## UCF-Tab-Signature-lockup_horizontal-KG-7406

***Title of research study: NeuroGaze in Virtual Reality: Assessing EEG and Eye Tracking Interfaces Against Conventional VR Selection Methods***

## Investigator: ***Wanyea Barbel***

## Key Information: The following is a short summary of this study to help you decide whether to be a part of this study. More detailed information is listed later in this form.

## Why am I being invited to take part in a research study?

We invite you to take part in a research study because you are 18 years or older, have normal (20/20) to corrected-to-normal vision and hearing, able to walk, able to extend both arms, able to use both hands, can speak and understand English, have no previous history of simulator sickness and do not have any injuries that would prevent you from using your arms and legs to complete the below task.

## Why is this research being done?

## With Virtual Reality (VR) becoming more of a commonplace technology in households and professional settings, we are interested in studying the performance and user preference of 3 different 3D User Interfaces (3DUI) techniques. 3DUI techniques are how people can communicate with a system. Examples of this can be a keyboard and mouse, a gaming controller and anything that allows you to tell a computer system what you would like to do. In this study, we are interested in seeing if our new 3DUI technique (called NeuroGaze) will yield a more accurate and efficient experience for users in a virtual environment.

## How long will the research last and what will I need to do?

We expect that you will be in this research study for 1 hour. You will complete a demographic survey and complete tasks in a virtual reality as quickly and efficiently as possible using three different interaction techniques. For one of the interaction techniques, you will wear an EEG headset with the VR headset on. A saline solution with be used to create a wet connection between the EEG headset and your scalp. You will complete a survey for each interaction technique and complete an additional survey at the end of your participation. You will be compensated $15 at the end of the study.

More detailed information about the study procedures can be found under ***“What happens if I say yes, I want to be in this research?”***

## Is there any way being in this study could be bad for me?

You may experience simulator sickness due to using VR, which can cause physical risks including general discomfort, fatigue, headaches, eye strain, difficulty focusing, increased salivation, seating, nausea, fullness of head, blurred vision, dizziness with eyes open, dizziness with eyes closed, vertigo, stomach awareness, and burping.

You may experience discomfort from wearing an EEG headset for a prolonged period. This may lead to a temporary headache during and after the session. This risk will be minimized by ensuring the EEG headset is correctly fitted and by limiting the duration of its use.

There is a slight risk of allergic reactions to the ingredients used in the saline solution that will be used with the EEG headset to keep a stable contact to your head. This risk will be minimized through the demographics survey where you will be asked if you are allergic to any of the ingredients in the saline solution.

If you experience these symptoms, you may choose to stop participating or you will be withdrawn by the researcher. There are no foreseeable psychological, social, legal, or economic risks involved with participating.

More detailed information about the risks of this study can be found under ***“Is there any way being in this study could be bad for me? (Detailed Risks)***

## Will being in this study help me in any way?

There are no benefits to you from taking part in this research. We cannot promise any benefits to others from your participation in this research.

## What happens if I do not want to be in this research?

Your participation in this study is voluntary. You are free to withdraw your consent and discontinue participation in this study at any time without prejudice or penalty. Your decision in participating or not participating in this study will have no effect on your continued enrollment, grades, employment or your relationship with UCF or the individuals who may have an interest in this study. Your alternative to participating in this research study is to not participate.

***Detailed Information***: The following is more detailed information about this study in addition to the information listed above.

## What should I know about a research study?

1. Someone will explain this research study to you.
2. Whether or not you take part is up to you.
3. You can choose not to take part.
4. You can agree to take part and later change your mind.
5. Your decision will not be held against you.
6. You can ask all the questions you want before you decide.

## Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, talk to the research team: Wanyea Barbel at wa964666@ucf.edu (Master's Student) or Dr. Joeseph LaViola at jjl@cs.ucf.edu (faculty supervisor) or Kyle Coutray at kyle.coutray@ucf.edu (Undergraduate Student).

This research has been reviewed and approved by an Institutional Review Board (“IRB”). You may talk to them at 407-823-2901or [irb@ucf.edu](mailto:irb@ucf.edu) if:

1. Your questions, concerns, or complaints are not being answered by the research team.
2. You cannot reach the research team.
3. You want to talk to someone besides the research team.
4. You have questions about your rights as a research subject.
5. You want to get information or provide input about this research.

## How many people will be studied?

We expect 30 people will be in this research study.

## What happens if I say yes, I want to be in this research?

The session will take place in HEC 208 on the UCF campus, and everything will take place in one session. Below are the details that you will be asked to complete as part of this study:

1. You will first complete a demographics survey recording age, gender, familiarity to using VR systems, familiarity playing video games, listing any video games you play, listing any VR video games you play and if you are allergic to any of ingredients found in our saline solution. A person wearing a device

   Description automatically generatedA person wearing a virtual reality headset

   Description automatically generated
2. We will provide an overview of the electroencephalogram (EEG) headset you will be wearing (the Emotiv Epoc X) and the VR headset (the Meta Quest Pro) and demonstrate how to put both headsets on. You will put the EEG headset on, and we will assist moving the nodes around to ensure the best contact quality and comfort for you.

