

Manus Glove VR Setup and Receiving Haptic Feedback

Chair of Robotics and System Intelligence

Department of Electrical and Computer Engineering

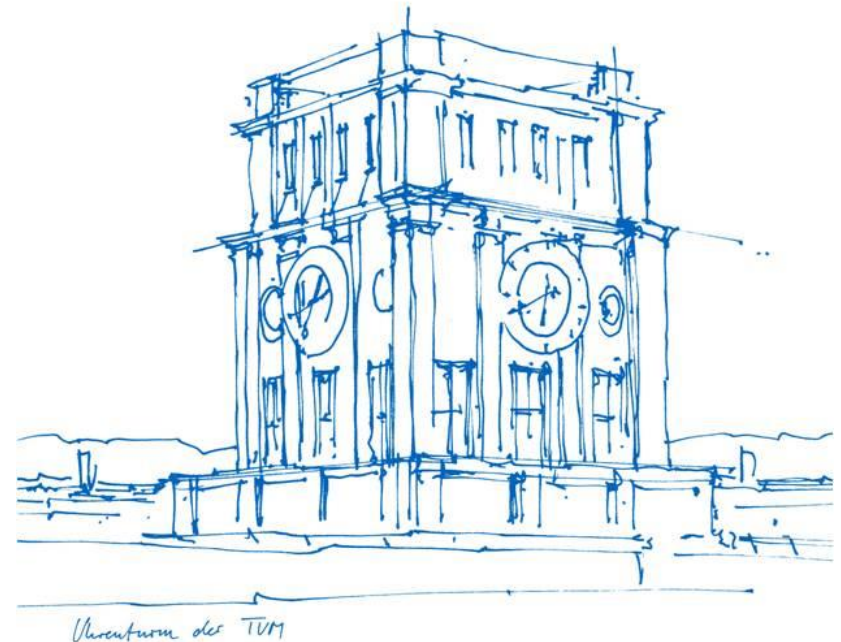
Technische Universität München

8. August 2022

Yanni Zhang

Sahil Salotra

Batu Kaan Oezen



Topics

1. Purpose of project.
2. Technologies used in the project.
3. Video of successful grasping and tactile feedback.
4. Roadmap of project.
5. Problems.
6. Further improvement.
7. References.
8. Demo time 😊

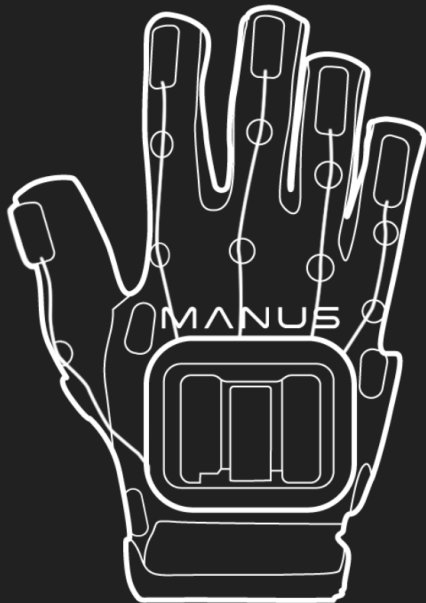
1.Objectives of project[1]:

1. Setting Manus Glove for unreal engine.
2. Making successful grasp in unreal engine.



2.Manus Glove[1]:

