NodNet Accessibility Software Overview

Abstract Summary

This tool combines commonly possessed and easily accessible pieces of technology to replicate the function of a computer mouse in order to enable amputees to more seamlessly use computers with the use of a head tracker and makeshift foot pedal to emulate mouse movement in order to allow the user to access the function of both a keyboard and mouse with only one arm. All a user needs is an iPhone, an extra keyboard, and a machine running Windows. When running the software the user must have an app called “Freelook” running and make sure their rear camera is pointing at them. It is free on the app store. The spare keyboard should be placed on the ground and be within reach of the user’s foot. The desktop client app will coordinate the user head movements to mouse movements on screen, and the spare keyboard will be divided into “zones” where, for example, clicking on the right half of the keys will trigger a right click function with the user’s mouse. Zone bindings are currently immutable but mouse movement settings may be adjusted for preference. The tool is designed for general ease-of-access, but can easily be used to play video games.

Download

Currently, the desktop tool is still in development. Post beta-testing, when it is ready for release, it will be available for free download on our website. The tool must be allowed all permissions requested or it won’t function as intended. Make sure to follow the app steps to configure all connected hardware and sockets before using. Ensure that the Freelook mobile app is installed on your iPhone and your spare keyboard is connected to your computer. Below is information about platform support.

Platforms Supported on Launch	**Platforms for Future Development**
Windows 8, Windows 10, Windows 11	MacOS

Game Integration

The tool is also being modified in order to prevent anticheat flagging - games can detect real mouse input versus artificial mouse movement, and can even detect how “human” a mouse movement is. By the time the tool is released, this issue will either have been addressed or safeguards will have been programmed in to prevent use in certain cases in order to avoid unjust user bans. The table below details all the obtained information about specific game engine functionality with the tool.

Fully Functional Platforms	**Non-functional Platforms**	**Not Yet Tested**
Web (Unity WebGL, HTML5)		Unity (Desktop)
Source (All Steam originals, certain games such as Apex Legends)		Unreal Engine v5 (Desktop)

(Yellow highlight indicates anti-cheat workaround necessary)

Mouse Customization

Mouse movement will be controlled by the yaw and pitch of the head as reported by the Freelook mobile app - in other words, moving your chin up moves the mouse up while moving your chin to the right moves the mouse to the right. Mouse input settings can be customized as shown by the list below.

Modifiable Behaviors:

- Mouse Sensitivity
- Exponential movement (greater movement -> faster mouse acceleration)
- Turning threshold (how far to turn your head before the mouse responds)

Ground Keyboard Customization

Although mouse movement itself is controlled by the orientation and position of the user's head, actual mouse actions such as right click and left click are controlled via the user's foot by a keyboard on the ground. The keyboard will have the following binds.

Right Zone (Keys Y, H, B rightwards)	**Left Zone (Keys T, G, V leftwards)**	**Spacebar**
Mouse Right Click	Mouse Left Click	Mouse Left Click

As of now, these binds are immutable and may not be changed. In further updates this will be updated to control mapping of certain keys and "zones" of the ground keyboard. It is important to note that scrolling is not bound to this keyboard, although for web use arrow keys are a sufficient substitute.

Mouse Input Registration

For now, the tool will be treated by windows as a mouse registered as "virtual," meaning it may not work in some applications that attempt to detect physical devices. Solutions to mimic physical devices in windows registries are currently being developed and will be updated soon if possible.