Positional Audio Based Communication in VR

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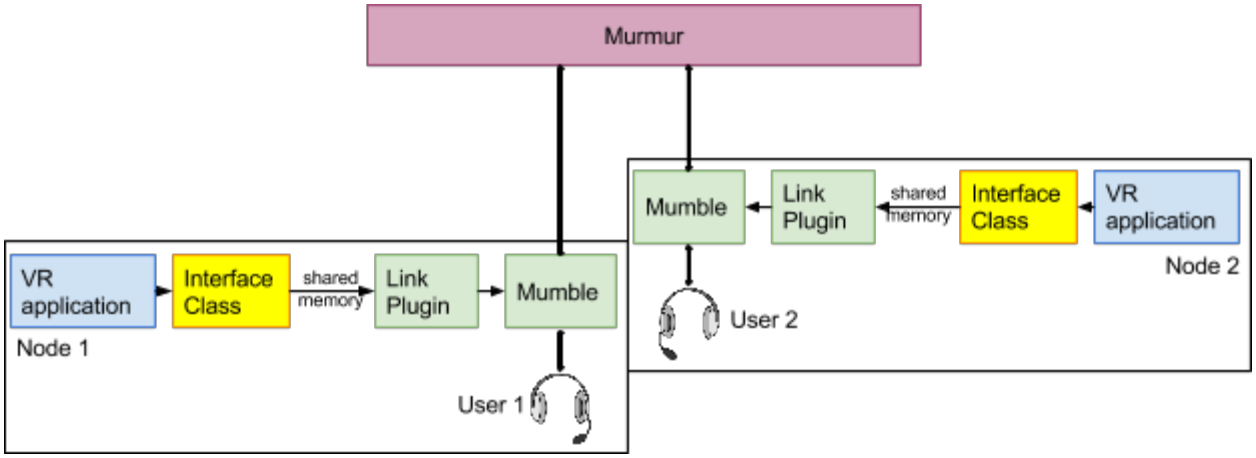
Motivation

Current virtual multi user environments often support communication only via physical body language or gestures of video avatars. Oral communication is an important medium for solving multi user tasks. If the shared space is equal to the user's physical space direct face to face communication is frequently used. However in distributed systems, like in the group to group telepresence, this is not available anymore. To enable users to use their voice for communication in such a system, we need to transmit audio between the physical nodes of the system. Should the voice of another user come from a different direction than the perceived position of this user, the perceiving user might get confused or immersion could be lost. It is therefore necessary to alter the transmitted audio based on the users position in the shared space. This functionality is already available in Mumble, a free voice over IP application.

Proposed functionality

Equipped with a microphone and earphones each user can be treated as a single sound source and receiver. Mumble is based on a simple client-server architecture where every user represents one client. A single Murmur server is used to distribute the data through the system. The computation of the stereo images is based on each users position and the orientation of the user's avatar. The system also allows to distinguish between separate camera and avatar transformations per user. For the communication we will use the existing Link plugin from mumble and feed it with data via shared memory.
The first development step will be a simple Python interface with the plugin independent of avango.gua. This will allow us to test the shared memory communication between the mumble plugin written in C and Python without having to set up a whole VR-application. We will use this simple interface as the base for our a main task: The development of a class that links avango.gua applications with mumble. This class will be connected with the navigation and head transform, extract the required values and write those to the shared memory of the mumble plugin. The overall concept is shown in the following figure:



Finally we will integrate Positional Audio Based Communication into existing avango.gua demos to showcase the project.