

The Limitations of Deep Learning Recurrent Neural Networks

Deep Learning (DL) is very successful in many applications [1] such as autonomous driving, manufacturing, and health care, and yet its meaning and limitations are not fully known yet [2]. The purpose of this research was to find out what a Deep Learning model represents and what its capabilities and limitations are. Specifically, I designed experiments to study how to use Recurrent Neural Networks (RNN) to generate paragraphs of text and essays. The RNN of DL has many practical usages in education, business, and government settings. I am using a trial and error approach in most part of my research due to an open problem with lack of DL design principles. I used Python and TensorFlow to conduct my research faster. In the research, I fine tuned specific aspects of the model in order to bring out better results. I have the following discoveries. The first being that RNN models are difficult to retrain, i.e. it has strong impressions once trained. It seemed intuitive to me that one could retrain a model multiple times in order to make it "smarter" but due to the way RNN is designed, this seems challenging to deck up trainings. I also found that TensorFlow facilitated my experiments greatly by allowing me to focus more on training and less on setting up the models. Overall, I hope I contribute to the study of discovering principles in designing DL RNN through experiments of applying them to essay generation.