

Trends in ACL 2018

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About ACL

- Annual Meeting of Computational Linguistics
- TOP 1 NLP conferences (**ACL > EMNLP > NAACL**)
- Founded in 1962, originally named the **Association for Machine Translation and Computational Linguistics (AMTCL)**
- Became the ACL in 1968
- The **56th in 2018**

About ACL

- Major tracks (double than listed)
 - Information Extraction and Text Mining
 - **Machine Learning**
 - Machine Translation
 - Document Analysis
 - Semantics
 - Sentiment Analysis
 - Dialogue and Interactive System
 - **Multidisciplinary (also for AC COI)**

About ACL

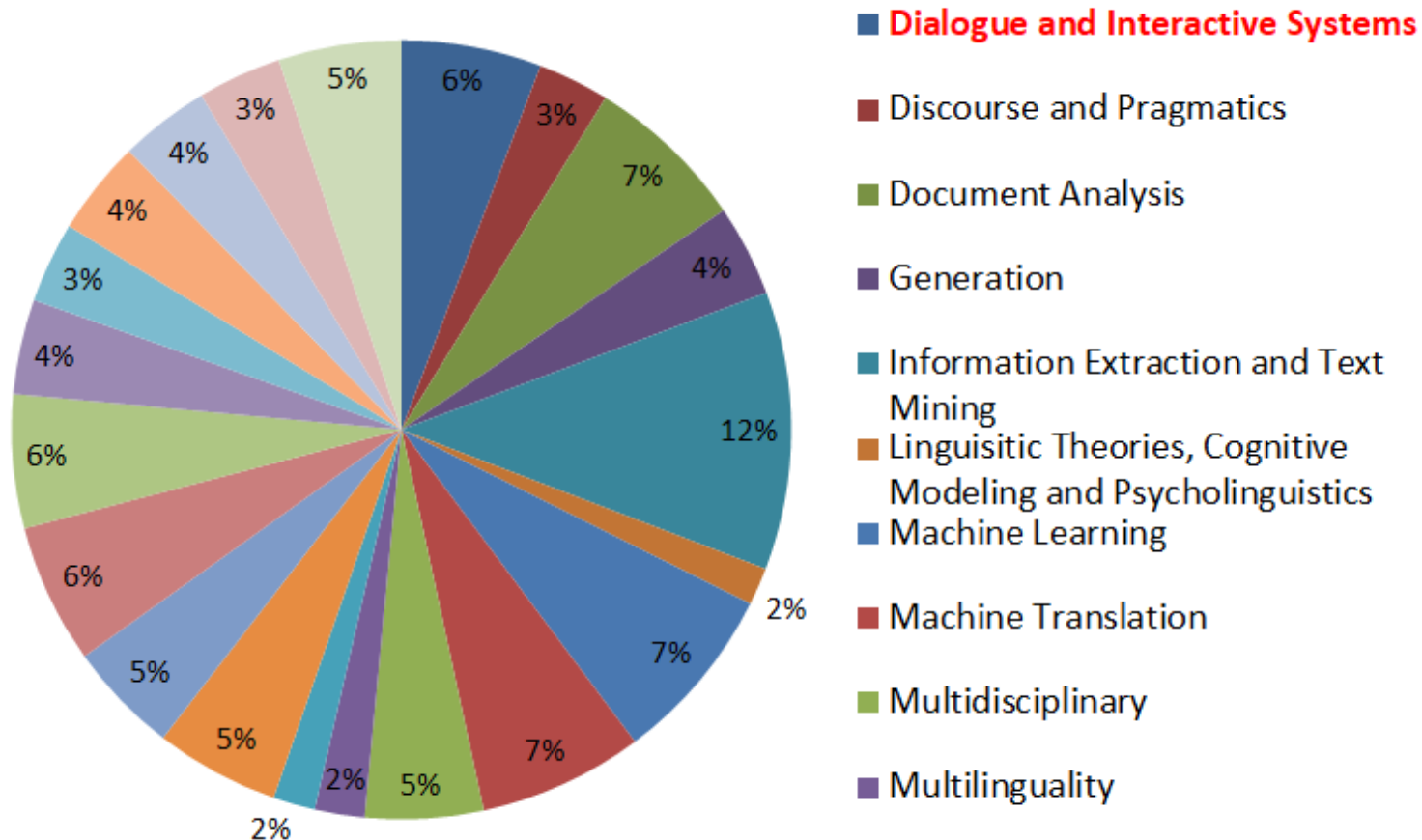
- **Long** paper submission (8+2 → 9+unlimited refs)
- **Short** paper submission (4 pages)
 - Novel but incomplete works

Submission Statistics in ACL 2018

Long: 258/1018

Short: 126/526

ACL2018 Submission



Best Papers

- **Best Long Papers**

- *Finding syntax in human encephalography with beam search*. John Hale, Chris Dyer, Adhiguna Kuncoro and Jonathan Brennan.
- *Learning to Ask Good Questions: Ranking Clarification Questions using Neural Expected Value of Perfect Information*. Sudha Rao and Hal Daumé III.
- *Let's do it "again": A First Computational Approach to Detecting Adverbial Presupposition Triggers*. Andre Cianflone,* Yulan Feng,* Jad Kabbara* and Jackie Chi Kit Cheung. (* equal contribution)

