

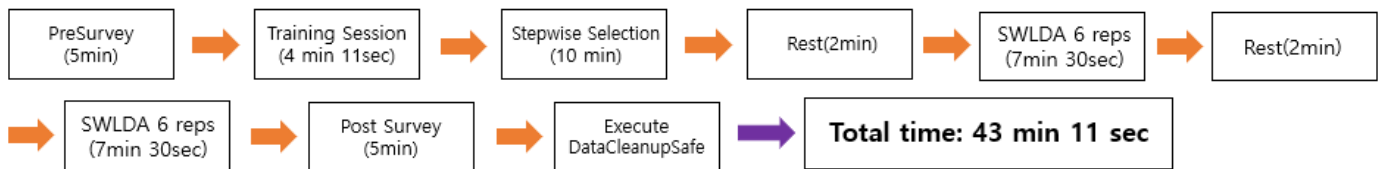
#####

This manual has been written to help researchers conduct an experiment more efficiently. Therefore, a template for experiment progress was proposed, and guidelines were presented for step-by-step experimentation. The survey is currently written in Korean. Think of it as template and modify it and use it.

We inform you that we do not take any responsibility for the consequences. However, we inform you that we used this system well and published a paper.

#####

Procedure of the experiment



Stepwise Selection: Stepwise function execution time. Time may vary depending on computer performance.

1. Pre Survey: Survey conducted prior to the experiment

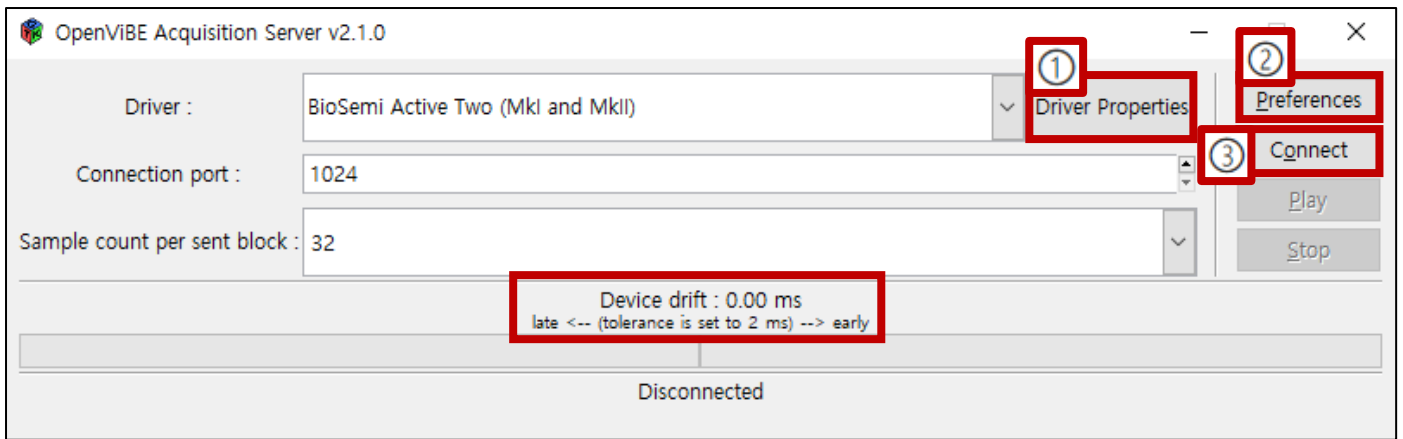
- WorldSystem\Survey_Program\Build\Survey_Program.exe 실행
- **As an attention issue, it is recommended to ask the subject to count each time the target button blinks.**

2. Experiment equipment setting (BioSemi ActiveTwo)

*** If other equipment is used, the channel related parts in the internal code and the parameters of the Channel Selector box of the Openvibe designer must be modified.**

