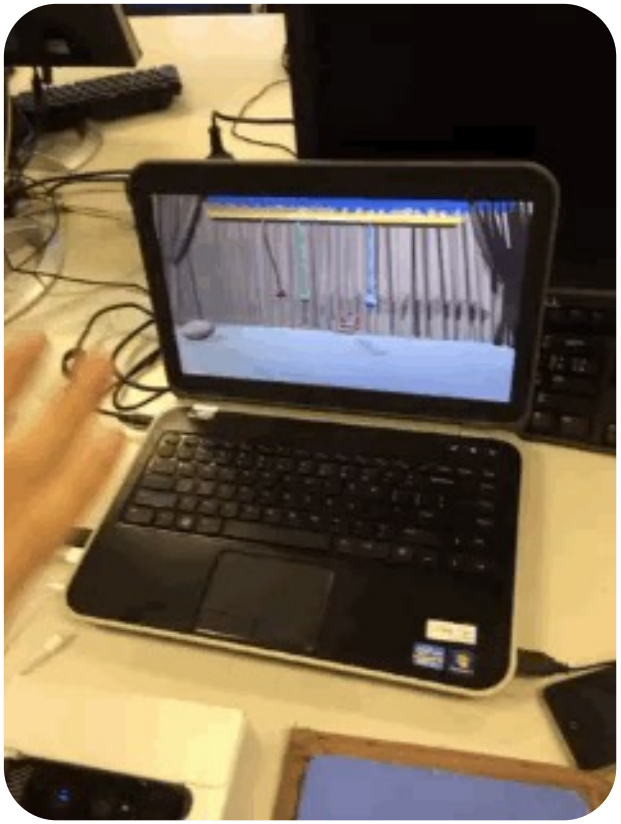




New on This term

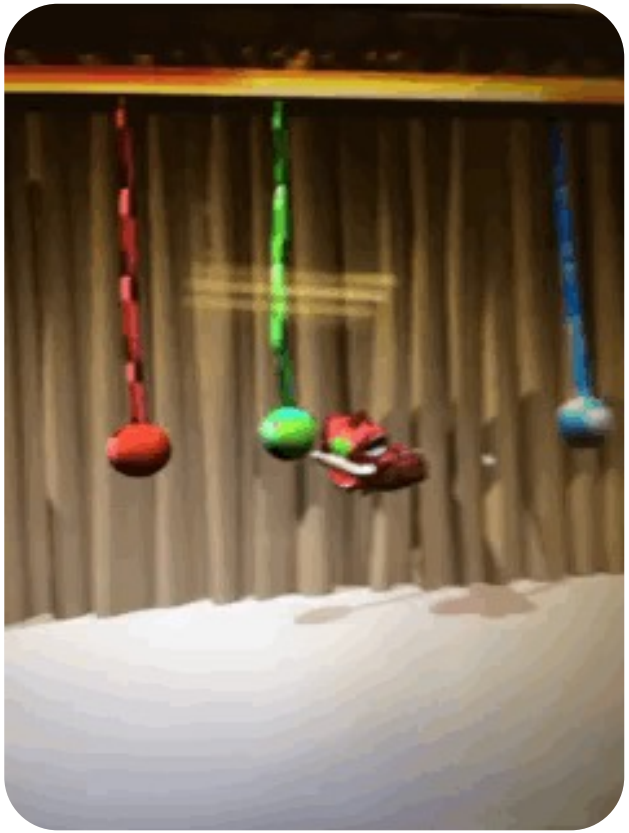
- Traction effect

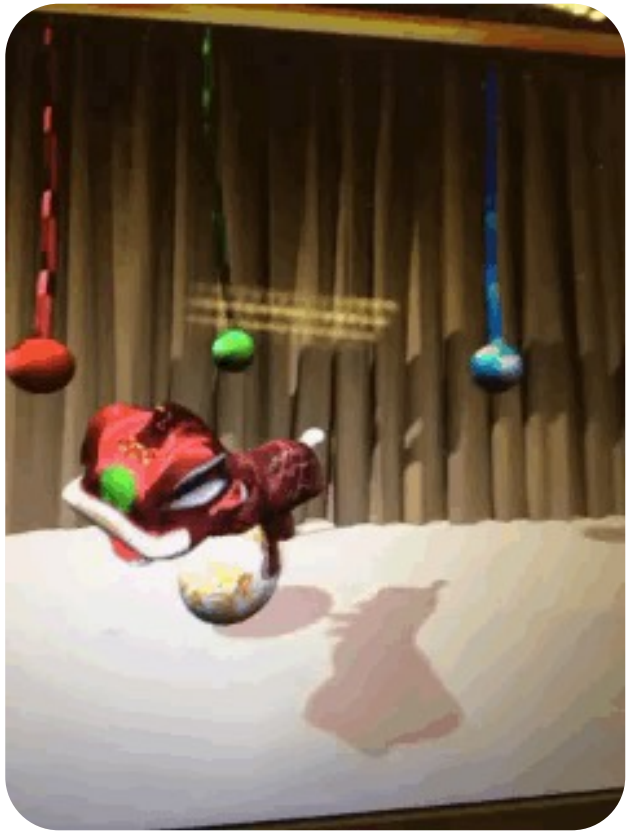




New on This term

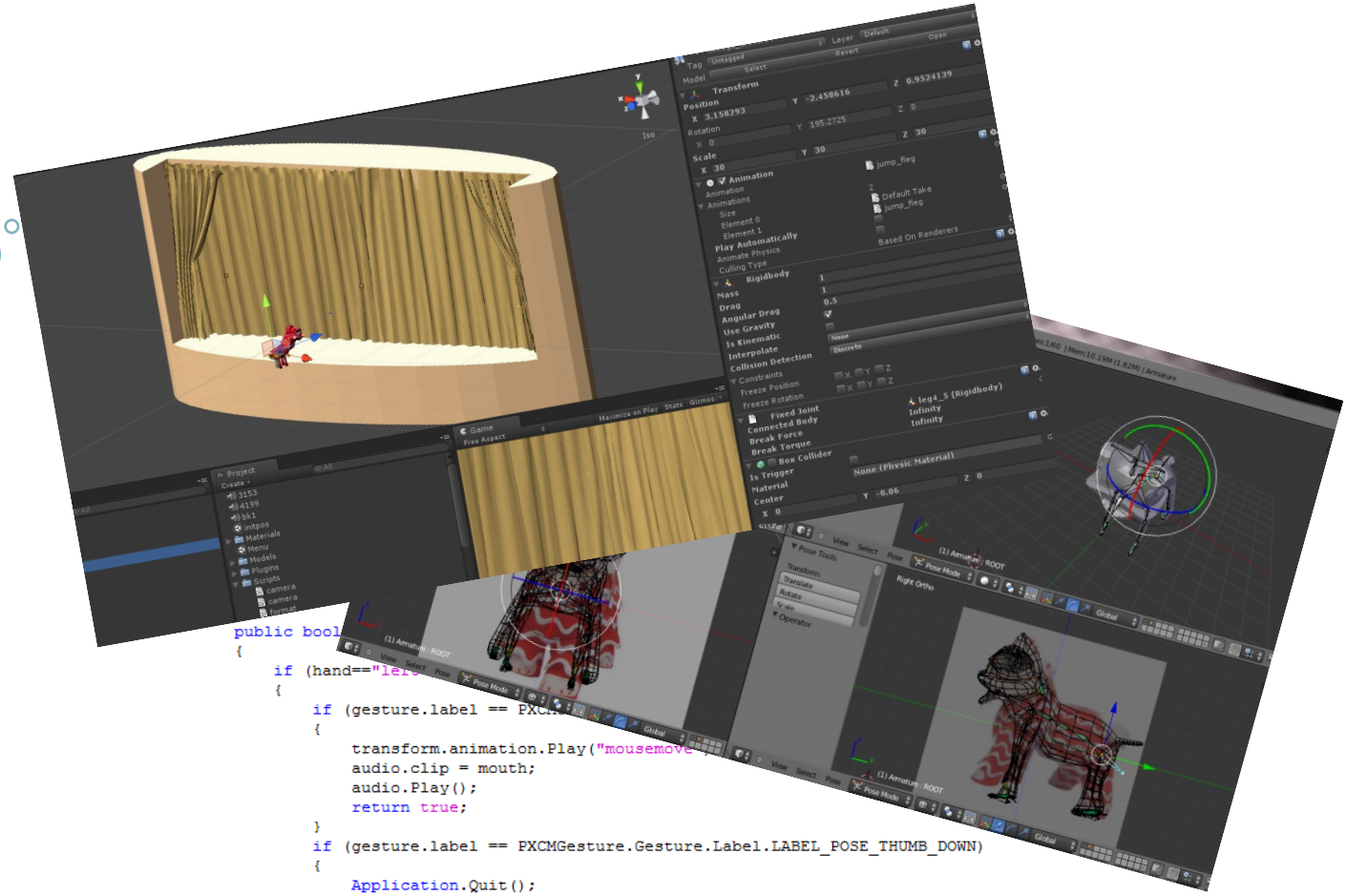
- Object Collision





How we made it?

IMPLEMENTATION DETIAL



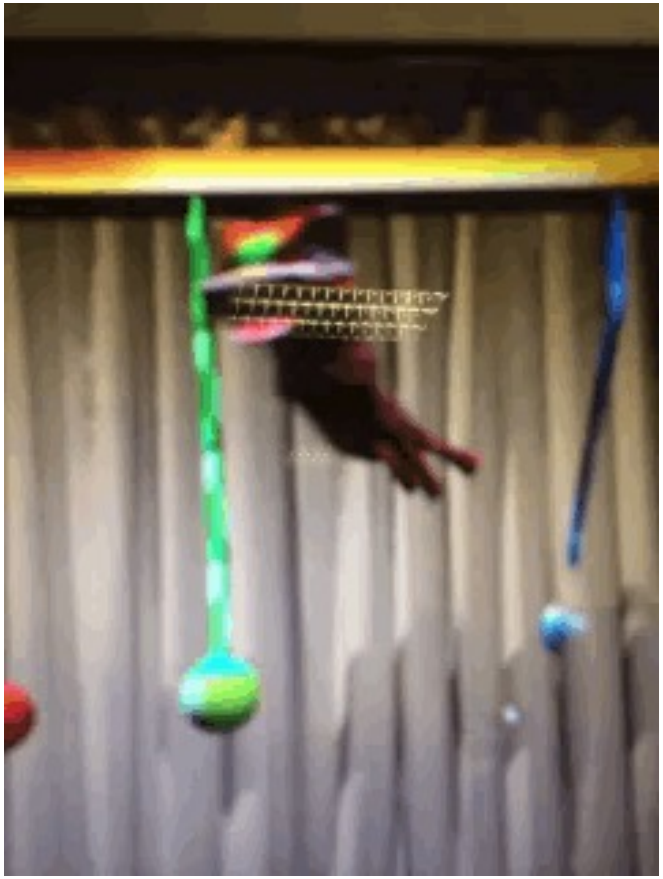
```
public bool
{
    if (hand=="lef
    {
        if (gesture.label == PXC
        {
            transform.animation.Play("mousemove
            audio.clip = mouth;
            audio.Play();
            return true;
        }
        if (gesture.label == PXCMGesture.Gesture.Label.LABEL_POSE_THUMB_DOWN)
        {
            Application.Quit();
        }
    }
    else if (hand == "right")
    {
    }
    else
```

Translation & Rotation---New methods

- Why new method needed
  - Unity instead of Openframeworks
    - Transform based on former frame
    - Transform with out change coordinate system
- What we did this semester?
  - Recalculate angle & displacement
    - Save last frame value

