Registration Form

TEAM INFORMATION

Team Name/Project Title: OptiNomics / Facial impression and expression based recognition system for seamless network authentications

Department: Computer Science

Faculty Advisor: Ashis Kumer Biswas

Team Members: Chase Brown, Nate Terry, Gavin Atkin, Matthew Michaelis

PROJECT INFORMATION

Description:

Robust network authentication system design and implementation leveraging the generic facial impressions and expressions captured by regular camera available in most workstations.

Abstract:

We have designed and developed a multi-factor authentication system that works in three stages: firstly, the face detection module is able to detect a face inside of an in-the-moment video captured by a regular camera. This stage is followed by the face recognition module that matches the detected face to one that has been registered and stored in user database. This Active Directory tied match will be communicated and secured with a protocol for the final stage: the generic facial expression detection that waits until the user demonstrates a particular facial expression. When detected, the authentication service request will be marked successful and secured communication between the trusted host across an untrusted network is established via the Kerberos protocol. All the three modules are developed using deep learning algorithms. This authentication process of the facial impression and expression matches use conventional shared secret cryptography to prevent packets traveling across the network from being read or changed and to protect messages from eavesdropping and replay attacks. Following the initial authentication, through utilization of the user’s webcam, our system can detect if the user is still sitting in front of their computer console after the initial user confirmation and authentication. The developed system allows for much lower overhead and security requirements than continuously attempting to detect the user’s personalized facial signature. By applying such a generic system running on the client computer, we can limit the amount that we have to query the authentication server.