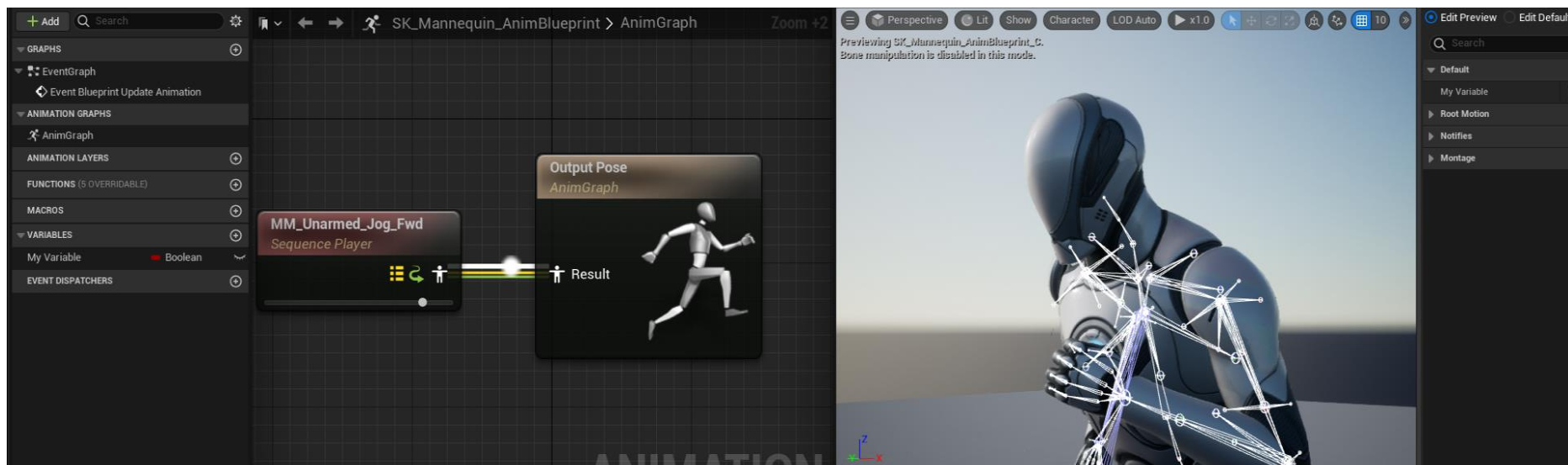
- Haptic Feedback
- Quick and easy calibration.
- Fast and accurate tracking.



Signal latency	< 5ms
Sensor sample rate	90Hz
Battery duration	5 hours (swappable)
Charging time	2 hours USB Type-C
Weight	70 grams
Wired communication	USB Type-C
Wireless communication	Proprietary high performance 2.4 GHz protocol
Supported operating system	Windows 10/11
Finger sensor type	5x 2DoF Flexible sensors and 6x 9DoF IMU's
Finger flexible sensor repeatability	>1.000.000 cycles
Orientation sensor accuracy	+/- 2.5 degrees
Textile information	77% Polyester 23% spandex (washable)

2.Unreal Engine[2]

Unreal Engine (UE) is a 3D computer graphics game engine developed by Epic Games. It uses a graphical software development tool called blueprint. It is based on object-oriented C++.



