

Annie Louis & Charles Sutton
University of Edinburgh

Narrative Processing in NLP



Stories are a central part of everyday human experience

- since childhood
- cultural significance

Automated story understanding is a hard problem, but

- useful for communicating narrative
- generating coherent text in summarization/QA: current systems lack focus, goals and structure



Learning **character-action interactions** is a central task

Previously → frequency-based

- What are frequent character-action pairs?



This work → predictive ties

- ✓ Given a character's attributes, what actions are likely?
- ✓ Given observed actions, what attributes might be attached to a character?

The Corpus: Role Playing Game Transcripts

From online RPG Forums: [roleplayerguild.com](http://groups.inf.ed.ac.uk/cup/ddd/)

An RPG transcript

- a set of character describing posts
- a sequence of action posts

1,544 RPGs

- 56,576 action posts
- 9,771 unique characters

Preprocessing descriptions

- Retain only parts related to character in focus
- Remove auxiliary information (other characters, location etc)
- Normalize character name

Character description

- ✓ Keep only sentences with character name or pronouns 'he', 'she'
- ✓ Sentences with personality words – 'ability', 'profile', 'talent' etc
- ✓ Replace character name with 'ENT'

Action description

- ✓ Keep only sentences which start with character name
- ✓ Replace character name with 'ENT'

Download our corpus at <http://groups.inf.ed.ac.uk/cup/ddd/> !

character → action
action → character
Does one aspect help predict the other?

Both characters and actions are described in **complex NL texts**

This work: **Modelling character-action interactions from complex language descriptions**

A corpus of RPG transcripts from online forums:
<http://groups.inf.ed.ac.uk/cup/ddd/>

Neural language models for learning interactions

Prior work

Learning types of characters	probabilistic topic models, distributed representations from neural networks
Learning regular event sequences	with some information about the agent. But fairly low-level, eg. noun-verb pairs
Classify characters based on their speech/actions	coarse classes only, eg. introvert / extrovert

Modeling character-action interaction

Mikolov and Zweig, 2012 – Language models with side information

- RNN Language model
- Side information for token $x_i \rightarrow$ feature embedding vector e_i
- e_i concatenated to input and output layers

$$h_i = LSTM(h_{i-1}, [x_{i-1}, e_i])$$

$$P(x_i | x_1 \dots x_{i-1}) = softmax(W_{rv} [h_i, e_i] + b_v)$$

Our language models

	Action LM	Character LM
Token seq	entire story thread	a character's description
+ Side info	char producing each token	all actions posts done by char

- ✓ e_i is jointly learned in the same model. Feedforward network with average pre-trained embeddings of side info (bag of words) as input.

Character/Action Descriptions from our Corpus

Character description



Name: Ana Blackclaw
Age: 27
Gender: Female
Appearance: Standing at a mighty 6'5, she is a giant among her fellow humans... Her face is marked by scars. ... Her body is muscular, as it would have to be to carry both her armor and the hammer. Preferred Weapon: Hammer. Preferred Armor: Heavy. Gift: Binoculars. Dark Sign: No.

Action description

She stopped dead in her tracks as the hissing began, and grabbed the back of the girl's neck, pulling her back to steady herself. The giant remained silent as she did so, and then glanced over to the nearby skeletons. They would be upon them soon. Her grip tightened on the hammer as she glanced from side to side. It would not be a fun fight.



- ✓ Complex natural language descriptions
- ✓ Express sophisticated character attributes and actions compared to coarse categories such as introvert/extrovert

Results and Future work

Language model perplexities

	Train	Test		Train	Test
Action LM	82.56	105.06	Char LM	69.45	106.12
Action LM + side:char	57.38	96.91	Char LM + side:action	61.84	100.86

Samples from Action LM + side:char

Character context	Continuations of "ENT called..."
small, girl, cheerful	<BOS> ENT called ... her name <EOS>
bulky, male	<BOS> ENT called... out to the group <EOS>

Samples from Char LM + side:action

Action context	Continuations of "ENT is..."
walked, looked, stayed	<BOS> ENT is ... a very friendly person <EOS>
strike, slap	<BOS> ENT is ... a bad boy <EOS>

Future work

- Infer one modality from another
- Better models for generation

References

1. Bamman, O'Connor, and Smith, "Learning latent personas of film characters", ACL 2013
2. Chambers and Jurafsky, "Unsupervised learning of narrative schemas and their participants", ACL-IJCNLP 2009

3. Iyyer, Guha, Chaturvedi, Boyd-Graber, and Daume III, "Feuding families and former friends: Unsupervised learning for dynamic fictional relationships", ACL-IJCNLP 2016

4. Mikolov and Zweig, "Context dependent recurrent neural network language model", IEEE Spoken Language Technology Workshop 2012