Development of a Virtual Environment for Visualizing Emotions

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1 PROJECT OVERVIEW

The end goal of my project is to develop an interactive virtual reality application to be demonstrated on a 200-inch glasses-free 3D HD wall display provided by NICT. The images will be comprised of multitudes of particles, with their speeds and colors dependent on the user's brain activity.

Brain activity will be captured via an EEG sensor developed by Yasushi Naruse, who has generously offered to lend me his device for the purpose of this project.

By constructing a virtual, artistic interpretation of the user's state of mind, this project aims to investigate whether or not such images can induce a therapeutic effect.

2 PROGRESS

Visual Application

- ◦ Set up work station and met fellow lab members, given a tour of the premises.
- ◦ Shown a demonstration of the 3D wall and met the developer behind integrating Unity with the wall, whom I will work with next week in order to begin displaying images.
- ◦ Set up Github repository in order to work on both desktop computer and personal laptop if needed.
- ◦ Currently working on generating particles using C# scripts for the scenes representing the following emotions: "happy" and "sad."

EEG

- ◦ Researched the best locations to place the 8 electrodes for the purpose of this project.
- ◦ Meeting with Naruse-san to discuss his EEG device (Poly-mate mini AP108), and shown a demonstration of his racing game in which the speed of the car is controlled by how relaxed/focused the user is while wearing the sensor.
- ◦ Since his device can capture EEG, EMG, and ECG, I will use 7 of the electrodes for EEG data and 1 for ECG data in order to monitor heart rate.
- ◦ Discussed types of data to capture, including alpha amplitude, the stability of the alpha waves, and R-R interval.
- ◦ Translated the user manual from Japanese to English.
- ◦ Installed Bluetooth driver on Windows laptop in order to connect with the sensor.
- ◦ Installed the CD for the Poly-mate mini AP108 in order to start gathering data.

3 UPCOMING GOALS

Visual Application
- ◦ Begin displaying Unity instances on the 3D screen.
- ◦ Test depth limitations with the screen.
- ◦ Finish prototype for "happy" emotion.

EEG
- ◦ Develop a better understanding of the algorithms used in analyzing data in order to determine the optimal approach to integrate with the Unity aspect.
- ◦ Test out the device on myself by the wall to see how much noise I will need to filter out.
- ◦ Familiarize myself with the sample code given in MATLAB and C, and write a simple application to try out EEG & ECG data analysis.

EXPERIENCING JAPANESE CULTURE

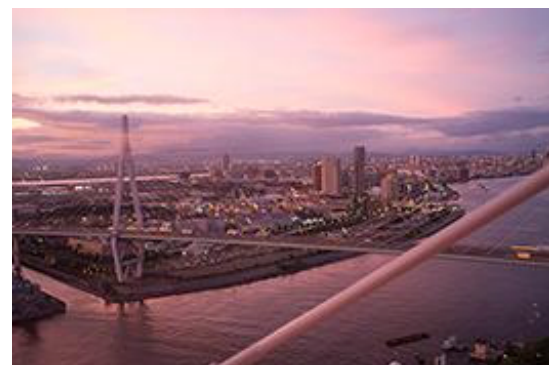JUST A FEW OF THE ACTIVITIES FROM THIS WEEK

BBQ at Osaka University with Shimojo-sensei and his students

Explored Osaka Aquarium
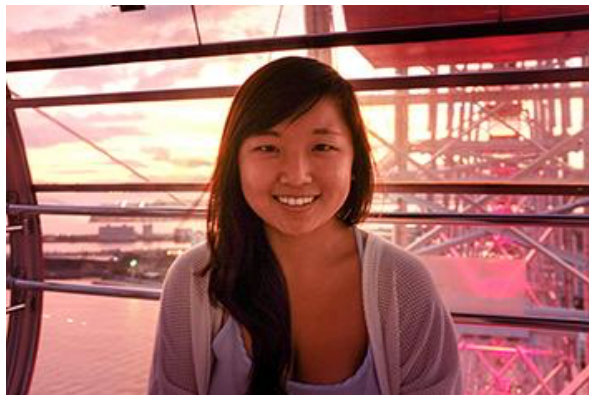
On top of Tempozan Ferris Wheel!

View from the top of the wheel

JAPANESE CUISINE

いただきます

Tonkotsu ramen at Kurobe, first meal in Japan!

Eating okonomiyaki in Osaka, the city it originated from

Sharing takoyaki with Richard and Curtis

Chicken Katsu Curry was delicious!

The making of taiyaki with red bean and custard

Matcha shaved ice on the way to Osaka Aquarium

ACKNOWLEDGMENTS

ありがとうございました