3. Successful grasping



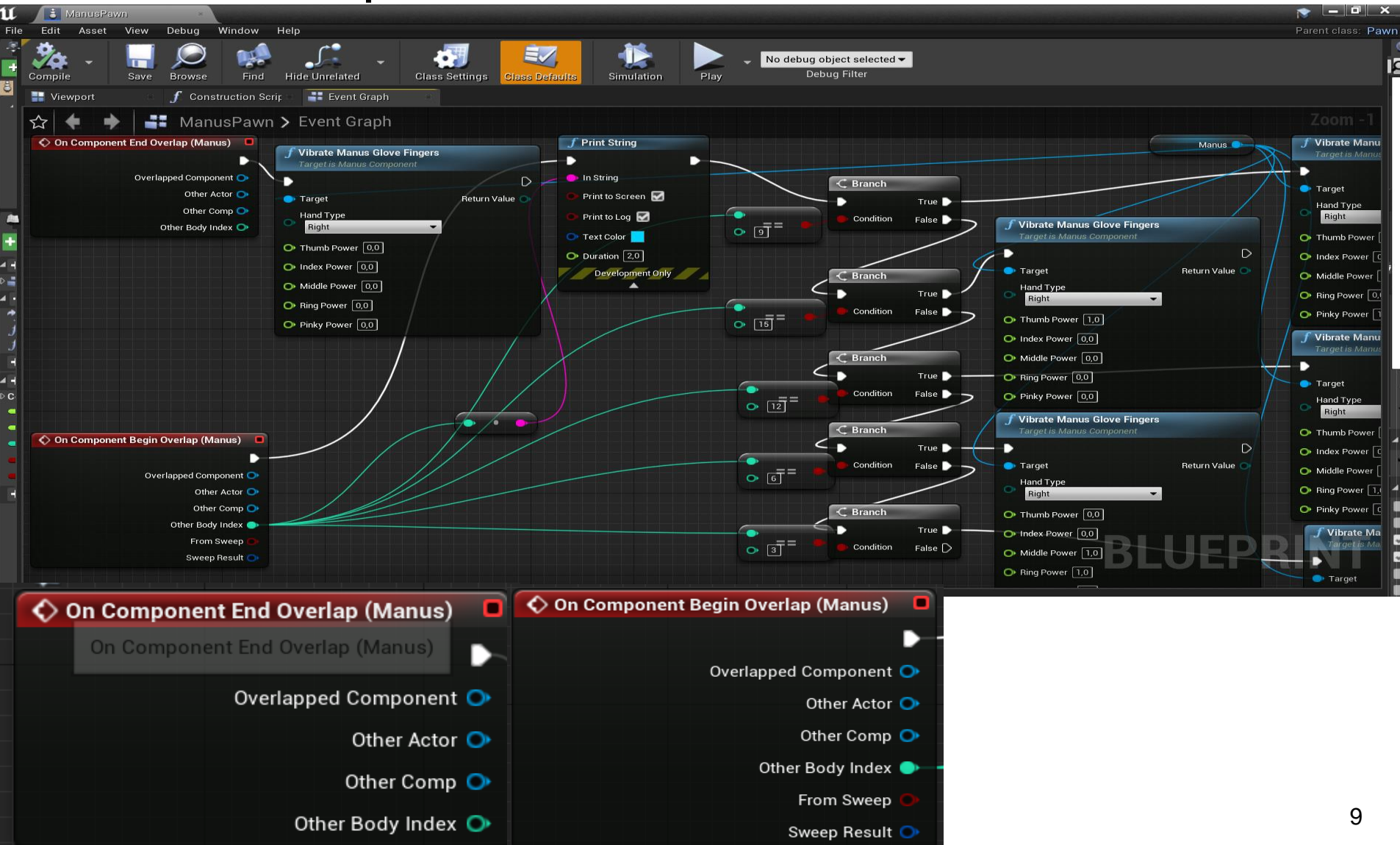
3. Successful tactile feedback:



