🏷️ 리뷰 관련 논문 리서치

리뷰 프로젝트를 진행하기 전, 리뷰와 관련된 어떤 task가 있는지 알기 위해 최근 논문 (2020~2017 acl, emnlp, naacl(2021년도 포함))을 리서치 하고 각 task에 해당하는 논문을 분류함. **(단, 논문 리서치 및 분류는 논문 Abstract 만 읽고 진행함)**

리서치

[task : 요약]

▼ Unsupervised Neural Single-Document Summarization of Reviews via Learning Latent Discourse Structure and its Ranking

- ACL 2019

- 한 리뷰를 생성 요약하는 모델

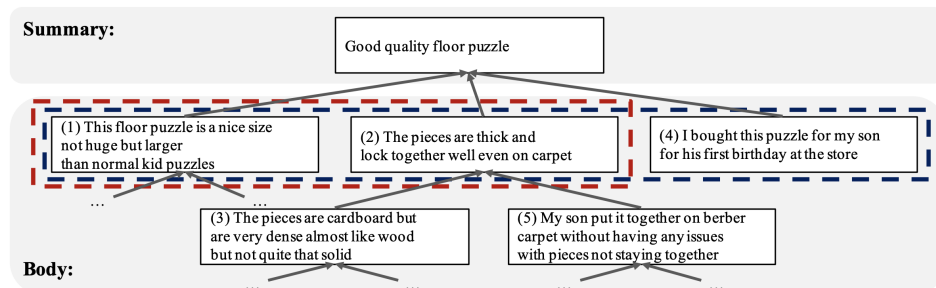   1. a single review를 discourse tree로 변환 → parent node가 child node의 요약인 셈

Figure 1: Example of the discourse tree of a jigsaw puzzle review. StrSum induces the latent tree and generates the summary from the children of a root, while DiscourseRank supports it to focus on the main review point.

    2. discourse tree의 node에 해당하는 각각 문장을 중요도에 따라 랭킹

▼ Not All Reviews Are Equal: Towards Addressing Reviewer Biases for Opinion Summarization [Student Research Workshop paper]

- ACL 2019 Student Research Workshop paper

- 리뷰러들은 bias(:선호 이슈, 견해가 다르므로)를 가지기에 balanced opinion을 갖는 리뷰 요약 모델을 만들고자 함

  1. bias를 파악하는 opinion representation 학습 (bias-aware opinion representation 학습)

  2. bias를 완화하는 리뷰 opinion summarization을 만듦 (balanced opinion summarization of review using (1.)bias-aware opinion representation)

▼ Review-based Question Generation with Adaptive Instance Transfer and Augmentation

- 리뷰에 기반하여 질문을 생성하는 모델이지만, 본질은 요약이라고 판단하여 요약에 그룹핑함

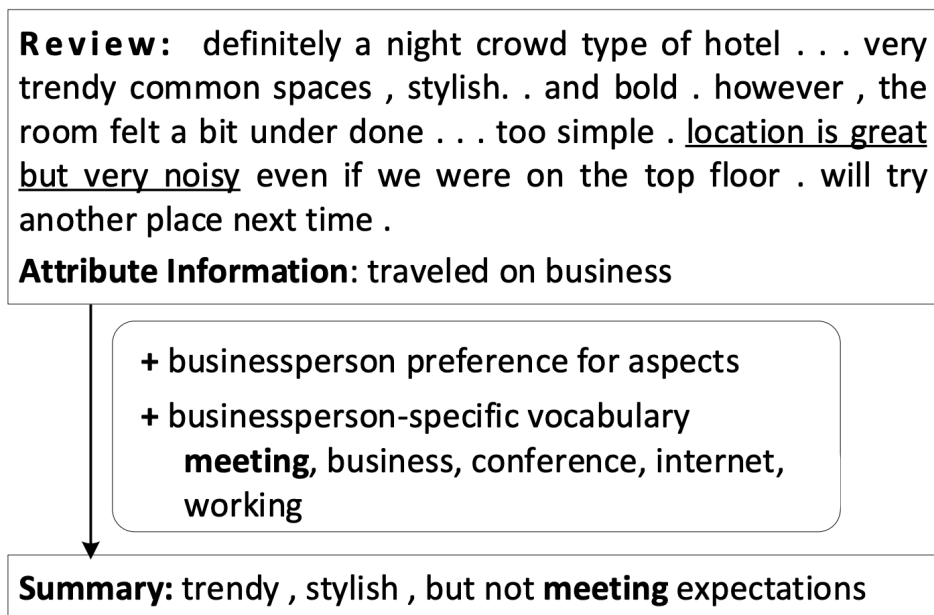| Review	Question
It doesn't heat up like most of the other ones, and I was completely fascinated by the ultra light and sleek design for the case. Before I was using the Mophie case but I couldn't wear it often because it was like having a hot brick in your pocket, hence I had to always leave it at home. On the contrary, with PowerBear, I never take it off because I can't even tell the difference. Also it is build in a super STRONG manner and even though I dropped my phone a few times, its shock resistant technology won't let a single thing happen to the case or the phone. The PowerBear case became an extension to my phone that I never have to take off because when I charge it at night, it charges both my phone and the case. I have battery life for more than two days for normal use, i.e. not power-consuming gaming.	Does this make the phone warm during charging? Have any of you that own this had a Mophie? Does this give protection to the phone? Can this charge the phone and the extra battery at the same time? How many days it can last?