EEG measurement status check → Biosemi Active viewer

- ① Execute Openvibe Acquisition Server

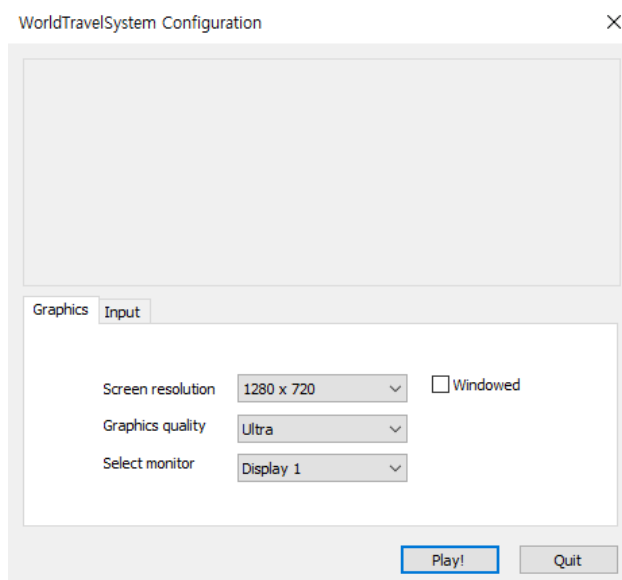


- 1 Enter the Driver Properties banner and click the Change channel names button. Add a channel by loading the 32_channel.txt file existing in the WorldSystem folder
- 2 Enter the Preferences banner and check whether TCP_Tagging_Port is 12140 or not. If not, set this value.
- 3 Click Connect and then Play button to start measurement on Openvibe. As this time, it the Device drift bar drift vibrates to the right and left, go to Preferences and set Drift Correction to "Let the driver decide". Otherwise, set Disable to default.

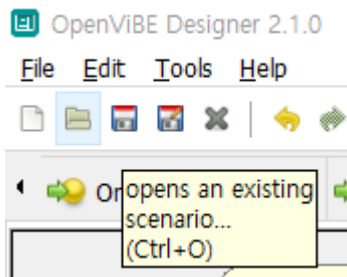
② Execute Openvibe Designer

3. Training Session

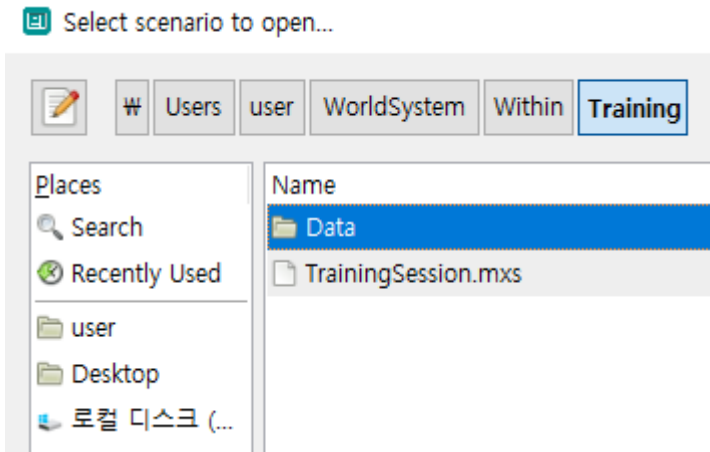
① Execute Unity application: WorldSystem\WorldDemo\World_125.exe



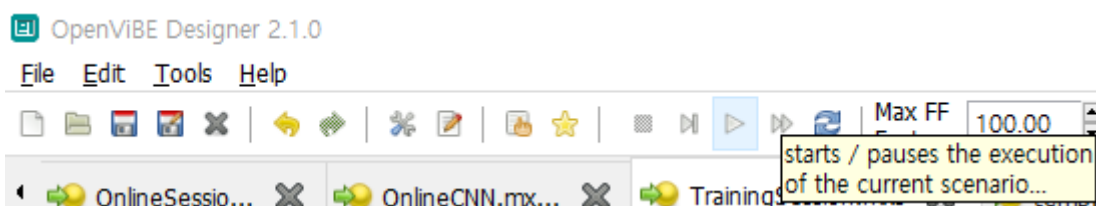
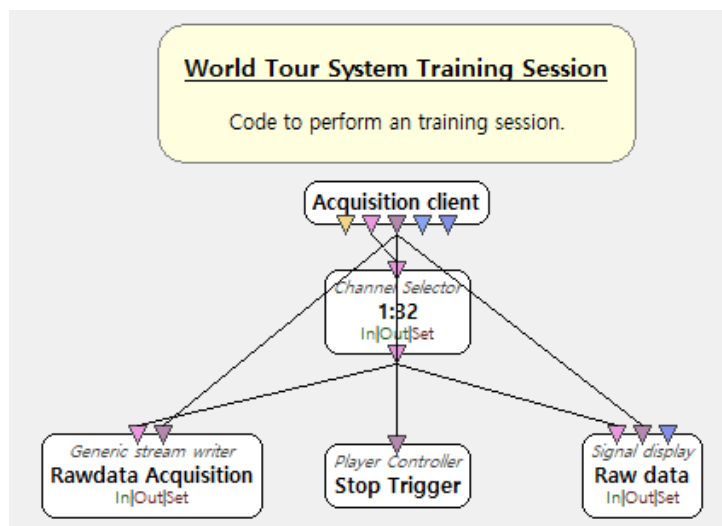
② WorldSystem\Within\Training\TrainingSession.mxs