- **Best Short Papers**

- *Know What You Don't Know: Unanswerable Questions for SQuAD*. Pranav Rajpurkar, Robin Jia and Percy Liang
- *'Lighter' Can Still Be Dark: Modeling Comparative Color Descriptions*. Olivia Winn and Smaranda Muresan

Best Paper Honourable Mentions

- **Short Papers**

- *Jointly Predicting Predicates and Arguments in Neural Semantic Role Labeling.* Luheng He, Kenton Lee, Omer Levy and Luke Zettlemoyer.
- *Do Neural Network Cross-Modal Mappings Really Bridge Modalities?* Guillem Collell and Marie-Francine Moens.

- **Long Papers**

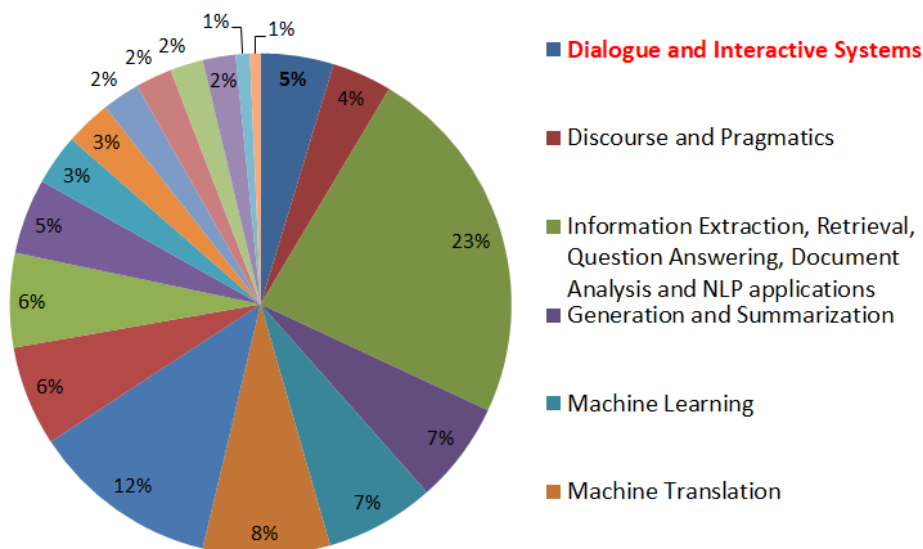
- *Coarse-to-Fine Decoding for Neural Semantic Parsing.* Li Dong and Mirella Lapata.
- *NASH: Toward End-to-End Neural Architecture for Generative Semantic Hashing.* Dinghan Shen, Qinliang Su, Paidamoyo Chapfuwa, Wenlin Wang, Guoyin Wang, Ricardo Henao and Lawrence Carin.
- *Backpropagating through Structured Argmax using a SPIGOT.* Hao Peng, Sam Thomson and Noah A. Smith.
- *Hierarchical Neural Story Generation.* Angela Fan, Mike Lewis and Yann Dauphin.
- *Semantically Equivalent Adversarial Rules for Debugging NLP models.* Marco Tulio Ribeiro, Sameer Singh and Carlos Guestrin.
- *Large-Scale QA-SRL Parsing.* Nicholas FitzGerald, Julian Michael, Luheng He and Luke Zettlemoyer.

Outline

- Dialogue and interactive system
- Reading comprehension
- Knowledge extraction, representation, applications

