The aim of this project is to create an olfactory display for the Oculus Quest 2 headset that utilises multiple scents with modular scent cartridges and offers scent clearing. The olfactory display will utilise an Arduino Nano RP2040 chosen for its compact size, Wi-Fi connection and high memory clock speed. The functionality olfactory display will be tested and demonstrated with a Unity VR game where it will communicate with the Arduino over Wi-Fi. The olfactory display will be housed in a 3D printed casing along with the 3D printed holders for the atomizers.

The scent dispersion is achieved using Seeed Studio Grove water atomization module. This is a plug and play module that is designed for easy prototyping therefore along with the ultrasonic piezo atomizers it also supplies the driver board for the atomizers. The final design will house 6 atomizers but due to the dimension limitations of the outer casing it’s not possible to use 6 driver boards, one for each atomizer. Therefore, reed relays are used for each atomizer to drive 6 atomizers with one driver board.

The scent cartridges will also have a unique binary code so when the user plugs them in to the olfactory display, the pin that they’re plugged into, and the specific scent will be recognised. The scent cartridges will have 2x4 pins for connection and 3 of those pins are utilised for the binary code which will be connected to a multiplexer. When the Unity game starts, the Arduino will read the binary code of each pin, and which will be the output of the three multiplexers and send it to the game. Unity will then locate the binary code that each scent is associated to in the message and assign the pin number to the scents according to the index of the binary code in the list.

There will be two fans located in the casing to clear away the scent once the scents are done being dispersed. The functionality and the effectiveness of this clearing system will be tested by a user study.