- A. Execute Openvibe Designer and open an existing scenario.



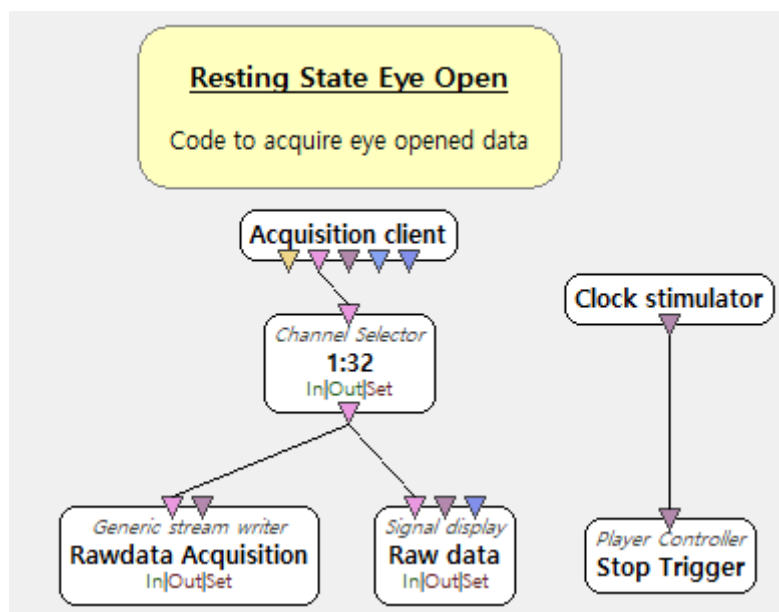
- B. Load mxs file in that path.



- C. Press that button and execute designer code.
- D. On the Unity application, the user enters the ID, press the Training button in the menu, and start measuring.
- E. **When the measurement is complete, execute Spyder or another Python IDLE.**
Load and execute WorldSystem\Within\SourceCode\StepwiseSelection.py
 Make sure it is working and then continue the next experiment. 😊

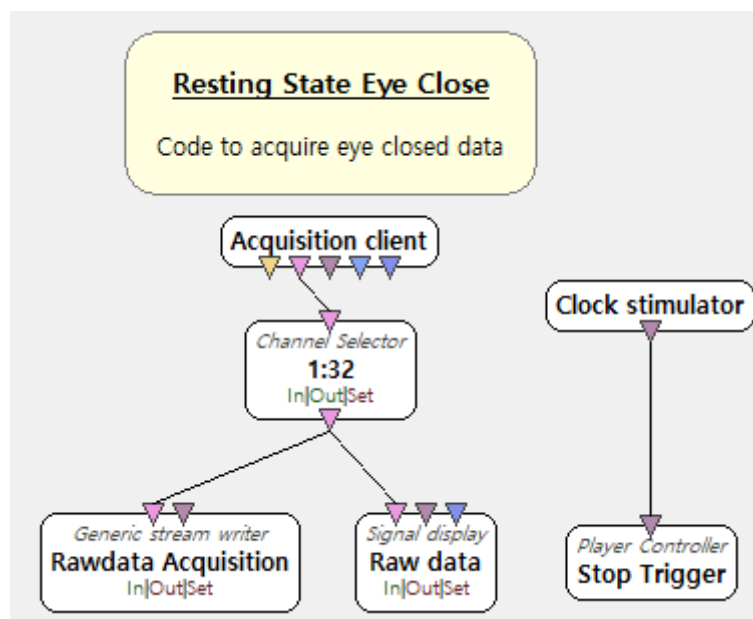
4. Rest

Eye Open: Openvibe Designer → Load WorldSystem\WRestingState\WRestingEyeOpen.mxs



Measure the eye open data for 1 minute

Eye Close: Openvibe Designer → Load WorldSystem\WRestingState\WRestingEyeClose.mxs



Measure the eye closed data for 1 minute

5. SWLDA Online Session

Verify that the StepwiseSelection code you ran earlier was terminated and the following results were obtained:

```
resulting features:  
[ 46  57 139 232 553 809 812 828 1037 1046 1075 1113 1127 1186  
 1188 1200 1304 1342 1495 1508 1804 1970]  
time : 750.8348515033722
```

Please check and proceed with SWLDA Online session!