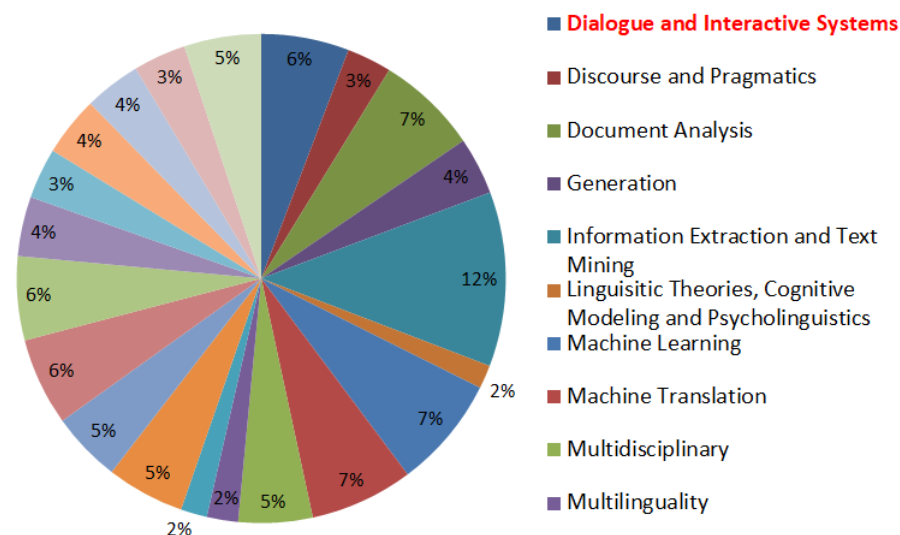
Dialogue Submission Statistics

ACL2017 Submission



5% of 1419 submissions

ACL2018 Submission

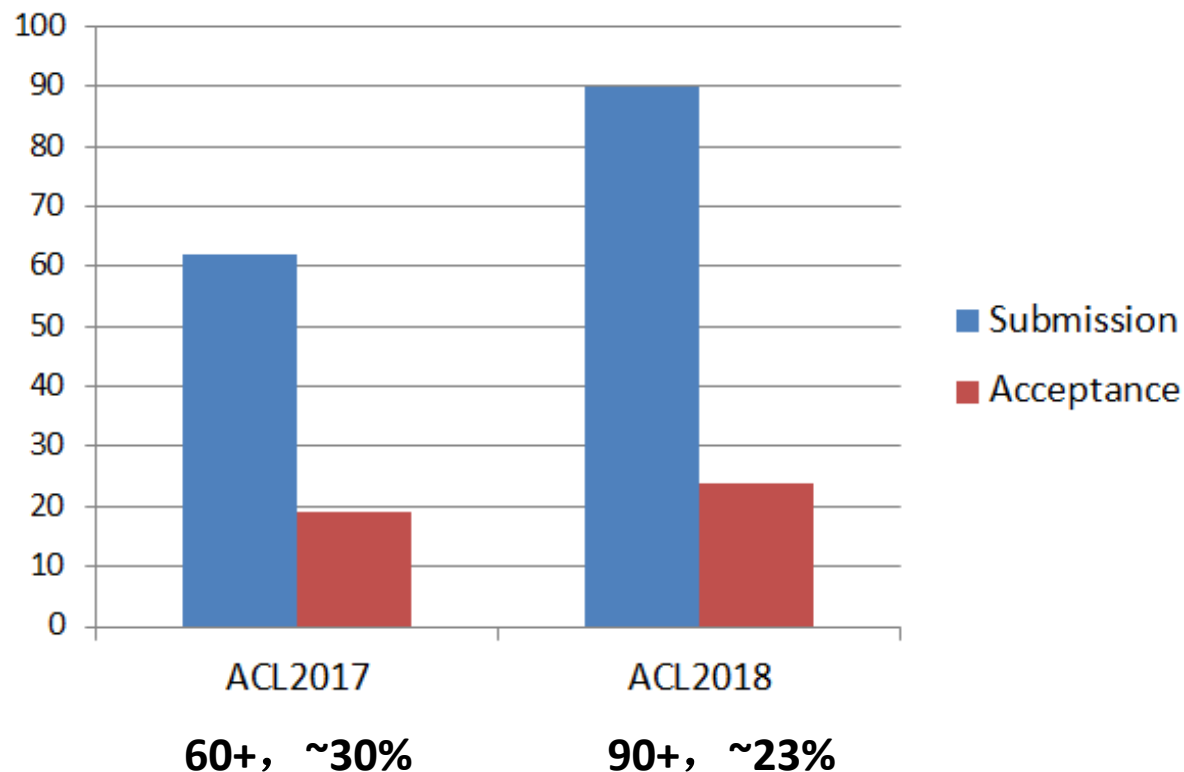


6% of 1621 submissions

Dialogue system papers **keep growing** recently.

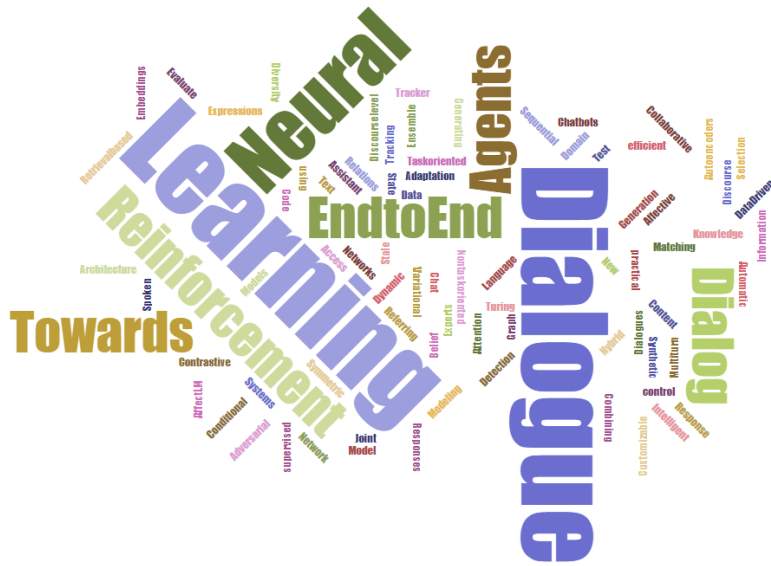
Dialogue and Interactive System

- Acceptance rate in ACL 2017 and ACL 2018



Dialogue receives more attention, but only the papers **bringing new insights** can be accepted by **top NLP** conferences.