4.Event Graph of Manus Pawn

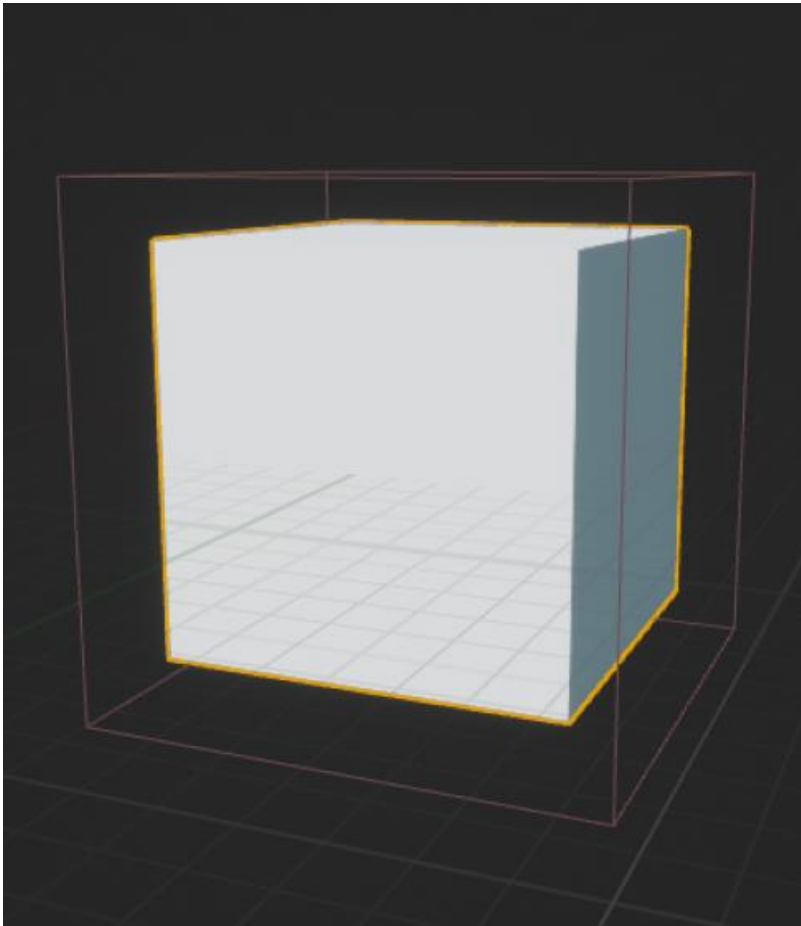


4.Event Graph of Manus Pawn.

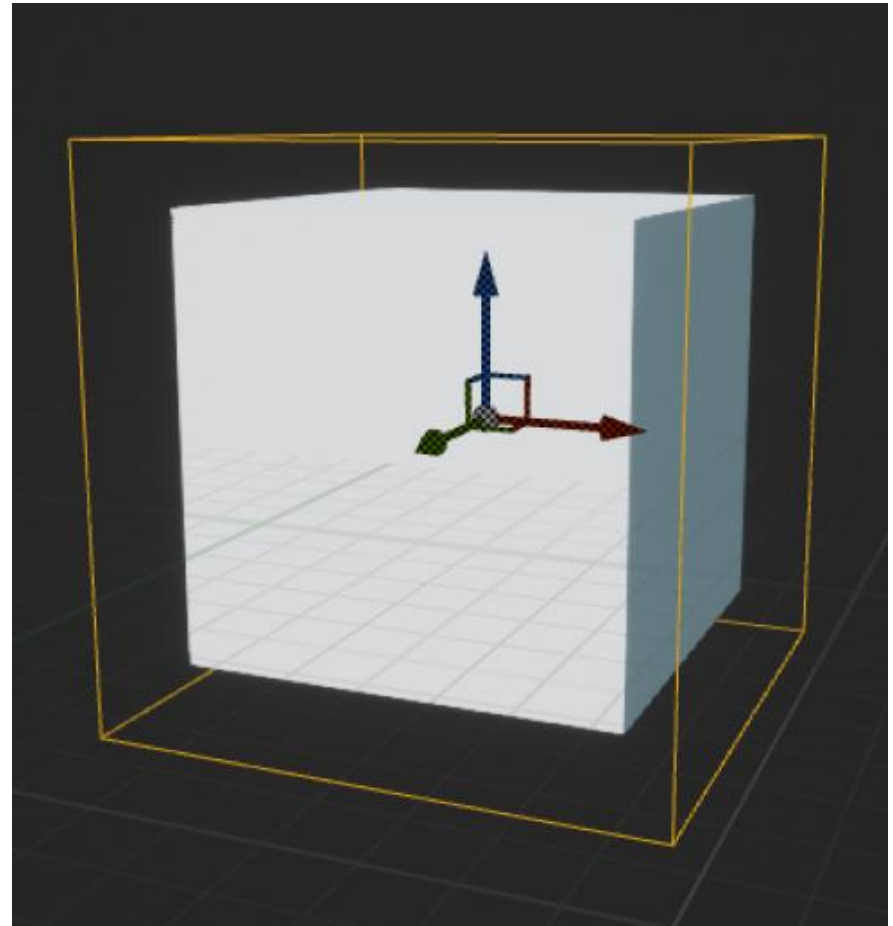


4. Collision Setting

Static mesh for Collision:
Collisions preset: PhysicsActor

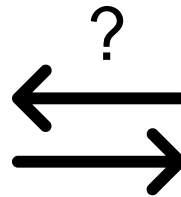


Static mesh for Overlapping:
Collisions preset: OverlapAll



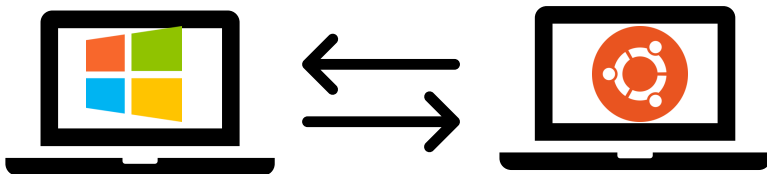
5. Problems we met during project[4][5][6]