Then, execute Spyder or another Python IDLE,

Execute WorldSystem\Within\SourceCode\SWLDA_Main.py

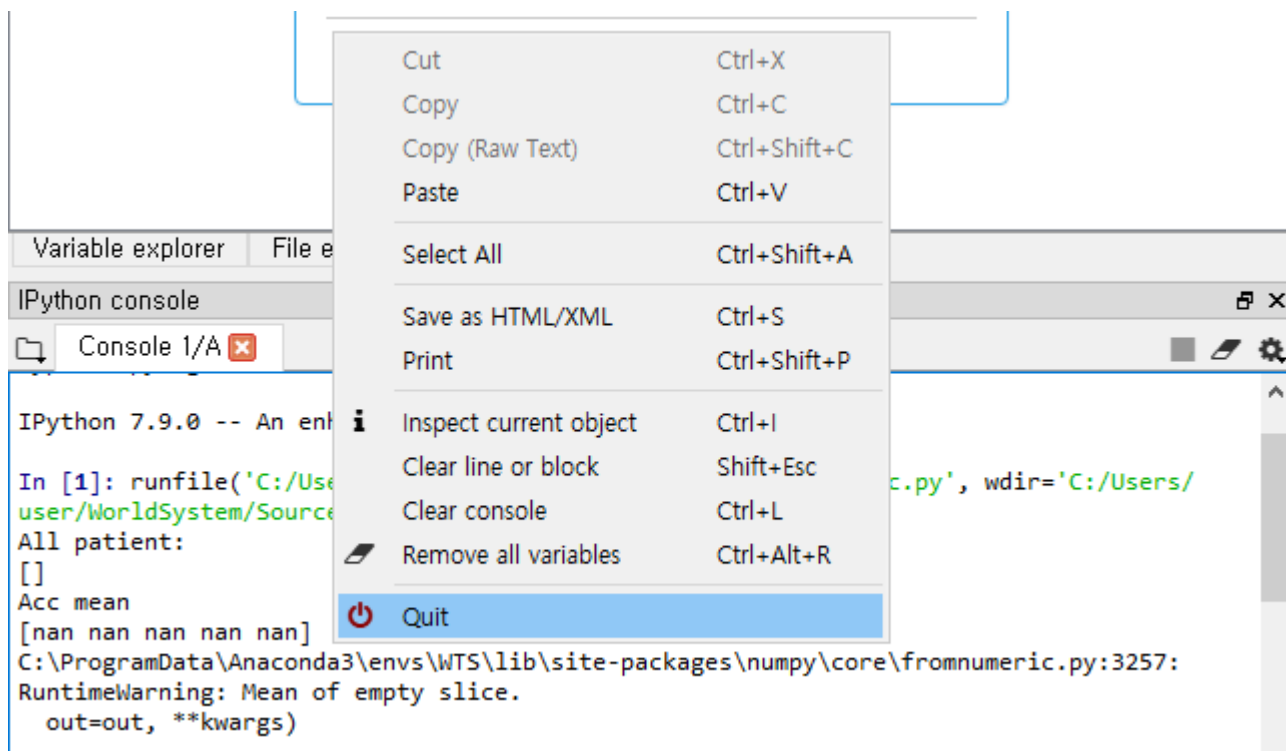
```
def main():
#     global file_exist, file1, file2, channelNum
    eegData_txt = 'WorldSystem/Within/Onlinetemp/eegData.out'
    stims_txt = 'WorldSystem/Within/Onlinetemp/stims.out'
    start_txt = 'WorldSystem/Within/Onlinetemp/start.out'
    moveData_eeg = 'WorldSystem/Within/Online/Data/txt_files/eegData/'
    moveData_stims = 'WorldSystem/Within/Online/Data/txt_files/stims/'

    channelNum = 32
    downsampleRate = 4

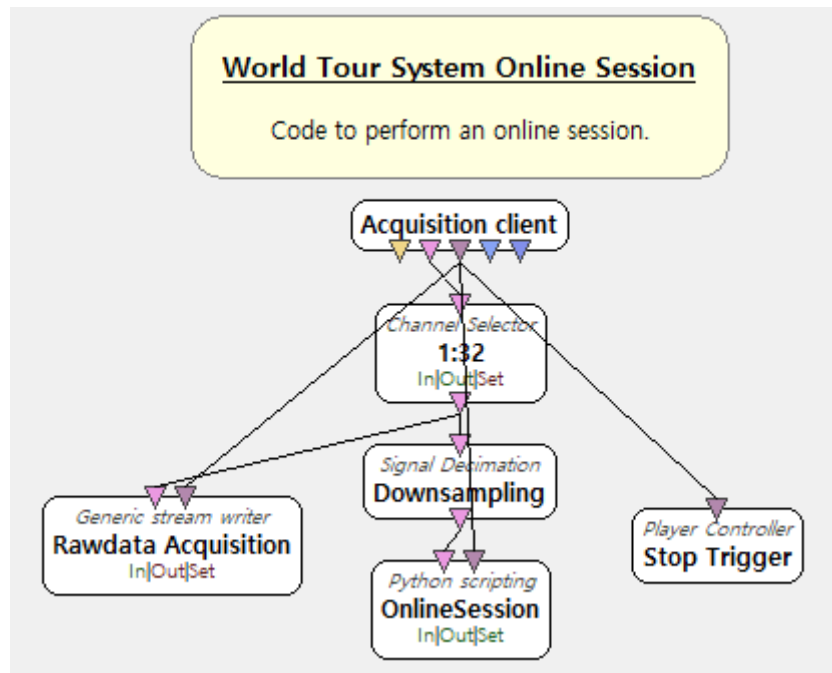
    serverSock = socket.socket(socket.AF_INET, socket.SOCK_STREAM)
    serverSock.bind(('', 12240))
    serverSock.listen(0)
    connectionSock, addr = serverSock.accept()
    print('The connection has been confirmed at~',str(addr))
```

