

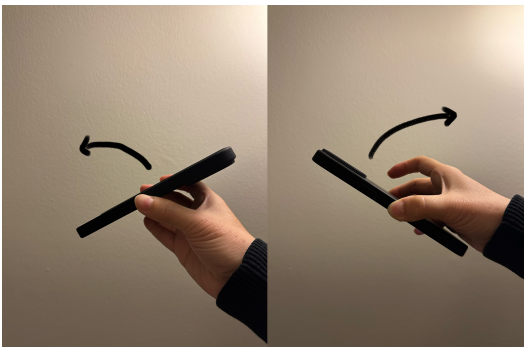
Design Concept

iBrush is a prototypical concept in gestural control, utilizing inertial measurement units to transform a common smartphone into a virtual brush for painting and adjusting background music. This system is accessible to users through a seamless integration with standard Wi-Fi networks and can be displayed on common platforms such as projectors or laptops, allowing for intuitive movement-based interactions.

Interaction

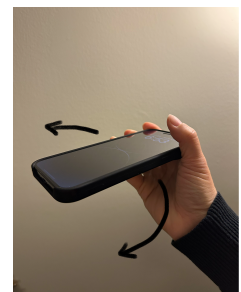
iBrush does not require a special equipment, users only need to use phone with GyroOSC App and connect to the correct network address within the range of signals provided by the installation.

After simple setup, by rotating the phone to operate the brush, iBrush can only use a continuous brush, but you can repeatedly paint to achieve different graphic effects.



By flipping the phone screen, users can reset the canvas and start painting again.

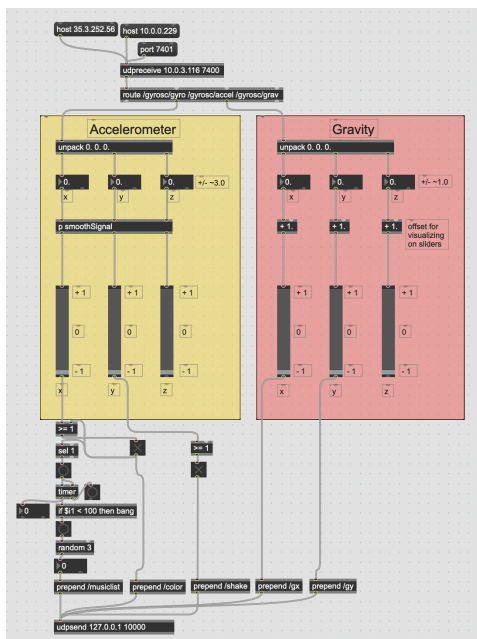
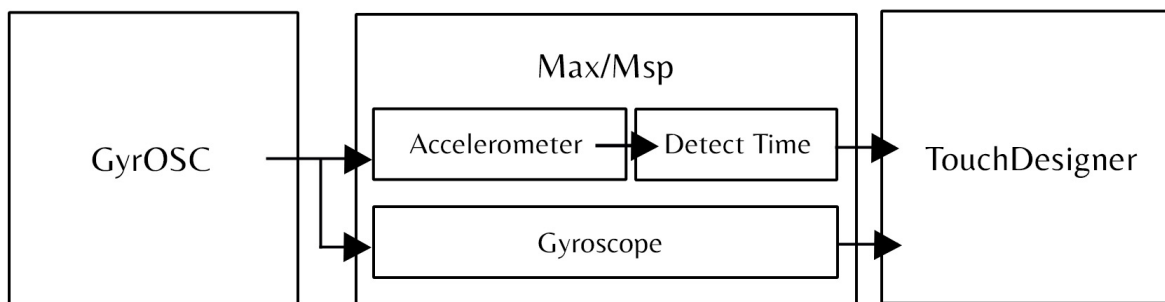
Randomly change canvas and brush colors by shaking the phone in parallel. For randomly changing background sound, user can shake the phone twice in parallel.



