

VR MusicBox

Final presentation : Course D7037E

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1.

Project Presentation

First Objectives

- Use Unity and the HTC Vive VR solution to create a "music room"
- Explore the use of Vive trackers to allow users outside the VR to interact with the application
- Allow the creation of music by the collaboration of several users in an out the VR world

HTC Technologies

HTC Vive



HTC Trackers



2.

First explorations

Initial ideas

- A user would be immersed in the virtual room to visualize it and play on a keyboard with the HTC gamepads.
- Another user could interact with the music room from the outside using the HTC Trackers.
- The user outside VR could use a mobile device to visualize the VR environment and thus help him to interact.

First explorations

“A user would be immersed in the virtual room to visualize it and play on a keyboard with the HTC gamepads”



Realisations: A pleasant scenery hosting a keyboard, a drum set, a maracas and a cello-harp to play some music

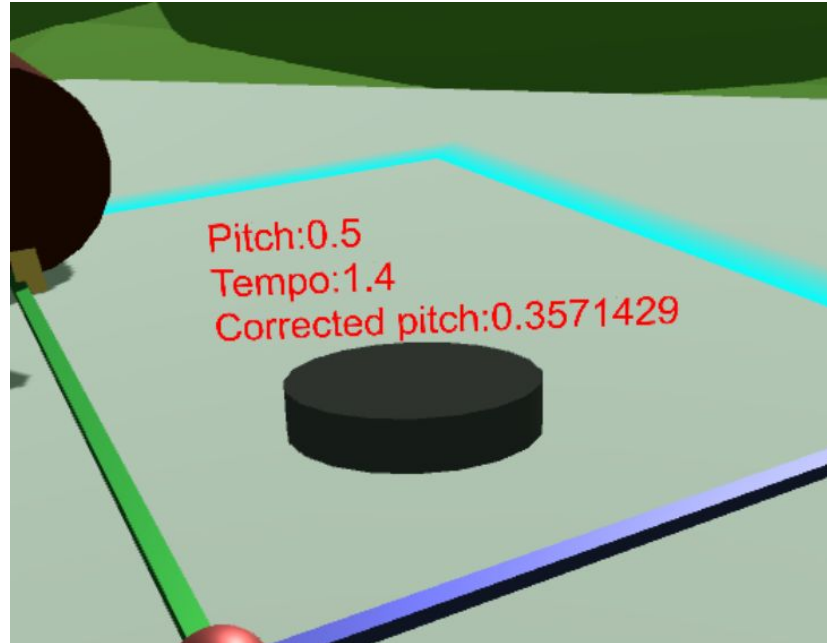
Conclusion: Success

First explorations

“Another user could interact with the music room from the outside using the HTC Trackers”

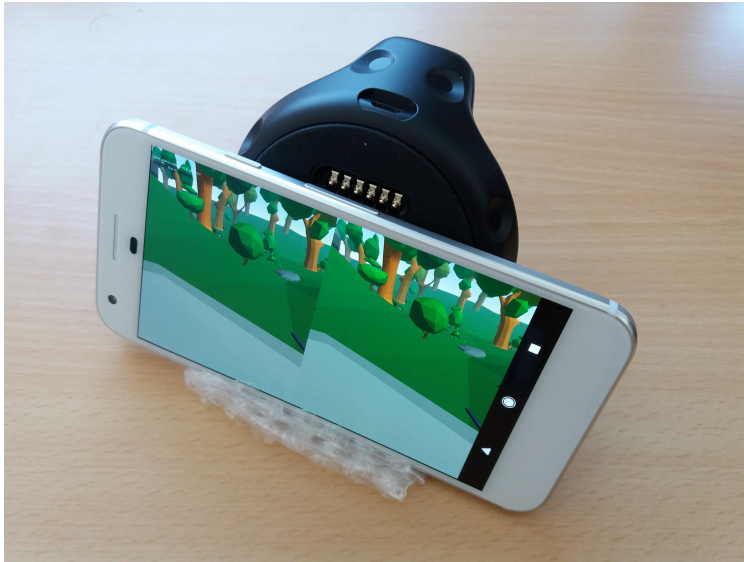
Realisations: A sound receptacle, which position controls the pitch and tempo of sound loops.