**The message "The connection has been confirmed at~" indicates that TCP communication is ready.
If not, restart the code.**

If you want to force an end,



Openvibe Designer → Load WorldSystem\Within\Online\OnlineSession.mxs



Run with the designer code **"infinite loop button" pressed**, then press the Play button in the Unity application menu and start measuring. It will automatically shut down after selecting city 6 times (Python module will also shut down), but you must turn off the openvibe manually!

* If you want to perform more trials, you must modify the SWLDA_Main.py (for statement) and the continent's code of Unity script.

If you want to check the results,

WorldSystem\WorldDemo\World_125\WorldTravelSystem_Data\StreamingAssets

Here the txt file produces the following results: Order is the instruction about current session, Result is the result of the prediction.

```

Order: 6 / Result: 6
Order: 5 / Result: 5

Order: 5 / Result: 5
Order: 4 / Result: 4

Order: 6 / Result: 6
Order: 6 / Result: 6
  
```

6. Rest: Same as 4. Rest. Repeat it!

7. SWLDA Online Session: Same as 5. SWLDA Online Session. Repeat it!

8. Post Survey: Survey conducted after experiment

- WorldSystem\WPost_Survey\WBuild\WPost_Survey 실행

9. 데이터 정리

Execute Spyder or another Python IDLE,

Execute WorldSystem\WSourceCode\WDataCleanupSafe.py

```
def main():
    start_txt = 'C:/Users/wldk5/WorldSystem/Zero/CNNtemp/start.out'
    if os.path.isfile(start_txt):