A person spraying a hair loss on their head

Description automatically generated with medium confidence

1. You may be asked to put your hair up to fit the EEG headset. Saline solution will be put in each of the nodes on the EEG headset. This saline is used to keep a stable contact between the EEG headset and your head. A new, unused silk headband will be put around your head to keep the EEG headset in place and provide more comfort to you.
2. We will put the VR headset on your head and help you adjust it for your comfort. We will calibrate the eye trackers in the VR headset by asking you to look at a target while it is moving in VR. This will allow us to ensure you are seeing things correctly and adjust the VR, as needed. We will also do a training with you on the game.
3. You will then play the VR game and during that time, we will be collecting data from the EEG. During this portion, you will only be playing using the VR headset.
4. After you complete the first game, we will remove the EEG headset and the silk headband, and you will not use the EEG headset again during this study. After removal, you will remove the VR headset and complete a questionnaire.
5. Next, you will play the game with your hands and the VR headset. After this game, you will again complete a questionnaire.
6. Finally, you will play the game with the VR controllers and the VR headset. After this, you will complete a few questionnaires and be compensated $15 in cash. If you are withdrawn or withdraw yourself from the study early, you will still be paid $5 in cash for every game, and its associated survey, you complete.
7. After you leave, the EEG headset will be sanitized with saline on each of the nodes, the VR headset will be cleaned with sanitized wipes, and the headband will be thrown away.

## What happens if I say yes, but I change my mind later?

You can leave the research at any time it will not be held against you, and any data collected up to that point will not be used as part of the final analysis and will be stored for 5 years after study closure but in a separate location. If you decide to leave the research, reach out to the investigator in the room so that the investigator can collect any devices that may be in your possession (such as the head mounted display) and you will be thanked for your time and dismissed from the session.

If you experience any simulator sickness, you will be withdrawn from the research without your consent and will be allowed to sit to ensure you are fine and to let simulator sickness symptoms subside, after which you will be thanked for you participation and dismissed. If you experience a reaction to the saline solution, you will be given a cup you can use in the bathroom to fill with water to rinse the area. Once your symptoms subside, you will be thanked for your participation and dismissed. There are three main parts to the experiment. For every part you completed before you chose to withdraw or before you are withdrawn by the researcher, you will be awarded $5. Even if you do not complete the remaining parts of the experiment, you will still be rewarded $5 for the parts you did complete.

## Is there any way being in this study could be bad for me? (Detailed Risks)

You may experience simulator sickness due to using VR, which can cause physical risks including general discomfort, fatigue, headaches, eye strain, difficulty focusing, increased salivation, seating, nausea, fullness of head, blurred vision, dizziness with eyes open, dizziness with eyes closed, vertigo, stomach awareness, and burping. For increased safety, a virtual boundary will pop up indicating that you are almost out of the allotted space.

You may experience skin irritation from the felt nodes on the EEG headset if worn for a long period of time. Additionally, the EEG headset may cause you feel discomfort or pressure on the scalp. During the entire time you are wearing the EGG headset, you will be asked if the EEG headset nodes feel comfortable on your scalp, and you are encouraged to let the researcher know if you start to feel discomfort. To reduce the amount of you time the EEG headset in on your head the headset will be removed if it isn’t actively being used.

We are using an over-the-counter saline solution (Opti-Free PureMoist Solution). There is a small risk that this saline solution may cause redness, itchiness, and discomfort if you are allergic to any of this solutions ingredient. You can ask the researcher to view the ingredients.

If you experience any of these symptoms, you may choose to stop participating or you will be withdrawn by the researcher. Additionally, if during the demographic survey you mark “Yes” to being allergic to any of the ingredients found in the saline solution or begin to show signs of being allergic during any point in the experiment, you may choose to stop participating or you will be withdrawn by the researcher. If this occurs before the study has completed, you will receive $5 for each part of the experiment you did complete. There are no foreseeable psychological, social, legal, or economic risks involved with participating.

***What happens to the information collected for the research?***

All your experiment evaluation data will be stored in a spreadsheet. This spreadsheet will be immediately transferred to our lab password protected computer as an encrypted file and only the principal investigator (PI) and faculty supervisor will have access to it. All survey data will be stored in Qualtrics and only the PI and faculty supervisor will have access to this Qualtrics account. All data will be stored for 5 years after study closure and will not be shared outside of the research team.

Your information or samples that are collected as part of this research will not be used or distributed for future research studies, even if all your identifiers are removed.

If at any point during the study you want to remove your data, make the researcher aware of this and all data collected until the point will be removed. If you have completed the study and want your data removed, contact the PI and they will be able to deanonymize your data to identify that it is yours and all your data will be immediately deleted.

## What else do I need to know?

Upon completion of the study, you will receive $15 in cash. If you voluntarily leave or are removed from the research prior to completing all the study activities, you will receive $5 for every part of the study you completed. If you get sick, you will be allowed to recuperate for 15 minutes, after which you will be dismissed and you will still receive $5 for every part of the experiment you completed.