Start of the project:

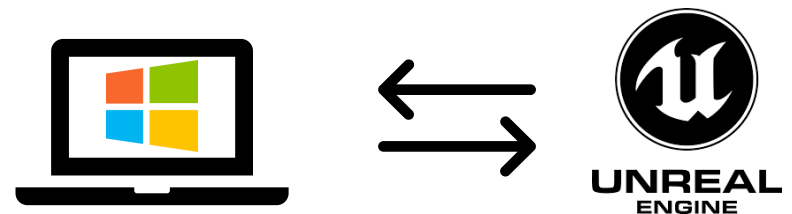


Two possible solutions:

1

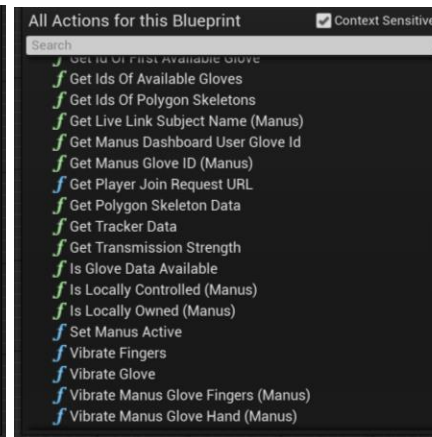
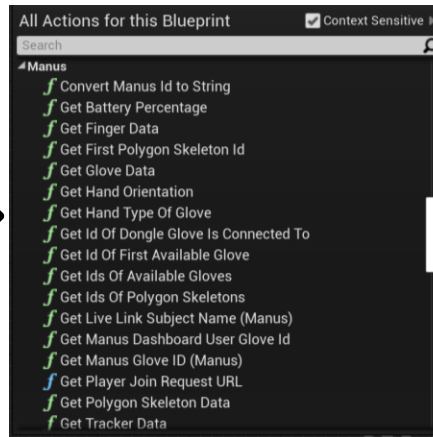


