Pupil Motion-Based Support Device That Aims to Increase the Neck Mobility of Patients With Neck Movement Disabilities

Sahin, Mustafa Ali (School: Gaziantep Private Sanko College)
Ocak, Beyza Nur (School: Gaziantep Private Sanko College)
Findik, Naz (School: Gaziantep Private Sanko College)

People lose their ability to move their neck muscles for various reasons. There are fixed support apparatuses but the muscle that is not moved gets weaker. Therefore they contribute negatively to the muscle strength. To address this need, this research aims to design a mobile neck support device. The device rotates the head with servo motors. The system runs on Raspberry Pi. Since there are different muscle groups affected in different people, the device was designed with 2 different control mechanisms. With gyroscope; the position of the head is supervised in real time, controlling the position of the head is possible with joystick control. In addition, the control of the necessary physical movements can be provided with this control. With pupil tracking, device can be controlled in real time using the position of the eye too. Image processing is performed with the camera placed in front of the eye. The position of the pupil is detected and sent to the motor. In this way, the person can turn their head where they are looking. With the massage module, the muscle that is inactive for a long time is prepared for movement. The head apparatus is designed to be adjustable according to the height of the person. The apparatus to hold the camera is also designed to move in 2 axes. In addition, the whole device is designed to be able to attach and detach from the wheelchair.

Awards Won: