

# Speed Control

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GIA HUY LE

Inspired by the channel The Slow Mo Guys on Youtube, I am thinking of a way where people can interact in the virtual world while manipulating the speed of everything. The user can observe the object and interact with it with whatever they want to do. They will be able to manipulate the speed of the object which can control the state of the object, make it fall extremely slow or make it go fast as bullets.

We are looking to create an immersive experience where users can have a better visual presentation of concepts like momentum, velocity and acceleration. AR and VR technologies offer exciting new ways to create immersive experiences that simulate power. It can be used for entertainment, education or maybe therapeutic purposes.

It can provide an interactive experience where users can control their movement and action such as using controllers or motion sensors to simulate the interaction with objects and environment. The app can be customised to vary scenarios where users can learn and observe different aspects of physics in the interactivity with objects.

Overall, the application can provide a great experience that users can feel like they are truly embodying the power. The app is designed to be engaging, interactive and customizable to meet the needs of different users

## **AR Components to implement**

[Gia Huy Le]

Nature of Reality Component used to recreate the environment and settings in the application. First, we are going to design a mobile application with unity software. The head-mounted display and controllers are not within the scope of our consideration. Because of the head devices, such as Google Glass and the Oculus Quest Head Device, have a low penetration rate among the world. It won't be very profitable and there will be fewer users after development.

Location Components can be used as a method to track location and scan to recreate surroundings which can interact with objects. In our project, we are going to use GPS to track locations globally. The camera is also important to control the object speed. The police need to know every users' location to prevent damage and actions violating the law. For example, a user is tired and lying on a bed, but he wants to get some water to drink. He could bring his phone and open our application, select a cup in the camera and move it under the water pipe just by clicking on the phone. Then move the cup back to his hand.

Object for interaction Component will be used to control the object as well as recognize different types of object and their state. This application needs user to move around and

explore the physical setting. Device emulators often provide synthetic sensor data from which a location-tracking component can derive its position. It will work with camera on the users' mobile device. We are also going to use sensor information from mobile devices to manage the behaviour of objects and to support interaction and feedback with the participant. Users open our application, sensor information will recognize what objects in the camera are and choose speed to move around. To achieve the object recognition, we are going to use Visual Recognition provided by Unity.

[ Zhongyu Zhang ]

Interaction and feedback components are used to interact with objects and change their states. In order to interact with objects, we are going to apply a handheld controller in our application. Smartphones have most of the hardware used in many controllers as is evidenced by the existence of simulators for some devices that run as smartphone apps. When a user needs to move an object or change its state, he needs to click on the screen, it will show the information, like what kind of objects it is, is it possible to move or not, Is it stationary or moving, and what is its moving speed. If all conditions are met, An option will appear for the user to choose the speed and direction of the selected object's movement.

Concepts explored components are used to enhance our application and improve practicability. Machine learning is significantly important in our application. While the technologies behind augmented and virtual reality are often flexible enough to be adapted to provide the base functionality to many applications, further refinement becomes the role of dedicated models trained on data specific to the context. We decided to use Hugging Face to train our models and data to recognize all different kinds of objects as well as control the simulation power in order to move objects and change their behaviour.

Participant engagement components allow users to create accounts and passwords and communicate with each other. Speed control is also a dangerous activity, we need to establish a community to tell the user which objects can be moved and not, what is the maximum moving speed and distance of the object, and what safety regulations to pay attention to when using it. We also need local police to join our community to monitor and prevent illegal behaviour from occurring. Users can also add friends to share their experiences and feelings about using our product, answer questions, and teach new users how to use our product to earn additional rewards.

Production components are used to integrate the work of each individual in our team to ultimately develop our software. For example, I work on machine learning to recognize objects and Gia works on simulating power to moving and changing objects' state. When we are using a version control system, If properly managed then you always have a runnable copy of your application even while in the process of trying to add further features. This record of previous versions allows you to roll back to a working version if something goes horribly wrong, or to compare files where some small change has made a crucial difference and you can't remember what it was. Therefore, we decided to use git as our version control system. For the final step, we decided to use Google Daydream publication to publish our product.