Dialogue and Interactive System



ACL 2017

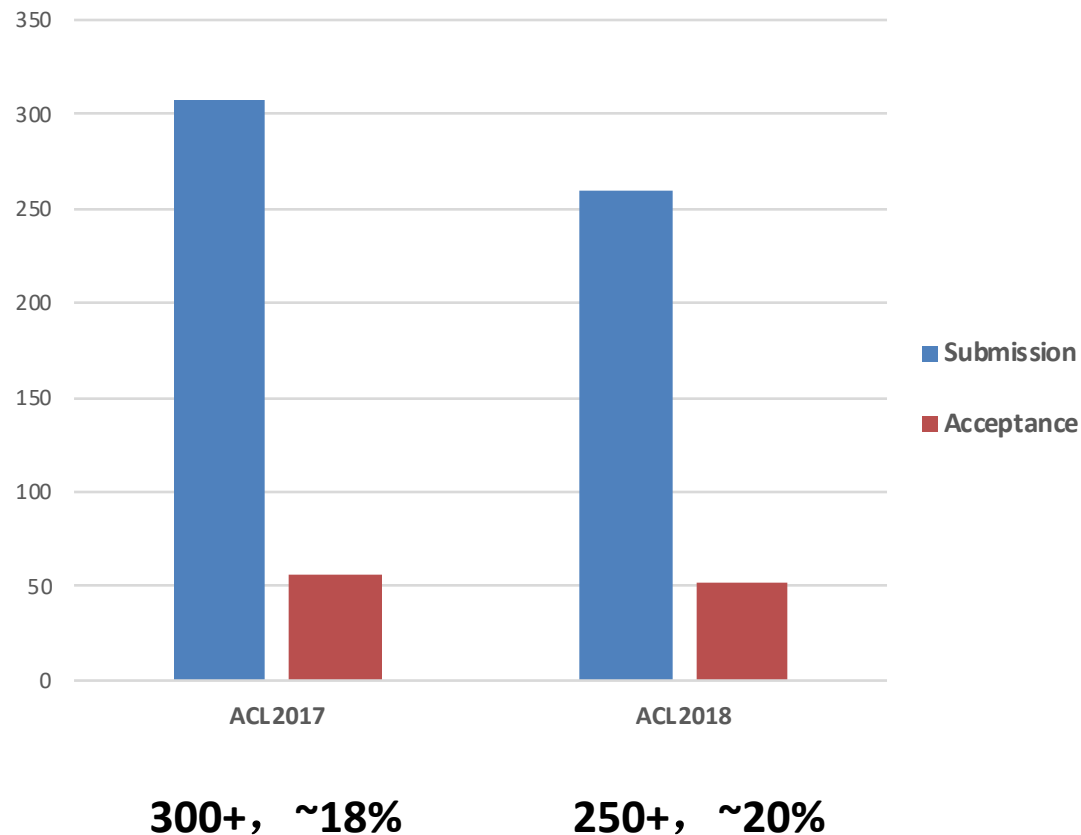


ACL 2018

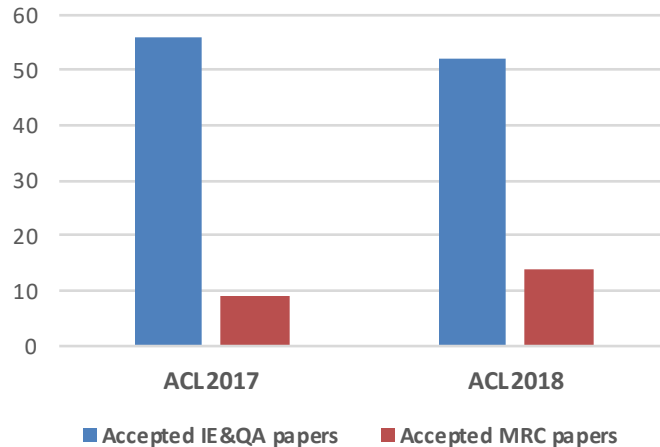
- ✓ **End-to-end neural dialogue system** has been continuously attended during 2017 and 2018.
- ✓ **Knowledge-driven** dialogue system is a future direction.
- ✓ **More diverse dialogue tasks** (matching, slot-filling, tracking) were developed in ACL 2018.

Information Extraction & QA

- Acceptance rate in ACL 2017 and ACL 2018 (IE&QA)



