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***“Application of Deep Learning to Forecast of Stock Price Change”*** (with Irena Vodenska, Hideaki Aoyama)

**Abstracts:**

We explore the predictive power of historical news sentiments based on financial market performance to forecast financial news sentiments. We define news sentiments based on stock price returns averaged over one minute right after a news article has been released. If the stock price exhibits positive (negative) return, we classify the news article released just prior to the observed stock return as positive (negative). We use Wikipedia and Gigaword five corpus articles from 2014 and we apply the global vectors for word representation method to this corpus to create word vectors to use as inputs into the deep learning TensorFlow network. We analyze high-frequency (intraday) Thompson Reuters News Archive as well as the high-frequency price tick history of the Dow Jones Industrial Average (DJIA 30) Index individual stocks for the period between 1/1/2003 and 12/30/2013. We apply a combination of deep learning methodologies of recurrent neural network with long short-term memory units to train the Thompson Reuters News Archive Data from 2003 to 2012, and we test the forecasting power of our method on 2013 News Archive data. We find that the forecasting accuracy of our methodology improves when we switch from random selection of positive and negative news to selecting the news with highest positive scores as positive news and news with highest negative scores as negative news to create our training data set.