iPonder: A Multimodal and Anonymous Approach to Remote Teen Mental Health Diagnosis and Peer-Based Conversational Therapy via Deep Transfer Learning and Computer Vision

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Suicide is the second leading cause of death for teenagers. Depressed teens feel obligated to deal with these serious issues by themselves to avoid burdening those around them and keep quiet due to shame and stigma. The researcher hypothesized that if text-based and audiovisual-based deep learning neural networks were trained on substantial mental health datasets over various modes of data, then these neural networks would be able to remotely predict mental health disorder tendencies in teens with accuracy, precision, and recall of over 95% and 80% per network type respectively. Thus, iPonder, a cross-platform accessible mobile application for teenagers to privately overcome their depression, was created. Using a user-submitted video and responses to behavioral questionnaires, iPonder constructs a hyper-personalized user profile, which is used to pair teenagers anonymously online with similar profiles to discuss their issues. Three artificial neural networks were constructed to predict user risk of depression, anxiety, and suicide watch respectively based on their free-text responses, using transfer learning. Labeled anonymous video data on audio analysis and time-based textual transcript analysis were used to train three long short-term memory neural networks. These models predict the risk of mental health issues from a user-submitted video. iPonder achieves over 95% accuracy, recall, and precision per text-based neural network and over 80% for audiovisual-based neural networks. It successfully integrated these models into the mobile application. Based on the profile created by the application based on neural network scores, iPonder anonymously pairs similar users online to discuss their issues via conversational therapy.

Awards Won:
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