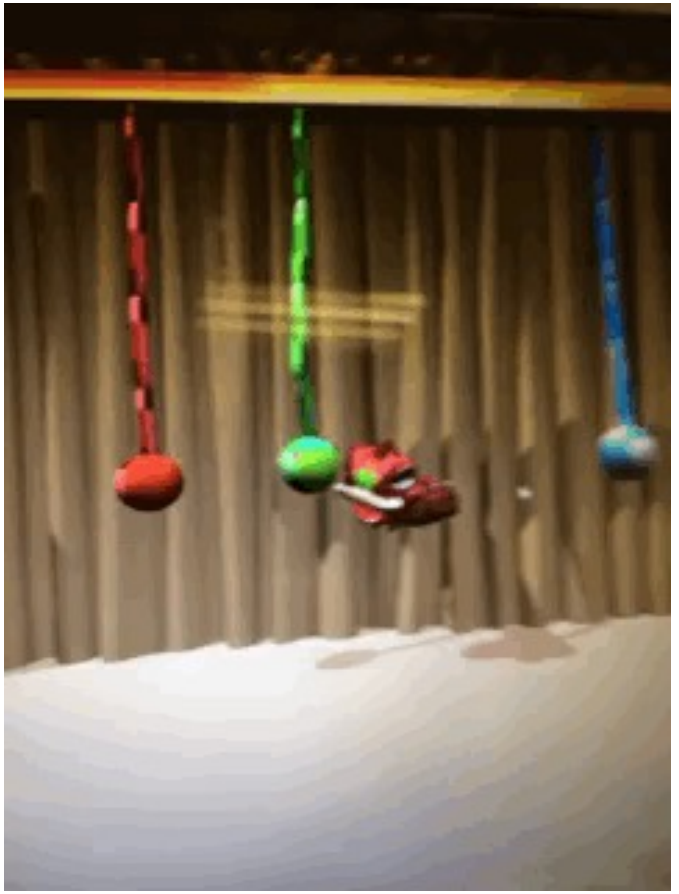
Physics effect

- Gravity & Inertial
  - Fixed joint
  - Hinge joint
  - Gravity



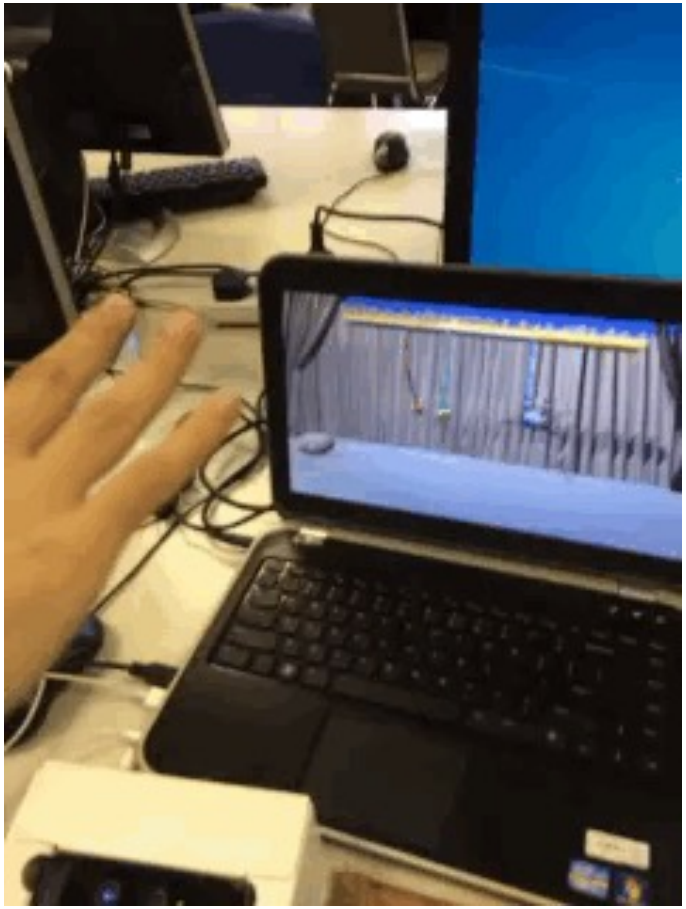
Physics effect

- Collision
  - Rigid body
  - collider



Physics effect

- Traction
  - Average value
  - Recent 10 frame



Optimization

- Code translation
  - Different platform, objects
- Resource saving
- Efficiency improvement
- Workload reduction
  - Easy to debug

What we learned

CONCLUSION

2013年9月

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2014年4月

日	一	二	三	四	五	六
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Conclusion

- What have done this year
  - Gesture information collection and recognition
  - 3D lion puppet construction and rendering.
  - Virtualized model (string lion puppet) behaviors pattern design.
  - Different dimension movement mapping.
  - Physics engine utilization.
  - System (Intel Perceptual computing SDK, Creative Camera) inherent limitation study and remedy.

Conclusion

- we learned how to reconstruct behaviors in real world in virtual computing world. At the same time, enhance our skills in software developing and programming.

- It is a precious experience for us, which will definitely benefit us in our future life
  - ---LYU1302

DEMONSTRATION