Table 1: A product review and the example questions.

- ACL 2020

- 많은 양의 리뷰를 고객이 보개 하는 것보단, 질문을 만들고 그 질문에 대응하는 리뷰를 응답으로 제공하자

  1. lack of training data 문제 해결

  2. 리뷰 내 주요 aspects에 대한 질문 생성

- 나의 의견 : 만들어진 질문에 대응하는 리뷰의 수가 적으면 안 될듯. → 그 상품에 대한 사람의 견해는 모두 다른데 리뷰 수가 작으면 한쪽 방향으로 의견이 치우칠 경향이 높기 때문

▼ Unsupervised Opinion Summarization as Copycat-Review Generation

- ACL 2020

- 다중 문서 생성 요약

- 리뷰의 내용을 따라하도록 하면서, 생성요약을 한다

▼ Attribute-aware Sequence Network for Review Summarization

Review: definitely a night crowd type of hotel . . . very trendy common spaces , stylish. . and bold . however , the room felt a bit under done . . . too simple . <u>location is great but very noisy</u> even if we were on the top floor . will try another place next time .
Attribute Information: traveled on business

+ businessperson preference for aspects
+ businessperson-specific vocabulary
    meeting, business, conference, internet, working

Summary: trendy , stylish , but not **meeting** expectations

- users's attribute (gender, age, and occupation)을 반영한 리뷰 요약 모델 → Attribute-aware Sequence Network(ASN)

- 모델 구성

  1. attribute encoder

  2. attribute-aware review encoder

  3. attribute-aware summary decoder

[task : 리뷰 생성]

▼ Generating Long and Informative Reviews with Aspect-Aware Coarse-to-Fine Decoding

- ACL 2019

- topical & syntactic characteristics을 살리는 aspect-aware coarse-to-fine generation model

> The method(coarse-to-fine generation) first generate a rough sketch in the coarse stage and then use the sketch to get the final result in the fine stage
> (in An Improved Coarse-to-Fine Method for Solving Generation Tasks paper)

Black Mini Microphone for iPhone 3G

Buy 1 Get 1 Free (2Pack)

Product ID: *****93428
User ID: *******QXGQ2
Rating: 5

Aspect: Sound ⟶ Service ⟶ Price

Sketch: this NN sounds RB great . i VBD VB this product fast IN the NN . price was WP it would cost on the JJ NN .
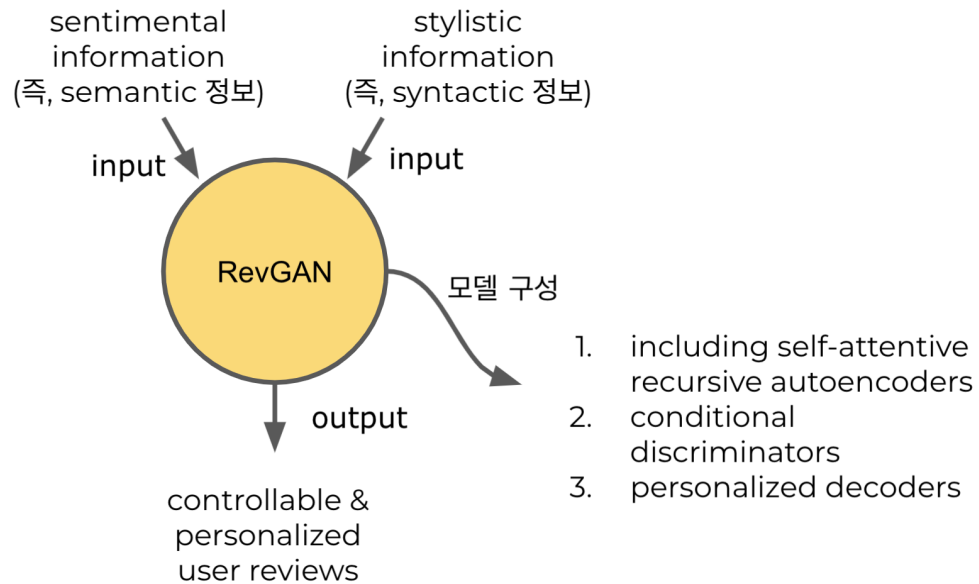
Review: this microphone sounds surprisingly great . i did get this product fast through the mail . price was what it would cost on the open market .

1. aspect 파악

2. aspect-aware decoder를 통해 aspect-aware sketch 예측

3. 또 다른 decoder를 통해 최종 리뷰 생성

▼ Towards Controllable and Personalized Review Generation

- EMNLP 2019

- RevGAN : controllable & personalized user reviews 생성

▼ Justifying Recommendations using Distantly-Labeled Reviews and Fine-Grained Aspects

- ACL 2019

- generating justification recommendations → 리뷰 생성과는 다른 개념이나 리뷰 생성으로 활용할 수도 있다고 판단하여 리뷰 생성으로 그룹핑

Review examples:

I love this little stand! **The coconut mocha chiller and caramel macchiato are delicious.**

Wow what a special find. One of the most unique and special date nights my husband and I have had.

Tip examples:

Great food. Nice ambiance. Gnocchi were very good.

I can't get enough of this place.

Justification examples:

The food portions were huge.

Plain cheese quesadilla is very good and very cheap.

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1. 리뷰에서 사용자의 intention이 포함된 구절 추출 → dataset으로 활용

2. justification generation 모델 구축

1. reference-based Seq2Seq model with aspect-planning → this can generate justifications covering different aspects
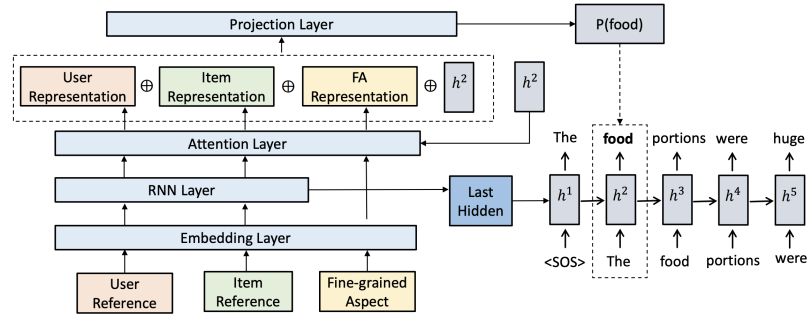
Figure 1: Structure of the reference-based Seq2Seq model with Aspect Planning

