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Detection and Computational Analysis of Psychological Signals (DCAPS)

As a result of their experiences during deployment, service members may return home with psychological health challenges and find it difficult to reconnect with family and society at large. Despite best efforts to improve awareness and care, only a small fraction of returning warfighters seeks help dealing with psychological health issues.

The Detection and Computational Analysis of Psychological Signals (DCAPS) project aims to develop innovative tools that can detect depression by analyzing facial expressions, body gestures, and speech. This will help in assessing the psychological status of warfighters in the hopes of improving psychological health awareness and enabling them to seek timely help.

Such sensitive software has the potential to assist healthcare workers who provide assistance over remote telemedicine applications that cannot convey subtle communication clues usually detected in face-to-face interactions. The software can also administer support in the form of an interactive virtual provider, based on signals received from the patient transmitted via cameras and sensors, such as on a laptop, computer, or Microsoft's Kinect,.

At ICT, experts in computer science and psychology are making these perceptive programs a reality in order to better identify and treat service members and veterans suffering from psychological health issues, including PTSD, depression and suicidal ideation.

Funded by DARPA and in collaboration with scientists at MIT-spinoff Cogito Health Inc., a team of ICT researchers is developing sensing systems that can capture and comprehend communication clues and then use that information to better understand people's emotional states and how to help them.

ICT's pioneering efforts on the DCAPS project encompass advances in the fields of AI, machine learning, natural language processing, and computer vision. It will also bring these techniques to the next level by defining a framework capable of analyzing language, gestures, and social signals to detect cues that indicate distress.

The technologies will be integrated with existing ICT virtual human technology, including the current SimCoach prototype that provides resources and support based on what it learns about users through conversations that take place over the internet. DCAPS is not intended to provide an exact diagnosis, but rather a general metric of psychological health.

Privacy and security are of paramount concern to the DCAPS program. Program data will be collected with the informed consent of individuals involved, and stored in a secure, private, data-sharing framework. DCAPS will develop, in conjunction with leading privacy experts, a novel trust framework such as envisioned in the National Strategy for Secure Identity in Cyberspace. This trust framework will allow warfighters to control and safely share their "honest signals" data.