Utilizing Computer Vision and Machine Learning Systems to Develop an Algorithm Helping Physically Disabled People to Use Computer

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Between 110 million and 190 million people suffer from physical disability according to WHO. Eye tracking systems for helping handicapped have limited self-reliance features, long delay in controlling, and high cost. This project tackles the problem of Lacking Community engagement of the physically disabled by enabling them to use computers without (Mouse-keyboard) by wearing mask only by developing a novel Algorithm. A mask was designed by researchers has 3 colors placed on its surface that allow user to control computer's cursor by moving attached colors using his tongue through our developed software via camera. The project was tested in two phases: algorithmic and real-world viability. Algorithmically, the performance was measured by testing 1500 (open sources) videos full of colors and the program detected movement of needed colors within 97.3% accuracy. It calculates occurred movement through the difference between color ranges, allowing cursor movement by moving his head. And based on the user's choice for right or left click or drag and drop by moving his tongue relying on distance between colors (<0.4 at 0.3sec). Viability in real-world was done by conducting an online SDQ to measure study variables. The sample used consisted of 112 disabled people ages from 11 to 55. After six months of using program with mask. From analyzing results, About 98.7% got a total of difficulties score (0-13) which reflects normal scale. Results suggested that the physically disabled could evolve in community by working and learning online to be more independence in their lives.

Awards Won:
Association for the Advancement of Artificial Intelligence: Third Award of $500