INTRODUCTION

MOTIVATION
• Despite our extensive exploration with GANs, we found that the relative performance of GAN models with respect to traditional deep learning models such as LSTM has not been assessed.

INPUTS/OUTPUTS
• Input: 20-days sequence of trade data, including open price, close price, highest price, lowest price and volume.
• Output: A prediction of the movement of the stocks close price on the 21th day.

APPROACH
• Baseline Model: ARIMA model, Shallow LSTM and Deep LSTM.
• Experimental Model: The GAN architecture used has a three-layer dense network as a generator and a three-layer CNN as the discriminator. The discriminator was implemented with three convolutional layers, followed by a flattened layer and one dense layer with sigmoid activation.

RESULTS
• The experimental model doesn’t outperform traditional deep learning models such as LSTM.
• GAN results were more consistent in regard to up and down predictions than LSTM.

Methods

Figure 1: Deep LSTM, two LSTM layers with 64 and 32 hidden units concatenated with three fully connected layers. The first three dense layers used tanh activation and the final dense unit a linear activation.

Figure 2: The GAN architecture used has a three-layer dense network as a generator and a three-layer CNN as the discriminator. The discriminator was implemented with three convolutional layers, followed by a flattened layer and one dense layer with sigmoid activation.

Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Train Set Up Movement Accuracy</th>
<th>Test Set Up Movement Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARIMA</td>
<td>N/A</td>
<td>59.16%</td>
</tr>
<tr>
<td>Shallow LSTM</td>
<td>59.95%</td>
<td>74.16%</td>
</tr>
<tr>
<td>Deep LSTM</td>
<td>79.26%</td>
<td>62.85%</td>
</tr>
<tr>
<td>GAN</td>
<td>73.04%</td>
<td>72.68%</td>
</tr>
</tbody>
</table>

References