Conclusion: Success, but underwhelming utility



First explorations

“The user outside VR could use a mobile device to visualize the VR environment and thus help him to interact.”



Realisations: A mobile phone connected to the main application, displaying the same scene using HTC Trackers

Conclusion: Success

First explorations

“Another user could interact with the music room from the outside using the HTC Trackers. The user outside VR could use a mobile device to visualize the VR environment and thus help him to interact.”

Realisations: Using the Tracker to interact with objects in the room.

Conclusion: Success



Problems encountered

- Creation in collaboration made impossible because of lags
- The utility of the trackers is disappointing
- Playable area too restricting and charged

Decision: Create a multiplayer-friendly and bigger scene, focusing on the collaborative creation

3.

Focusing on multiplayer

New objectives

- Allow more people and more type of devices to connect
- Tackle the lag problem between users
- Widen the playable area

Focusing on multiplayer

“Allow more people and more type of devices to connect .”

Google VR Daydream

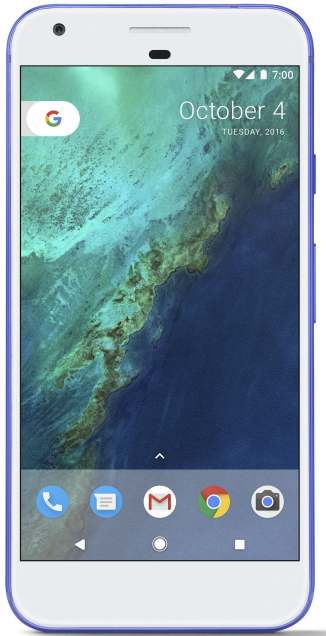
- Bring our application on smartphones and tablets
- Improve the VR experience of mobile users thanks to the controller



Daydream View

Google Vr Daydream : Our setup

Google Pixel



+

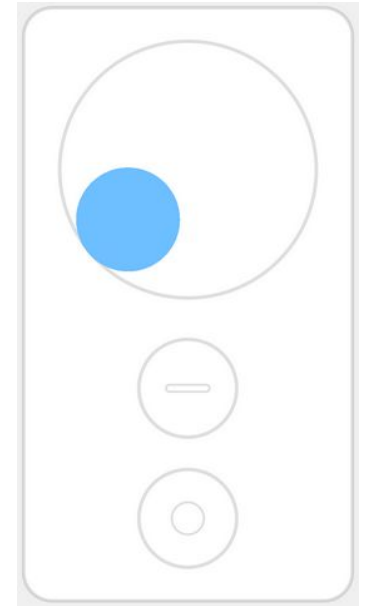


Google Cardboard

+

Controller Emulator

(on a second mobile phone)



Focusing on multiplayer

“Allow more people and more type of devices to connect .”

Photon Pun

- Create a cross-platform multiplayer application seamlessly
- Client/Server architecture : Photon Cloud
- Reliable , scalable and powerful



Focusing on multiplayer

“Tackle the lag problem between users.”

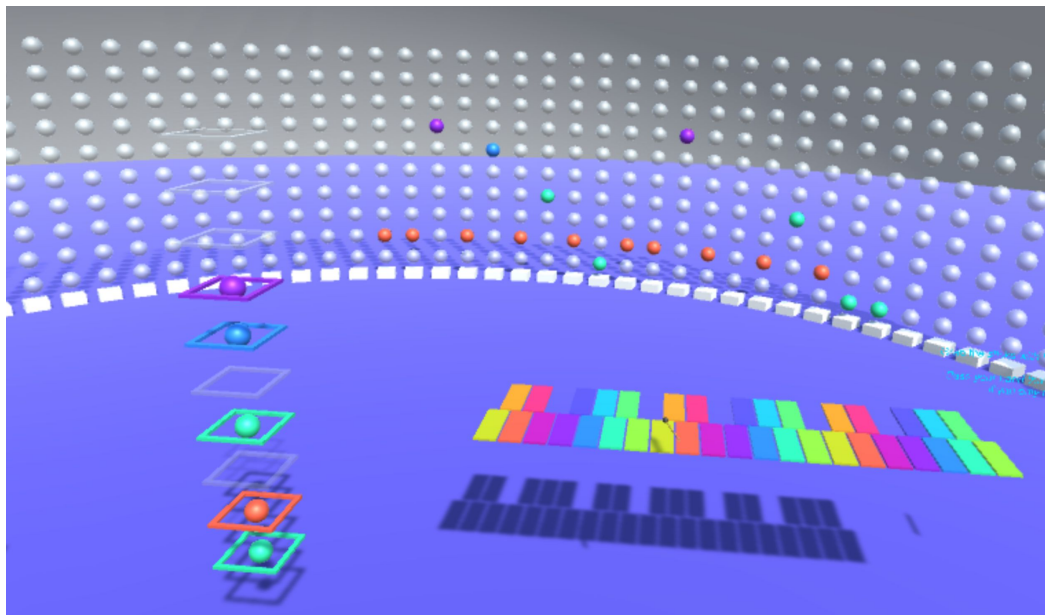
Sequencer:

