Controllable Neural Story Plot Generation via Reinforcement Learning

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Neural story plot generation can be controlled via guiding a language model through intermediate plot points toward a desired goal.

Motivation

Automated Plot Generation is the problem of creating a sequence of main plot points that create a story.

Existing story and plot generators lack controllability—the ability to receive guidance to achieve a particular goal.

Reward Function

Reward a seq2seq model when it moves the story progressively toward a target

1. Compute reward for all verbs using:
   - Frequency before target verb
     \[ r_1(v) = \log \frac{k_{vg}}{N_v} \]
   - Distance from target verb
     \[ r_2(v) = \log \sum_{s \in \mathcal{S}_v, g} l_s - d_s(v, g) \]

2. Create clusters of verbs based on their reward values
   \[ R(v) = \alpha \times r_1(v) \times r_2(v) \]

3. Constrain output verb selection to the next cluster.

4. Use the REINFORCE method to backpropagate the reward

Goal

Find a coherent sequence of events that results in a world state where a desired goal holds.

RL allows to address the control and coherence in plot generation

Contributions

We present a policy gradients approach to plot generation.

Our novel reward shaping technique facilitates intermediate rewards, enabling the system to progress towards a specific goal.

Results

<table>
<thead>
<tr>
<th>Goal</th>
<th>Model</th>
<th>Goal Achievement Rate</th>
<th>Average Perplexity</th>
<th>Average Story Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>admire</td>
<td>Seq2Seq</td>
<td>35.52%</td>
<td>48.06</td>
<td>7.31</td>
</tr>
<tr>
<td></td>
<td>DRL</td>
<td>15.83%</td>
<td>5.73</td>
<td>7.32</td>
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<tr>
<td></td>
<td>DRL + Clustering</td>
<td>94.29%</td>
<td>7.61</td>
<td>4.90</td>
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<tr>
<td>marry</td>
<td>Seq2Seq</td>
<td>39.92%</td>
<td>48.06</td>
<td>6.94</td>
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<td></td>
<td>DRL</td>
<td>24.05%</td>
<td>9.78</td>
<td>7.38</td>
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<tr>
<td></td>
<td>DRL + Clustering</td>
<td>93.35%</td>
<td>7.05</td>
<td>5.76</td>
</tr>
</tbody>
</table>