2



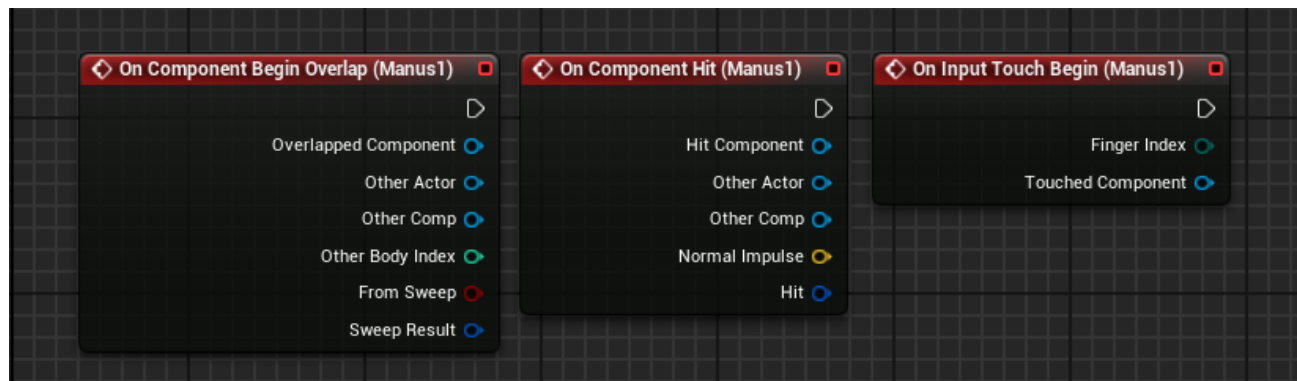
5. Problems we met during project

Many Blueprint-
functions from
Manus-Core plugin
for Unreal Engine



No
documentation
available

Many Blueprint-function
with similar names but
different use-cases



5. Problems we met during project

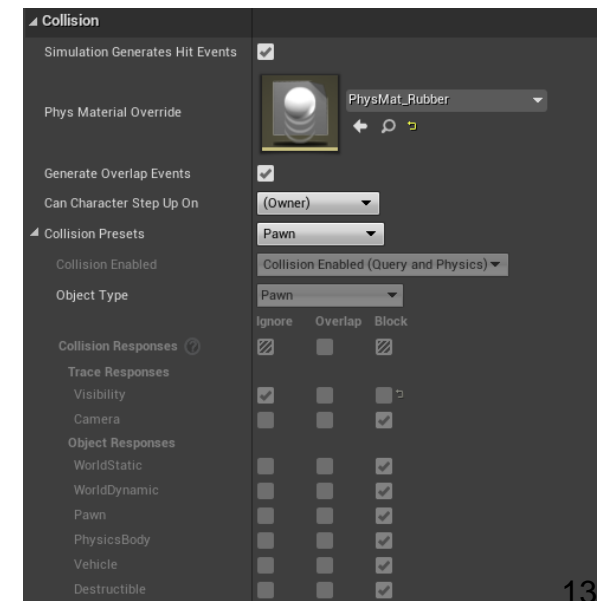
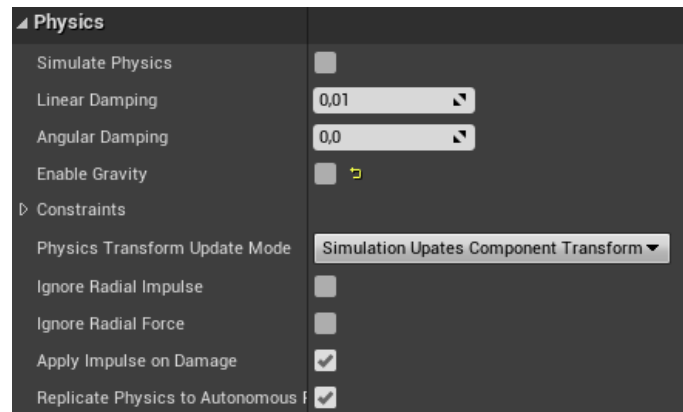
Work with blueprint
function with fixed setting
→ No clean Code (C++)

```
// Tell a Manus glove to vibrate its fingers. The first available glove of the given hand type will be used.
EManusRet UManusBlueprintLibrary::VibrateFingers(EManusHandType HandType, float ThumbPower, float IndexPower, float MiddlePower, float RingPower, float PinkyPower)
{
    TArray<int64> HapticDongleIds;
    EManusRet Result = CoreSdk::GetHapticDongleIds(HapticDongleIds);
    if (Result != EManusRet::Success)
    {
        return Result;
    }
    if (HapticDongleIds.Num() == 0)
    {
        return EManusRet::DataNotAvailable;
    }

    TArray<float> Powers;
    Powers.Add(FMath::Clamp(ThumbPower, 0.0f, 1.0f));
    Powers.Add(FMath::Clamp(IndexPower, 0.0f, 1.0f));
    Powers.Add(FMath::Clamp(MiddlePower, 0.0f, 1.0f));
    Powers.Add(FMath::Clamp(RingPower, 0.0f, 1.0f));
    Powers.Add(FMath::Clamp(PinkyPower, 0.0f, 1.0f));

    return CoreSdk::VibrateFingers(HapticDongleIds[0], HandType, Powers);
}
```

Change Properties
and Collision Setting
of Manus-Hand and
Grabable Object



6.Further Improvements

- Unreal Engine is a complex program with many powerfull tools → Invest more time in understanding Unreal Engine before beginning of project
- Our working approach during project was Trial and Error → Lost a lot of time because of lack of documenation of hardware component (Manus Core) → More knowledge on the hardware used would be better

References:

1. <https://www.manus-meta.com/>
2. <https://www.unrealengine.com/en-US>
3. https://www.youtube.com/watch?v=6Pm2dHmm0Qc&ab_channel=MANUS%E2%84%A2
4. <https://blogs.windows.com/>
5. <https://www.ros.org/>
6. <https://ubuntu.com/>

Questions and Demo 😊

Thank you for your attention.