## 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, 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) using electroencephalogram (EEG) and eye tracking technology will yield a more accurate and efficient experience for users in a virtual environment. EEG records the electrical activity of the brain and will be used in this study to allow you to interact with objects in virtual reality.

## 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.

After consenting, you will complete a demographic survey.

You will be asked to complete tasks in a virtual reality as quickly and efficiently as possible using three different interaction techniques.

Following the assessment portion of the study, you will be asked to complete a survey for each interaction technique.

You will be asked to complete a survey giving feedback on how you felt about the entire experiment.

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 the 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 they play, listing any VR video games you play and if you are allergic to any of ingredients found in our saline solution.
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 of these headsets on.
3. 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.
   1. You may be asked to put your hair in a higher position.
4. Saline solution will be put in each of the nodes on the EEG headset.
5. A new-unused silk headband will be put around your head to keep the EEG headset in place and provide more comfort to the you.
6. We will put the VR headset on your head and help you adjust it for your comfort.
7. We will calibrate the eye trackers in the VR headset by asking you to look at a target while it is moving in VR.
8. We will load the training game in VR and explain what you will need to do.
9. You will perform tasks in VR within the training game that we will use to gather your EEG data.
10. We will load the evaluation game in the VR headset and explain what you will need to do.
11. You will perform a task using your eyes and the EEG headset.
12. We will remove the EEG headset and the silk headband and keep the VR headset on your head.
13. We will put you in the evaluation game in VR and you will perform a task using your eyes and your hands.
14. We will put you in the evaluation game and we will explain how the VR controllers work with the VR headset.
15. In the evaluation game in VR you will perform a task using the VR controllers.
16. The VR headset will be removed, and we will gather the VR controllers.
17. You will complete a Qualtrics survey on a laptop that gives feedback on the interaction techniques:
    1. A survey for the EEG combined with eye tracking technique (NeuroGaze).
    2. A survey for the hand tracking combined with eye tracking technique.
    3. A survey for the VR controllers technique.
18. Your will complete a survey giving your feedback about the entire experiment and all three interaction techniques.
19. You will be paid $15 in cash and are free to leave.
20. 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 get motion sick and, you will be given a chance to reschedule for the study if you wish to. You will not receive compensation if the study is not completed.

## 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 they 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 encourage to let any 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 a saline solution (Opti-Free PureMoist Solution) with the following ingredients:

Sodium Citrate, Sodium Chloride, Boric Acid, Sorbitol, Aminomethyl Propanol, Disodium EDTA, Two Wetting Agents (Tetronic 1304 and HydraGlyde Moisture Matrix [EOBO-41- polyoxyethylenepolyoxybutylene]) with Polyquad (Polyquaternium-1) 0.001% and Aldox (Myristamidopropyl Dimethylamine) 0.0006% Preservatives. HydraGlyde Moisture Matrix is a Proprietary Multi-functional Block Copolymer that is Primarily Designed for Wetting and Lubricating Silicone Hydrogel Lenses.

There is a small risk that this saline solution may cause redness, itchiness and discomfort if you are allergic to any of this solutions 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. 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 in our lab 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.

## What else do I need to know?

Upon completion of the study, you will receive $15 in cash. You will not receive compensation if you voluntarily leave the research prior to completing all the study activities. If you get sick, you will be allowed to recuperate for 15 minutes, after which you will be dismissed you will not receive compensation. However, you will be invited to reschedule your session.

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