Development of a Virtual Environment for Visualizing Emotions

National Institute of Information and Communications Technology (NICT)
Osaka, Japan
Michelle Wu
7/24/2015

1

PROGRESS

Visual Application

- Completed background graphics for “happy scene.”
- Working on beat synchronization for “sad” scene.
- Selected Mozart’s “Requiem Mass in D Minor” for the background music for its slow tempo and intense escalations of sound.

EEG

- Attended EEG/BCI conference at the Osaka University Toyonaka campus.
- Obtained Emotiv device and SDK from Ando-sensei at Osaka University.
- Installed Emotiv Consumer Control Panel and began creating user profiles to test with different lab mates.
- Began training the Emotiv through tutorials and exercises provided on the Assets store.
- Debating using Emotiv EPOC Unity 3D plugin in order to read input data from device or to use Matlab.

Emotiv Headset and Electrodes

2

UPCOMING GOALS

Visual Application

- Finish beat synchronization.
- Select song for “happy scene” and begin working on models.

EEG

- Implement communication between Emotiv device and Unity project before obtaining access to the REI library.
- Experiment with data output from watching videos and listening to music.

SUCCESSES

Visual Application

- Able to load any objects into a scene and will be displayed as a mesh of particles on screen.
- Colors change in a random fashion.
- Minimal beat synchronization completed.

EEG

- Able to detect facial features which will help greatly with calculating an emotion. The Unity plugin also appears to be very useful because it instantly instantiates a connection with a single line in a script, and has many flexible functions that will help when devising an algorithm

ROAD BLOCKS

Visual Application

- Road block: Figuring out how to construct a scene entirely composed of particles without greatly affecting rendering performance.
- Fix: Loaded all the vertices into Vector3 objects, and then stored those into an ArrayList. Also, having the particles appear in the scene one after the other has no affect on performance speed.

EEG

- Road block: Determining which device to use in order to best capture emotion recognition
- Fix: Consulted numerous experts in the neuroscience field and concluded that the Emotiv headset is the optimal choice because it has more electrodes and can also capture facial gestures such as smiling or brow-furrowing, so I adjusted my project to work with the Emotiv's features.

EXPERIENCING JAPANESE CULTURE

JUST A FEW OF THE ACTIVITIES FROM THIS WEEK

Tenjin Matsuri Parade

View from the top of Hep Five Ferris Wheel

Riding the ferris wheel

Fireworks at the end of Tenjin Matsuri

Played Luigi's Mansion Arcade Game

Visited Osaka University's Toyonaka campus

JAPANESE CUISINE

いただきます

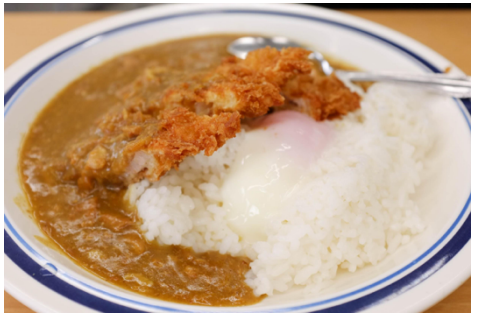
Shaved ice at a matsuri near

Sesame ball street food

Strawberry shaved ice sundae

Kaiten (conveyor belt) sushi!

Tried cheese biscuit flavored ice cream from this selection



Tried Ebi Katsu at a cafeteria in Osaka University

ACKNOWLEDGMENTS

ありがとうございました

National Institute of Information and Communications Technology (NICT)

- Professor Shinji Shimojo, my mentor in Osaka
- Dr. Yasushi Naruse, for lending his EEG device
- Masanari Goto & Megumi Kanagawa, who helped with the initial commute to the lab, along with other logistics
- Everyone else at NICT, who have made me feel very welcome

University of California, San Diego (UCSD)

- Professor Jurgen Schulze, my mentor in San Diego
- Madhvi Acharya

PRIME, for their financial support and guidance

- Teri Simas, for her additional financial support
- Dr. Gabriele Wienhausen
- Jason Haga
- Jim Galvin
- PRIME alumna Haley Hunter-Zinck
- National Science Foundation

Previous PRIME alumni for their advice and recommendations