- One row = one note
- One column = one step
- Plays toggled notes of each column sequentially (hence sequencer)



Focusing on multiplayer

“Tackle the lag problem between users.”



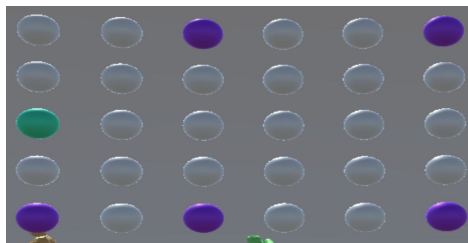
Realisations: A circular sequencer, networked to allow multi-user interactions

Focusing on multiplayer

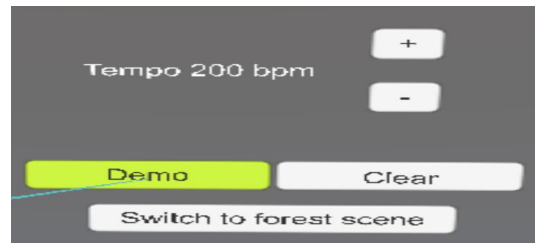
“Tackle the lag problem between users.”

What is networked?

- The notes
- The switches
- The tempo



Switches



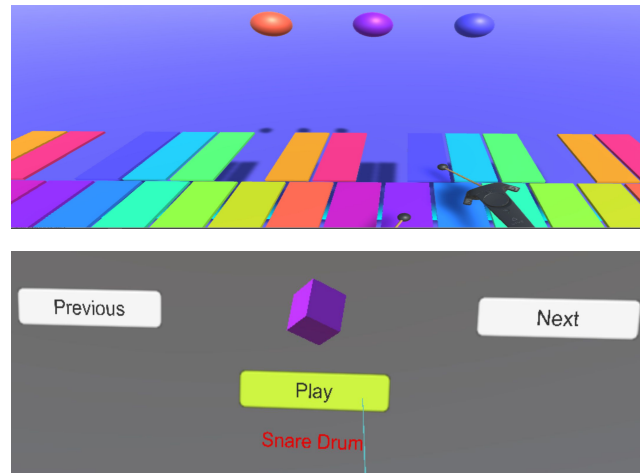
Tempo

Focusing on multiplayer

“Tackle the lag problem between users.”

How are the notes networked?

- Each note belongs to a player
- The owner of a note sends its position to all other users (unreliably but constantly)
- If a user wants to use a note, he must take its ownership first



Focusing on multiplayer

“Tackle the lag problem between users.”

How is the rest of the room networked?

- Only use RPC calls (punctual and reliable)
- Toggle a switch implies a RPC call to the other users to notify them to update the same switch
- Same way to synchronize the tempo
- No buffered RPC call
- The master client sends the statement of all the objects to a new player when he joins the game

Focusing on multiplayer

“Tackle the lag problem between users.”

Why does it solve our lag problem?

