19F DALI Handoff

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DALI LAB

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About

The Tarsier Goggles Project aims to enable users to experience the world from the perspective of a tarsier. The experience focuses on different vision adaptations and the everyday life of these unique animals. The DALI Lab has partnered with DCAL and Professor Maue and Professor Hill to bring this project to Dartmouth classrooms.

Image of a Bornean Tarsier from Professor Maue

Progress This Term

This term, 19F, was the fourth term the DALI Lab worked on the Tarsier Goggles virtual reality project. We focused on migrating the experience from the HTC Vive to the Oculus Quest, implemented insect interactions, and optimized the processing required to run the experience. We also added saplings and improved the tutorial and scene transitions, as well as ran a user testing session to learn insights on how to further improve.

Development

- Migration of the Tarsier Goggles experience from HTC Vive to Oculus Quest
- Insect interaction functionality
- Optimization of assets, scripts, optics features
- Achieved ability to cast to iPads/mobile devices wirelessly
- Implemented new and updated tutorial

Screenshot of new scene selector in Lobby scene

Design

While Dorothy designed digital assets like 3D models and textures, the rest of the team also worked as UX designers.

- Designers refined and redesigned all assets from the previous term to create a cleaner and more intuitive flow in learning how to use the program. Previously, there was no structured tutorial and the experience relied more heavily on instructors guiding users through verbal instructions. After some user testing, we found that it is much more efficient to implement an in-app tutorial, which takes place in the "home" scene before users enter any of the optics-related scenes. Link to tutorial flow document
- They also performed user testing with TAs, professors, and invested parties of BIO14. Through user testing, prototyping, and research, designers fleshed out onboarding for new students to go through when they use the program for the first time in a lab. Link to user testing notes

Video Walkthrough

Core Functionality Updates

Migration to Oculus Quest

A primary goal of this term was to migrate the experience from the HTC Vive to the Oculus Quest. The main motivation behind this decision was the ease of use and portability of the Quest, an important factor when considering the volume of students who will be using the experience in classrooms. The migration worked successfully, especially after planning out how to remap the controls. However, because of the disparities in computing power, the migration introduced new challenges in optimization of the scenes.

Insect interactions

Another main priority this term was to build out more interaction in the Forest scene, with the goal of emphasizing the optic differences between human and tarsier visions. We added insects (specifically katydids) with green leaf textures. They run around randomly on the forest floor, and stand stationary on the saplings (smaller trees that are not buttresses) in the forest. We implemented functionality that allows users to "eat" the bugs by grabbing them with the grip button on the controllers. In addition, we added the sounds that katydids make in the wild to simulate a more realistic experience, amplifying the volume when users switch to tarsier mode to emphasize

their enhanced ability to hear the katydids. The overarching goal of the insect feature is not only to demonstrate the type of insect that tarsiers generally eat, but also to encourage users to explore the forest scene more.

Screenshot of a katydid in Bornean forest scene

Optimizations

The team also worked on improving the performance and size of the assets in order to reduce lag. The Oculus Quest is less powerful in terms of processing than the HTC Vive, so the forest scene in particular has caused lagging and frame rate issues in the new headsets. While the optimization process is ongoing, the team has taken the following steps to make the program run more efficiently:

- Reduced poly count of assets
- Simplified collision meshes (changed from mesh colliders to shape collider)
- Switched from real-time lighting to baked lighting
- Simplified scenes (deleted duplicates, combined assets)
- Made more pre-fabs for assets that are repeated

Tutorial and New Controls

Another area of progress the team made this term was remapping the functionality (e.g. teleportation, grabbing items, toggling between visions) from the HTC Vive controllers to the different configuration of buttons on the Quest controllers. The new mapping is outlined here.

A related improvement was also made on the initial tutorial that walks users through how to use the virtual reality system and controllers, which was made much clearer after integrating the insights we learned from our user testing session. This was implemented to make the system more self-sustainable in a classroom setting.

Screenshot of new tutorial in Lobby scene

Next Steps/ Future Development

Optimizations

- More research into how to improve processing
- Continue reducing poly count of assets
- Reducing the render distance of scenes further
- Make the color blindness more biologically accurate

More bug grabbing functionality

- Could be more dynamic and interactive to encourage users to explore the scene more

- Potential to implement a points system or game element
- Improve the ease of grabbing bugs (make it less of a challenge)

Other animal visions

- Potential to expand the experience into other animals and related variations
- Could become a whole suite of related experiences

Contact Us

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