CSCE 585: Assignment #2
Company: Project Proposal
Team Members: V.N. Anirudh Oruganti Nathan Dolbir Kennedy Fairey

Machine learning (ML) has flooded our society with bountiful use cases, as it's present in nearly every industry, and consumers may not even be aware of the amount of ML under the cover of the products we buy and services we use. From optimizing manufacturing processes to recommending our next favorite Netflix show, ML is truly everywhere. While ML has found its main use as a means to make our lives easier and processes faster, is this truly the ceiling we have reached for ML? I believe ML has much greater meaning than this.

Unpacking these two words, ML is the way an artificially intelligent system is to learn about objects and ideas like we humans do. However, one of the greatest deficits in ML today is that ML systems cannot truly learn and express themselves nearly to the degree that we humans can. ML may be implemented on networks which can process big data at speeds leaps and bounds ahead of our human eyes, but their ability to understand the world and think for themselves holds nothing to our minds. The closest intelligent guise we have are chatbots which can piece apart your sentence and respond in a surprisingly intelligent way. However, even today's chatbots rarely go past generating answers based on huge amounts of training data and database querying. By relying on training and knowledge bases, chatbots and ML in general are losing sight of what I believe their ultimate ability should be: to reflect and reproduce the intellectual capability of the human being.

In order to work towards an ML system as intelligent as a human, we must learn what makes humans intelligent, how humans think and communicate, and how these can be applied in machine terms. I propose using the human personality through dialogue as the primary application area for this goal. Personality is the way we humans uniquely express ideas and would therefore be an excellent facet of the human mind to implement in ML. This proposed study will be a difficult task heavily rooted in natural language understanding (NLU) along with heavy study and application of human psychology. The study's result will be a chatbot which can intelligently converse with a human with augmentable personality traits which in turn would affect the course of dialogue.

There are several articles and publications that dive into the theory of human personality from a psychological perspective. There is an excellent paper by Dr. Carol S. Dweck of Stanford University that dives into the foundation of a person's personality and how it is developed by needs and goals. There are also a few articles on verwellmind.com (a psychology and mental health website) that go into several of the aspects that are important in human personality development. We have also found a few repositories on github that we can reference to provide a solid foundation for training and developing our models.

Many companies from Amazon to Facebook release data sets that contain millions of text conversions every year. These data sets contain many different human personalities, emotions, etc. of everyday users. Parameters of demographic information are one of the important things in ML systems. Having demographic information provided beforehand (instead of predicting them) from these sources could make a huge difference in predicting users' mental state and personality . Finding a user's personality via only a few lines of text could be challenging and may take time for ML systems to narrow it down to a subset of personalities. A dataset which contains not only text but Age, Location and Gender could help ML systems learn and predict personalities with faster response times.

According to many articles and research papers DeepLearing is one of the most popular algorithms to be used in NLP and text analysis. We would like to build a ML system that uses at least two algorithms and those being DeepLearing and Convolutional neural networks. There are many research papers of NLP based on these algorithms. Also, we would like to compare both algorithms and may choose one over the other based on the performance of the algorithm.

Statistically we plan to evaluate how our model responds to a variety of different human emotions (happy, sad, empathetic, confused, etc.). When testing we will feed the chatbot questions or messages that should receive a response that reflects how a normal human would react. Our graphs and visual data will reflect how well our model performs vs. how well we expect it to perform in specific circumstances.Perceived medical benefits of this study include better understanding of how the human brain perceives and uses personality to augment dialogue along with better understanding of how the brain 'thinks' in general. Perceived research benefits include expanded knowledge on how to make ML systems function closer to how the human brain does along with numerous possible NLU advancements.