- The steps play independently between clients
- All the users play the same music at the same rhythm
- Constant delay between two users

Conclusion: **Success**

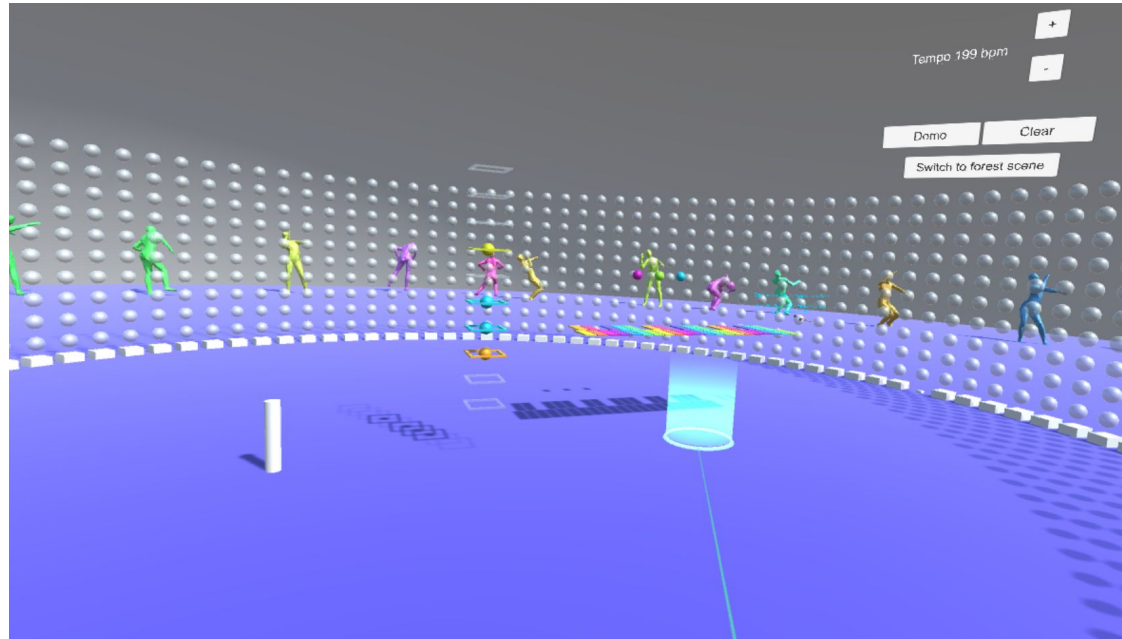
Lag-tolerant, easy-to-use,
scalable

Focusing on multiplayer

“Widen the playable area.”

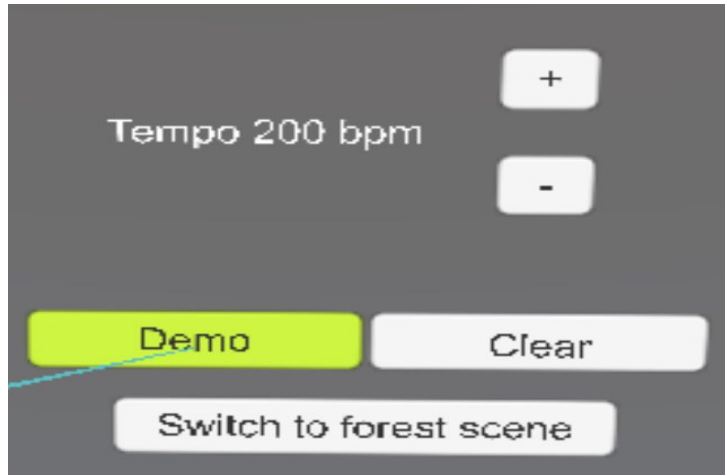
Realisations: A bigger area,
with a teleportation system

Conclusion: **Neutral.** The
area is bigger and more
open, but less pleasant to
the eye.



Focusing on multiplayer

“Find a way to use the trackers.”



Realisations : The tracker is associated to the tempo.

If a user rotates it, the tempo will change.

Conclusion: **Failure, the tracker is unreliable and cumbersome to use**

4. Conclusion

An exploratory project

- No real final product
- A lot of little prototypes and tries
- A real learning value for us
- Some interesting conclusions

Learnings

- Movement in VR
 - Teleportation and its variations.
- HTC Trackers
 - Easy to use, harder to find a use for it.
- Multi-user VR applications
 - Differences between devices must be accounted for.

What can be done next?

- Add new platforms (PC without VR, IOS, etc.)
- Add more instruments
- Improve the visual of the scene
- Thinks of new uses for the HTC Trackers

Thank you for your attention!