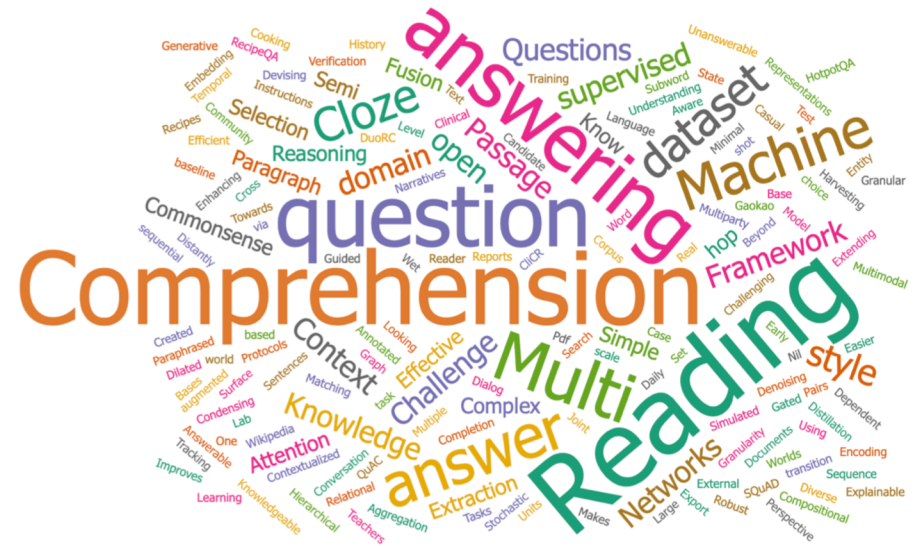
MRC: Machine Reading Comprehension



<20%

>20%

- Dataset
- Multiple hop reasoning
- Open domain



*Image generated by <https://wordsift.org>

MRC: Real Scenario

- **Datasets** are more challenging and closer to real scenarios
 - Multiple documents^[1]
 - Multi-relational questions^[2]

Question: What is the difference between a mixed and pure culture?

Passages:

[1] **A culture is a society's total way of living and a society is a group that live in a defined territory and participate in common culture.** While the answer given is in essence true, societies originally form for the express purpose to enhance ...

[2] ... There has been resurgence in the economic system known as capitalism during the past two decades. 4. **The mixed economy is a balance between socialism and capitalism.** As a result, some institutions are owned and maintained by ...

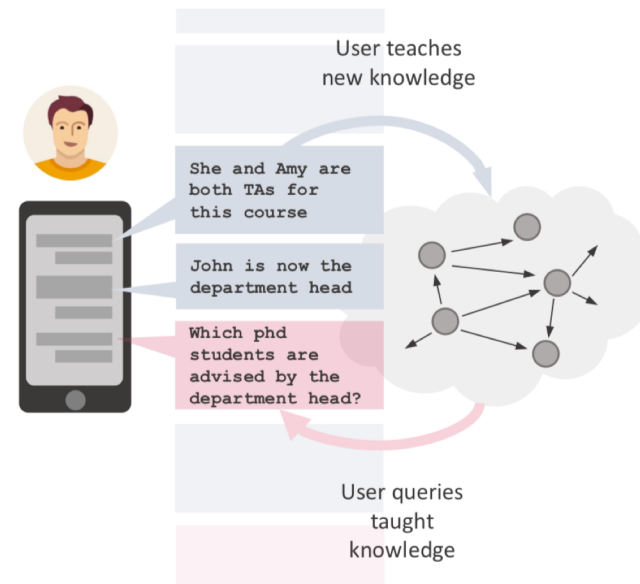
[3] **A pure culture is one in which only one kind of microbial species is found whereas in mixed culture two or more microbial species formed colonies.** Culture on the other hand, is the lifestyle that the people in the country ...

[4] Best Answer: **A pure culture comprises a single species or strains. A mixed culture is taken from a source and may contain multiple strains or species.** A contaminated culture contains organisms that derived from some place ...

[5] ... It will be at that time when we can truly obtain a pure culture. **A pure culture is a culture consisting of only one strain.** You can obtain a pure culture by picking out a small portion of the mixed culture ...

[6] **A pure culture is one in which only one kind of microbial species is found whereas in mixed culture two or more microbial species formed colonies.** A pure culture is a culture consisting of only one strain. ...

...



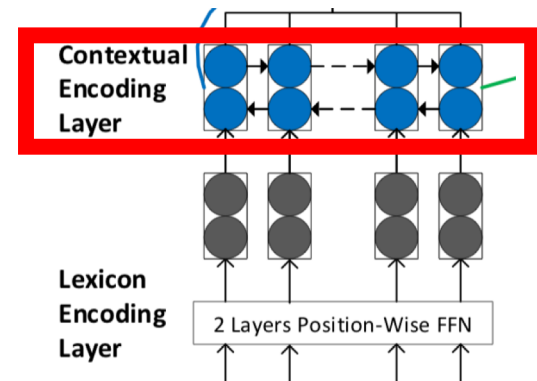
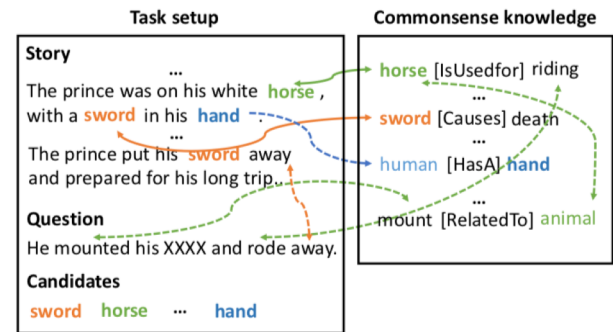
[1] Clark et al, Simple and Effective Multi-Paragraph Reading Comprehension