        os.remove(start_txt)

    ##Generate User folder
    RootPath = "C:/Users/wldk5/WorldSystem/UserData/"
    RestingState_Path = "C:/Users/wldk5/WorldSystem/RestingState/"
    TrainingData_Path = "C:/Users/wldk5/WorldSystem/Within/Training/Data/"
    OnlineResult_Path = "C:/Users/wldk5/WorldSystem/WorldDemo/World_125/WorldTravelSyst
    OnlineData_Path = "C:/Users/wldk5/WorldSystem/Within/Online/Data/"
    OnlineTxt_Path = "C:/Users/wldk5/WorldSystem/Within/Online/Data/txt_files/"
    Stepwise_Path = "C:/Users/wldk5/WorldSystem/Within/StepWise/"
    ZeroData_Path = "C:/Users/wldk5/WorldSystem/Zero/Online/Data/"
    ZeroTxt_Path = "C:/Users/wldk5/WorldSystem/Zero/Online/Data/txt_files/"
    DataAcquisition_Path = "C:/Users/wldk5/WorldSystem/DataAcquisition/Data/"
    PreSurvey_Path = "C:/Users/wldk5/WorldSystem/Survey_Program/Build/Survey_Program_Da
    PostSurvey_Path = "C:/Users/wldk5/WorldSystem/Post_Survey/Build/Post_Survey_Data/St
    Result_list = []
    #They are stored in the list in the order they are stored.
    Result_list = sorted(glob.glob(OnlineResult_Path + '*.txt'), key=os.path.getmtime)
    #Create a folder with the name of the first file created
    UserName = Result_list[0][86:-4]
    CurrentFolder = RootPath + UserName
```

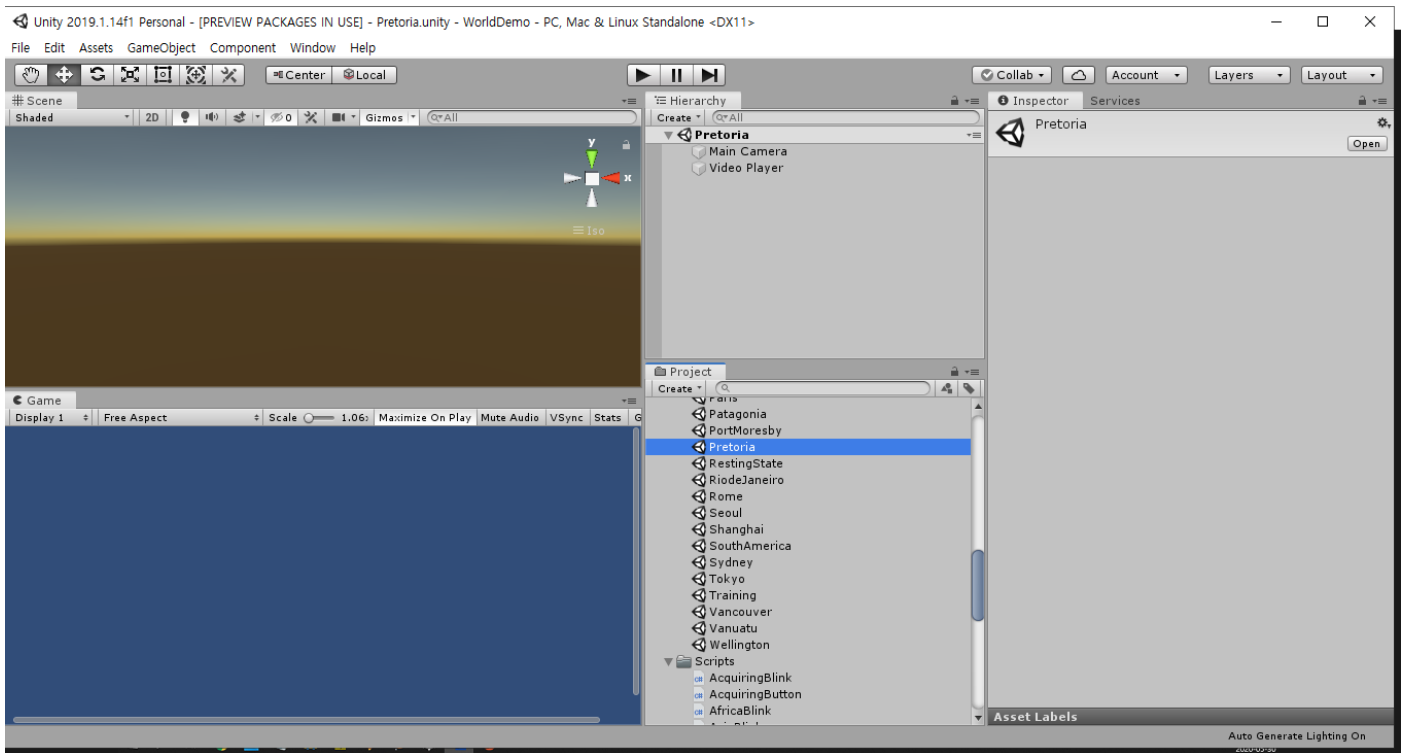
UserData 폴더에 해당 피험자의 데이터들이 뽀로롱 하고 한 폴더 내부에 정리되는 코드입니다 ^^

```
for t in range(0, x):
    shutil.move(Resting_list[t], CurrentFolder + '/RestingData/' + Resting_list[t][40:])
```