2. aspect-conditional masked language model → this can generate diverse justifications based on templated extracted from justification histories.
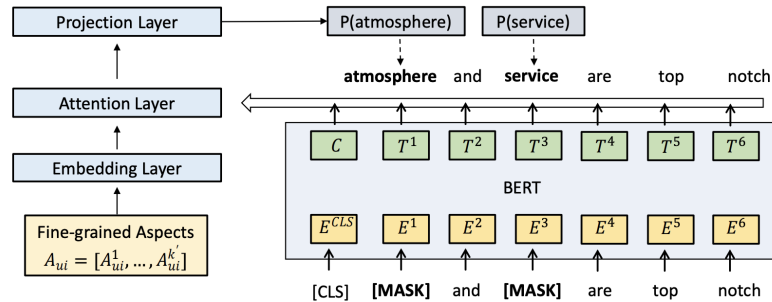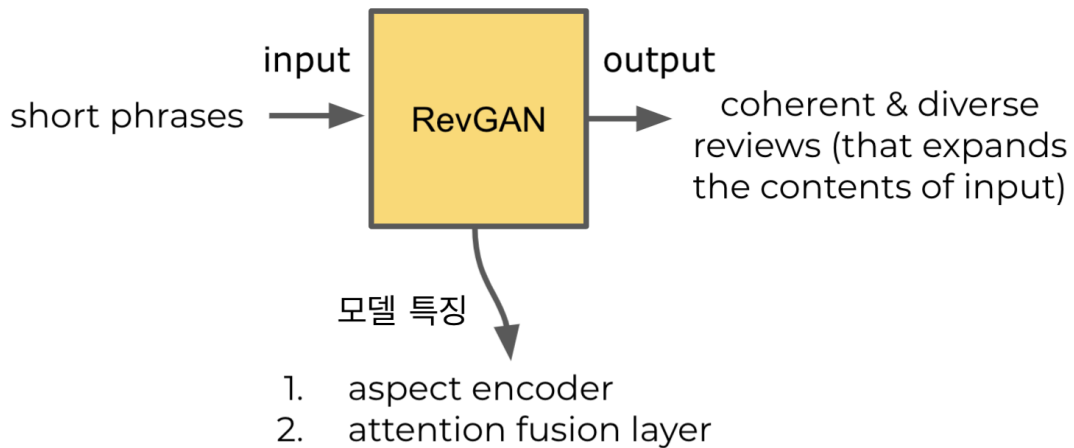
Figure 2: Structure of the Aspect Conditional Masked Language Model

▼ Personalized Review Generation by Expanding Phrases and Attending on Aspect-Aware Representations

input → RevGAN → output

short phrases → RevGAN → coherent & diverse reviews (that expands the contents of input)

모델 특징
1. aspect encoder
2. attention fusion layer

[task : 토픽]

▼ Semi-supervised Category-specific Review Tagging on Indonesian E-Commerce Product Reviews [workshop paper]

- 이 논문에서 정확한 명칭은 review tagging이지만 본질적으로 토픽 모델이라고 판단함

- ACL 2020 workshop paper

- 논문 배경

  - 사용자가 작성하는 리뷰의 토픽은 1. generic topic과 2. category-specific topic이 있음

  - 1. generic topic에 대해 태깅하는 것은 가능하지만, 2. category-specific topic에 대해 일일이 태깅하는 것은 불가능

- 각각의 리뷰에 product category-specific tags를 다는 모델

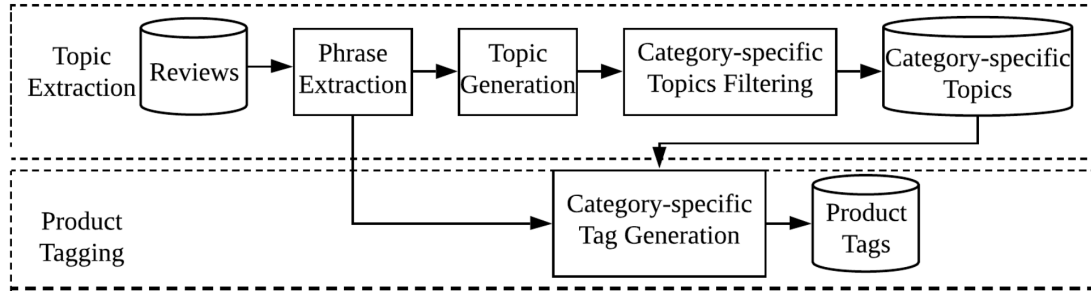 1. Topic Extraction

  2. Product Tagging

Figure 1: Category-specific topic extraction and product tagging pipelines

[task : 번역]