[2] Labutov et al, Multi-Relational Question Answering from Narratives

MRC: Heavy Techniques

- **Models** utilize heavy techniques

- Attention^[1]
- External knowledge^[2]
- Multi-task learning^[3]
 - + Candidate extraction
 - + Answer verification
- Pre-training
 - COVE or ELMO
- Efficiency
 - CNN + self attention



[1] Wang et al, Multi-Granularity Hierarchical Attention Fusion Network for Reading Comprehension and Question Answering

[2] Mihaylov et al, Knowledgeable Reader: Enhancing Cloze-Style Reading Comprehension with External Commonsense Knowledge

[3] Wang et al, Joint Training of Candidate Extraction and Answer Selection for Reading Comprehension

MRC: Critical Evaluation

- **Best short paper!**^[1]
 - Normal test → **Adversarial test**^[2]
 - Answerable → **Unanswerable**

Single model:	AddSent	AddOneSent
LR (Rajpurkar et al., 2016)	23.2	30.3
SEDT (Liu et al., 2017a)	33.9	44.8
BiDAF (Seo et al., 2016)	34.3	45.7
jNet (Zhang et al., 2017)	37.9	47.0
ReasoNet(Shen et al., 2017)	39.4	50.3
RaSoR(Lee et al., 2016)	39.5	49.5
Mnemonic(Hu et al., 2017)	46.6	56.0
QANet(Yu et al., 2018)	45.2	55.7
Standard 1-step in Table 1	45.4	55.8
SAN	46.6	56.5

Table 5: Test performance on the adversarial SQuAD dataset in F1 score.

Know What You Don't Know: Unanswerable Questions for SQuAD

Pranav Rajpurkar* Robin Jia* Percy Liang
Computer Science Department, Stanford University
{pranavsr, robinjia, pliang}@cs.stanford.edu

Article: Endangered Species Act

Paragraph: “... Other legislation followed, including the Migratory Bird Conservation Act of 1929, a 1937 treaty prohibiting the hunting of right and gray whales, and the Bald Eagle Protection Act of 1940. These later laws had a low cost to society—the species were relatively rare—and little opposition was raised.”

Question 1: “Which laws faced significant opposition?”

Plausible Answer: later laws

Question 2: “What was the name of the 1937 treaty?”

Plausible Answer: Bald Eagle Protection Act

[1] Rajpurkar et al, Know What You Don't Know: Unanswerable Questions for SQuAD

[2] Liu et al, Stochastic Answer Networks for Machine Reading Comprehension

Knowledge Everywhere

- Encoding **symbolic knowledge** becomes a hot topic
- **Knowledge type**
 - World facts
 - Commonsense knowledge
- **Application**
 - Language inference, semantic reasoning
 - MRC, QA & dialogue
 - Language generation (story, dialogue, etc.)

Commonsense Extraction

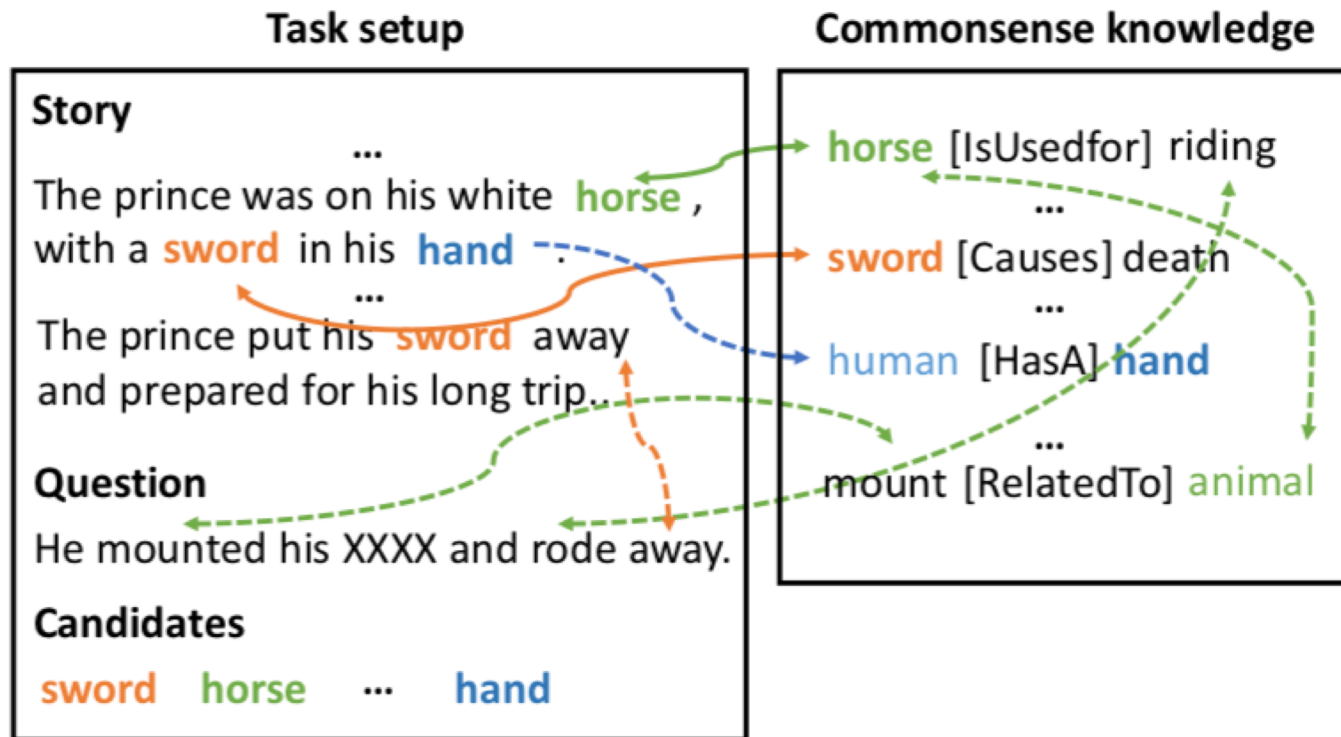
- What is commonsense knowledge?
- What is the **boundary**?
- Commonsense extraction
 - From embeddings [1]
 - Commonsense knowledge base completion [2]
 - From raw data [3]