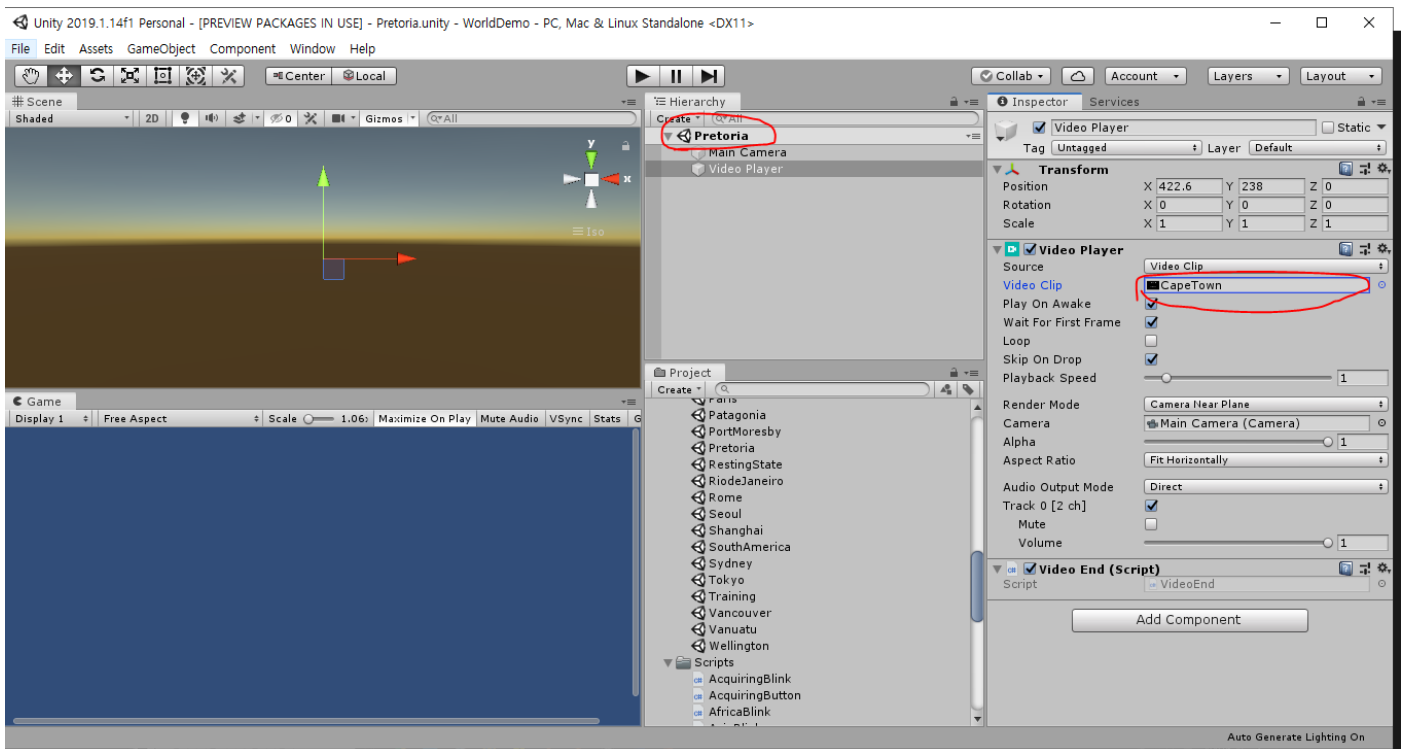
Warning: Adjust the array slicing position to make sure your data is stored in the desired folder!! Problems arising from mistakes are not warranted.

Modify video clip

1. In the Unity window's Project banner, go to the asset you want to modify.



2. When you go video player inspector, video clip is empty or selected as another city.



3. If you click the button with a dot on the right of the video clip, the videoclip selection window appears. Here, double-click the video for the relevant video.

