

**Meeting:** 1154, Denver, Colorado, SS 109A, AMS Special Session on Markov Models and Matrix Properties, I

1154-00-2269      **Yuliang Wang\*** (wxwy1990402@gmail.com), **Zhe Xiong, Jiahao Qu, Nicholas Liskij, Nicholas Hanoian, Henry Sojico, Yuchen Guo, Zhexiao Lin, Zhenhong Zou** and **Hanbeak Lyu**, UCLA. *RNN and NMF Chatbot: Combining two machine-learning techniques to create a dynamic, topic-aware chatbot.* Preliminary report.

In this work we construct two models for a topic-aware chatbot by combining existing text-generation models with non-negative matrix factorization (NMF). In the first model, we augment a traditional encoder-decoder structure with message attention and topic attention layers. A topic representation of a given sentence is obtained using NMF and encoded into a topic attention vector. We train the model so that it prefers to sample relevant topic words as opposed to non-topic ones. In the second model, we utilize the pre-trained BERT architecture developed by Google and combine it with NMF to generate topical responses to questions. The relevant response to an input question is sampled from the joint distribution learned by the model using Markov Chain Monte Carlo. Lastly, we propose several approaches to improve both topic modeling and word generation. (Received September 17, 2019)