- ① Yang et al. 2018. Extracting Commonsense Properties from Embeddings with Limited Human Guidance
- ② Li et al. 2018. Commonsense Knowledge Base Completion
- ③ Xu et al. 2018. Automatic Extraction of Commonsense Located Near Knowledge

Application: Commonsense Knowledge

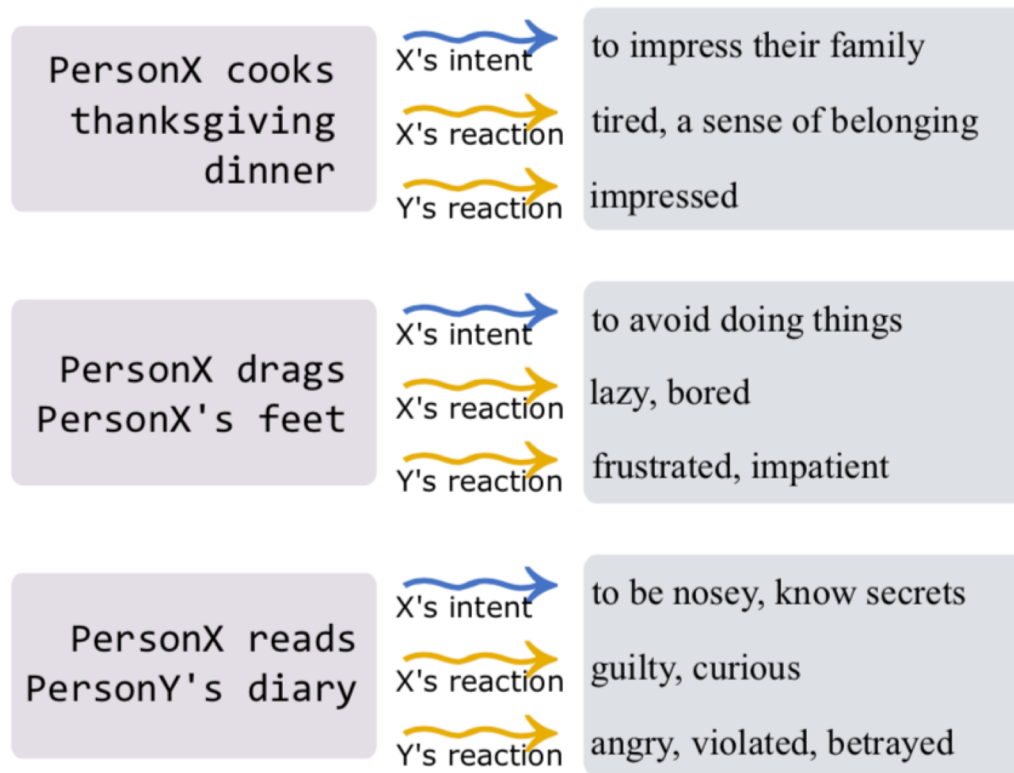
Commonsense in Reading Comprehension



Mihaylov and Frank. 2018. Knowledgeable Reader: Enhancing Cloze-Style Reading Comprehension with External Commonsense Knowledge

