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Summary

Every part of development has been going to be integrated to the iOS application. The mobile controller and loader were developed for the iOS environment. Google MediaPipe framework was created through Swift. Additionally, the draft of paper was revised especially introduction and literature review part.

What “Gangsture” completed this week:

- **Studied and wrote for introduction and literature review of the draft**
 - The drone market growth report [1], detailed examples of the commercial drone market [2], and important factors and difficulties of the market [3], [4] were added to the introduction of the draft.
 - Previous research from human-computer interaction [5] area was added to the literature review of the draft.
- **Developed a controller that can control drones in the iOS environment**
 - The mobile controller was developed to control the drone using Swift and Tello SDK.
 - An UDP network environment was developed through Wi-Fi, and it was checked whether socket communication is possible between each other [6].
 - The connection between the drone and UDP was successful with CocoaAsyncSocket and the drone could also be controlled.
- **Made a code for uploading an image using Swift**
 - The previous Python code did not work on the iOS application. It needed to be changed to Swift.
 - First of all, it was created to upload an image file to Firebase with Swift [7]. Cloud was changed because there is little open source about Google Drive using Swift.
 - It will be improved to upload a video file [8].
- **Integrated Google MediaPipe framework to iOS App**
 - A MediaPipe framework applicable to Swift projects was created.
 - Due to the lack of official documents, more research is needed to build the MediaPipe framework.
 - Landmarks of gestures from mobile camera video were extracted through MediaPipe.
 - Coordinate values of 21 hand landmarks can be checked in real time.

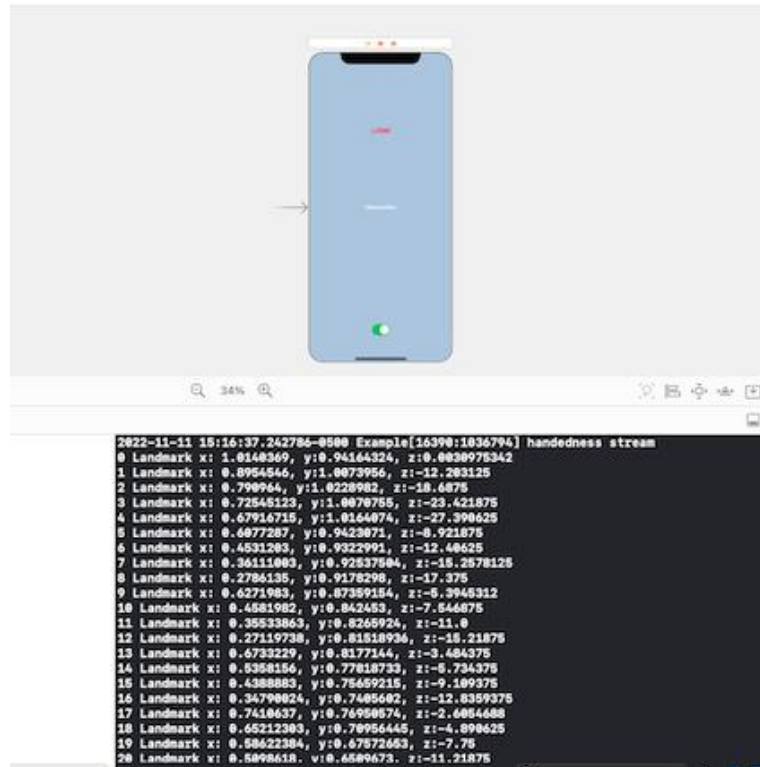


Fig. 1. Results of 21 hand landmarks from mobile video in real time

Things to do by next week

- Write the methodology part of the draft
- Develop code for uploading a video file to Firebase
- Integrate the developed mobile controller with the iOS platform
- Put the coordinate values of landmarks into the converted machine learning model and obtain the result through the iOS platform

Problems or challenges:

- **Transformation between Python and Swift**
 - Almost every piece of code for the entire system was created using Python but, it does not work in the iOS application. That is why codes are changing to Swift.
 - At the same time, another way to solve this problem is being searched. One way is using C or C++ and the other way is using Django. However, this is the second plan. The primary plan is to change the code to Swift.
- **Version problem when building MediaPipe Framework**
 - In the building process using bazel to create a framework for iOS, there was a difference between the bazel version of the build script and the currently available bazel version. A great deal of research was needed to solve this problem.
 - It was solved by applying the built iOS framework [9] which was found through much research.
- **Development environment issues when installing Swift library**

- A lot of research was required because Swift socket library was not well installed by the Cocoa Pods dependency manager on the M1 CPU Mac device.
- The library installation was completed by replacing Cocoa Pods with Carthage [10].

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