CS486 Proposal

Team member:
Ren JIe Liu (20608581)

Application domain:
Affective (emotional) computing

Problem:
The problem I would like to tackle on is related to Polygraph Tests (Lie Detectors)
Nowadays, the Lie Detectors are often used in the police investigation, and the goal is to see whether or not the person is telling the truth when answering certain questions. The theory behind the traditional polygraph tests is to determine if there's a significant change in person's blood pressure, pulse and many other indicators that are detected by the sensors attached to them. However, the accuracy of the polygraph tests is not guaranteed even with a well-trained examiner since different people react differently to lying and some medicines can help them fool the detectors machine easily by keeping their pulse and other indicators consistent.

Proposal:
In order to improve the accuracy of the polygraph tests, I would like to propose a new methodology to detect lying by creating a software that could recognize the tiny change of facial expression called "Lie to me". Unlike the traditional polygraph tests that could be fooled by fake health indicators, the facial expression is nearly impossible to be cheated. Anyone who is lying when answering questions will always have some sort of unusual behavior in their micro-expressions and most of those micro expressions can be transferred into different hidden messages based on the Facial Action Coding System, a system to taxonomize human facial movements by their appearance on the face, based on a system originally developed by a Swedish anatomist.

However, facial analysis can be really time-consuming and requires experience from the experts and my "Lie to me" software can learn and improve the accuracy by studying high volumes of available data itself.

Some of the Artificial Intelligence techniques I would like to analyze is listed below

1. Virtual Agent
2. Machine learning platforms
3. Emotion Recognition
4. Deep learning platforms
5. Biometrics
6. Decision management

Citation:
1. C., Natalia Maynez. "19 Artificial Intelligence Technologies To Look For In 2019." Adext Blog, blog.adext.com/en/artificial-intelligence-technologies-2019.
2. "Emotion Preview." A Beginner's Guide | Microsoft Azure, azure.microsoft.com/en-ca/services/cognitive-services/emotion/.
3. "An Emotion Recognition Model Based on Facial Recognition in Virtual Learning Environment." NeuroImage, Academic Press, 9 Jan. 2018, www.sciencedirect.com/science/article/pii/S1877050917327679.
4. "Different Approches for an AI-Based Facial Recognition Using Deep Learning." Towards Data Science, Towards Data Science, 23 Nov. 2018, towardsdatascience.com/different-approches-for-an-ai-based-facial-recognition-using-deep-learning-f737e7f84241.
5. Lun, Erwin van. "Virtual Agent, Animated Intelligent Agent for Automated Chat with Human Users." Chatbots.org, www.chatbots.org/virtual_agent/.