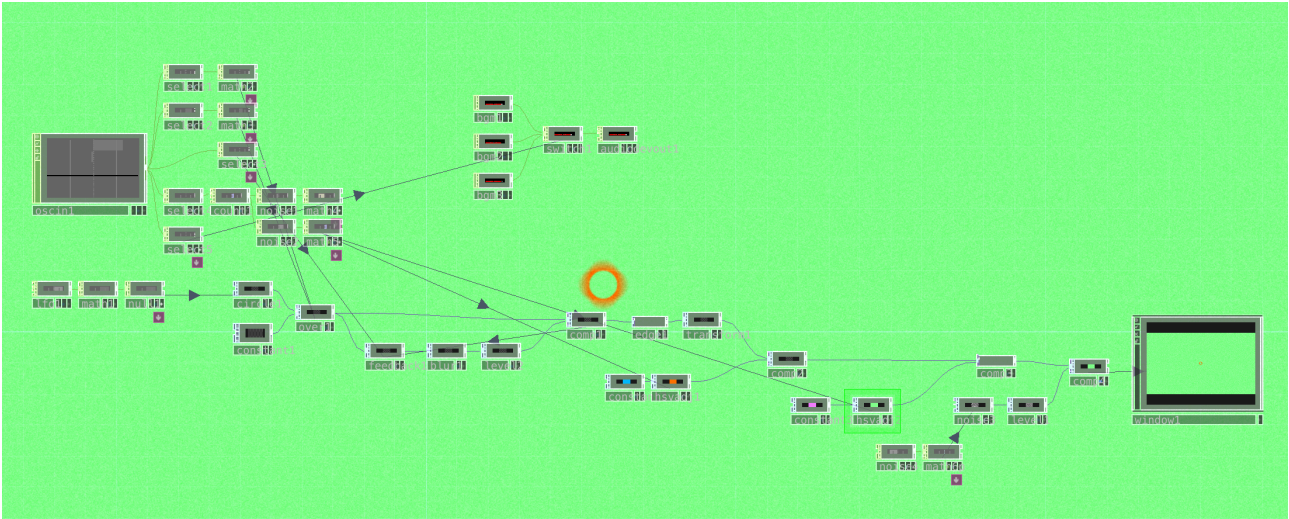
Technical Design

iBrush relies on a trio of software components that seamlessly exchange data through Open Sound Control (OSC) and MIDI protocols. The process begins with the capture of accelerometer and gyroscope data using the GyrOSC smartphone application, which transmits OSC data over a Wi-Fi connection to Max/MSP. Subsequently, this OSC signal is forwarded to TouchDesigner for the final stage of interaction.

Flowchart:



Specifically, I extract the Gravity value from the xy-axis, which is then mapped onto the canvas's xy-axis to determine positioning. The acceleration value along the y-axis serves as the trigger for resetting the system. Lastly, the acceleration value along the x-axis is employed to influence both color and music parameters. To gauge the frequency of shaking, I utilize a timer within Max/MSP to measure the time intervals between shaking events (trigger events). If the recorded time interval falls below 100 milliseconds, it signifies continuous shaking, prompting an analysis to determine whether a music change is warranted.



Discussion

In the domain of interactive digital brush painting, various approaches have been explored. For instance, Virtual Reality (VR) technology offers users the ability to create artwork within a 3D virtual environment using corresponding handheld devices. However, VR adoption remains limited, with many individuals still unfamiliar with this emerging technology. Recognizing that smartphones are ubiquitous digital mediums carried by nearly everyone, we advocate for a more straightforward approach involving simple connections and motion instructions. By harnessing the capabilities of Inertial Measurement Units (IMUs) that operate without location constraints and capitalizing on the convenience of smartphones, we can achieve remarkable levels of flexibility, adaptability, and user-friendliness in our interactive experiences.

In essence, iBrush fulfills a pressing industry need by providing a user-friendly and widely accessible solution to the world of interactive digital brush painting.