myCAST: A Personalized Cerebrovascular Accident Self Test

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Strokes are a leading cause of death throughout the world, but little has been done to assess stroke susceptibility or provide retainable education for the subject matter. Increasing medical fees and limited health care coverage along with the assumed unlikeliness of a stroke may cause many at risk to disregard symptoms – delaying treatment and thus reducing survival rates. If victims are hospitalized within three hours of their first symptoms, survival rates would dramatically increase. Hence, we explored the concept of a mobile application for stroke self-examination and education. Self-examination was performed using a three-stage procedure. The first stage of the self-examination was a questionnaire that tested the user's sensations of moderate stroke indicators. Detection of slurred speech, a prominent stroke sign, followed. Users were prompted to repeat a predetermined phrase, which was converted to text using Google's Speech-to-Text API. This text was compared with the original prompt using a string distance metric. The final stage was a face paresis detector developed in MATLAB®. The detector captured a smiling self-portrait of the user. After identification, the user's mouth profile underwent various mathematical transformations, resulting in an asymmetry criterion which could be compared to archived data to yield another stroke identification metric. Finally, the proposed mobile application compiled the various stroke identification metrics and alerted the user to seek medical assistance, accordingly. An intelligent emergency contact button sent the user's GPS location and medical history to emergency services, fostering expedient communication and treatment. The application was validated on the authors.

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