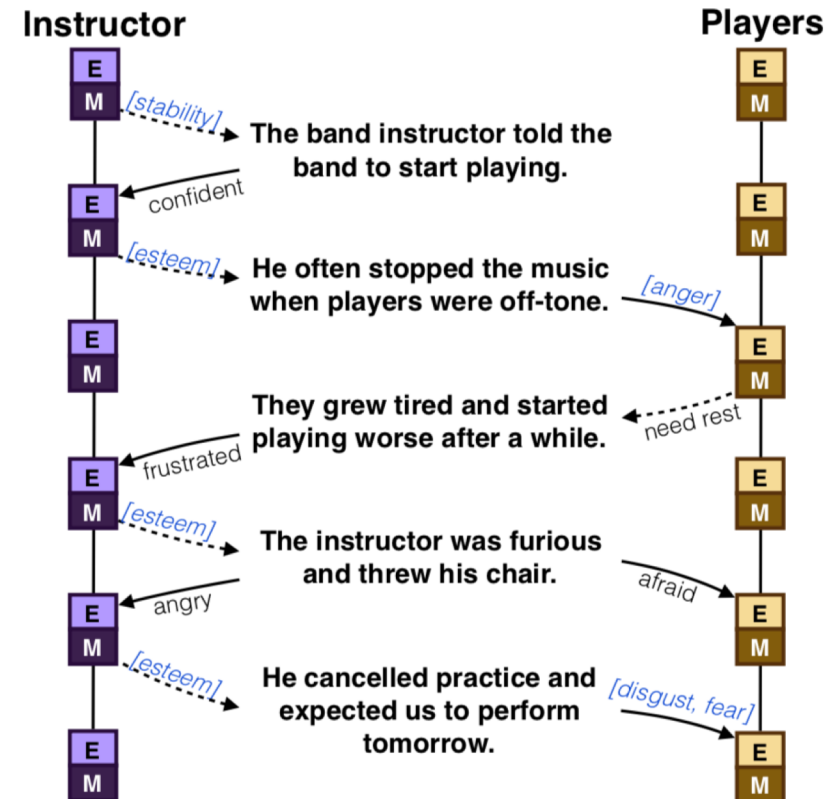
Application: Commonsense Knowledge

Event, Intents, and Reactions



Rashkin et al. 2018. Event2Mind: Commonsense Inference on Events, Intents, and Reactions

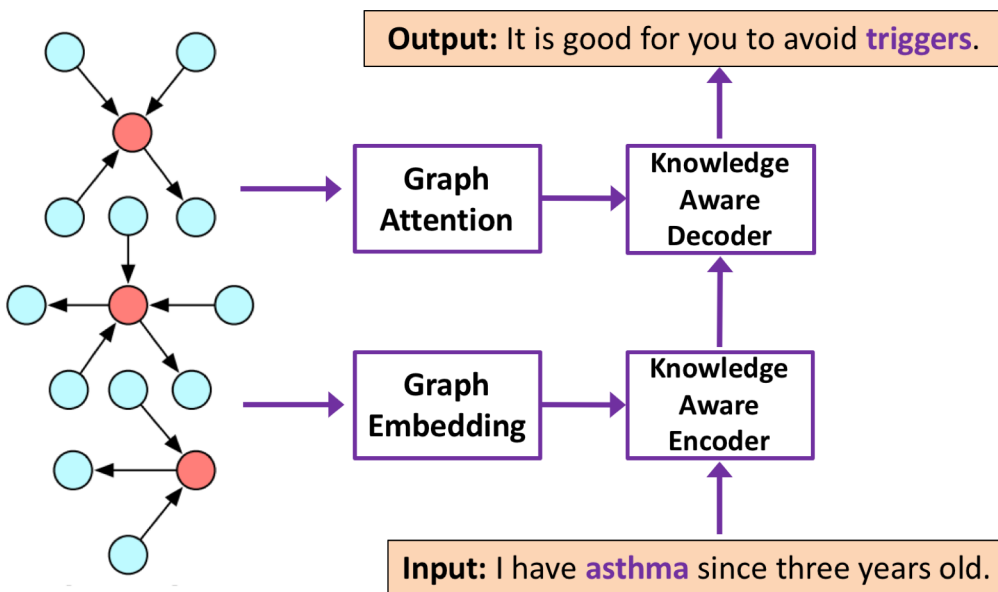
Mental states: *motivations* and *emotional reactions*



Rashkin et al. 2018. Modeling Naive Psychology of Characters in Simple Commonsense Stories

Application: Commonsense Knowledge

Dialogue Generation: knowledge

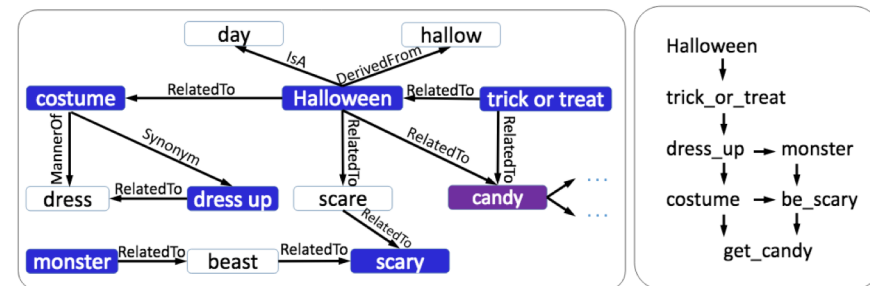


Story Ending Generation: logic

Today is **Halloween** .
Jack is so excited to go **trick or treating** tonight .
He is going to **dress up** like a **monster** .
The **costume** is real **scary** .

↓

He hopes to get a lot of **candy** .



Zhou et al. 2018. Commonsense Knowledge Aware Conversation Generation with Graph Attention.

Guan et al. 2018. Story Ending Generation with Incremental Encoding and Commonsense Knowledge.

How to be more successful in ACL?

- Language/Linguistics insights
- Very detailed, comprehensive experiments
- Not necessary fancy models but **new tasks, new problems, new applications**

Thanks for Your Attention!

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