▼ Machine Translation of Restaurant Reviews: New Corpus for Domain Adaptation and Robustness [workshop paper]

- ACL 2019 workshop paper
- French ←→ English 레스토랑 리뷰 번역

  1. French ←→ English 레스토랑 리뷰 번역 코퍼스 공유

  2. robustness & domain adaption에 부합하는 method 제시

  3. task-specific metrics 제안

[task :감정관련 task]

감정분류

▼ Disambiguating Sentiment: An Ensemble of Humour, Sarcasm, and Hate Speech Features for Sentiment Classification [workshop paper]

- EMNLP 2019 workshop paper
- Humour, Sarcasm, and Hate Speech Features를 이용하여 **감정 분류**하는 모델 제안
- 모델은 1 step, 2step으로 구성됨

1 step : Humour, Sarcasm, and Hate Speech를 포함하는 features 추출

2 step : 추출된 Humour, Sarcasm, and Hate Speech를 포함하는 features을 이용해 감정 분류

▼ Dual Memory Network Model for Biased Product Review Classification [workshop paper]

- ACL 2018 workshop paper

- 모델명 : DUPMN

  1. separate memory network를 이용해 user profiles & product review modeling (representation 학습)

  2. two representations가 joint되어 sentiment 예측을 위해 사용됨

감정 변환

▼ Learning to Flip the sentiment of Reviews from Non-paraller Corpora

- EMNLP 2019

- review의 content는 유지하되, sentiment만 뒤바꾸는 모델 제안. **감정을 뒤바꿈**

  예시 : the service was great too (긍정 감정을 가지는 문장) → the service wasn't too great (부정 감정을 가지는 문장)

[task : 추천]

▼ Reviews Meet Graphs: Enhancing User and Item Representations for Recommendation with Hierarchical Attentive Graph Neural Network

- EMNLP 2019

- review를 이용하여 상품 추천하는 모델 제안

Figure 1: Two example users and items.

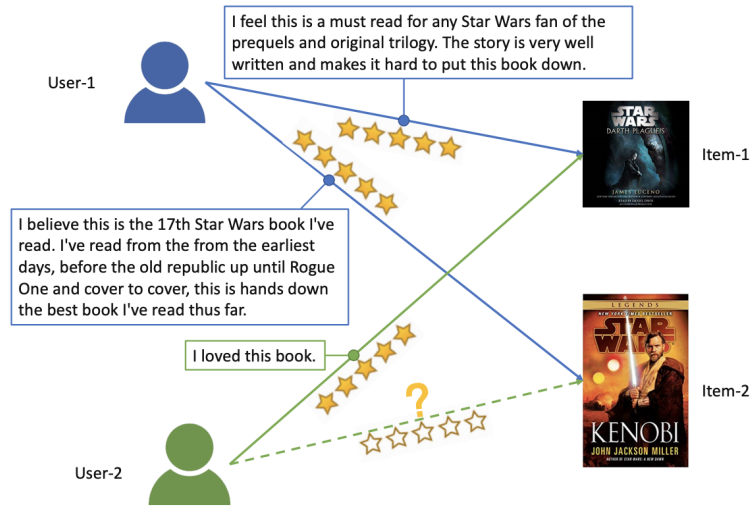1. Review content-view : review를 이용하여 user-item representation 학습

    1. hierarchical model

    2. a three-level attention network

2. Graph-view : user-time뿐만이 아니라 user-user, item-item relatedness을 고려한 모델

    1. hierarchical graph neural network

    2. attention mechanism

[task : 의견추출]

▼ Author-aware Aspect Topic Sentiment Model to Retrieve Supporting Opinions from Reviews

- EMNLP 2017

"Weekend Stay"

Reviewed 2 weeks ago

I stayed in this hotel for three nights with my family. *I made a reservation online, and even though we arrived early in the morning the front-desk staff was very accommodating and helped us in doing an early check-in.* The hotel is located just a few blocks away from all the major attractions and restaurants. We ate most of our meals outside since the food at the hotel had very limited choices and wasn't much good either. We had a spacious room with a clean bathroom and a comfy bed but no wifi.
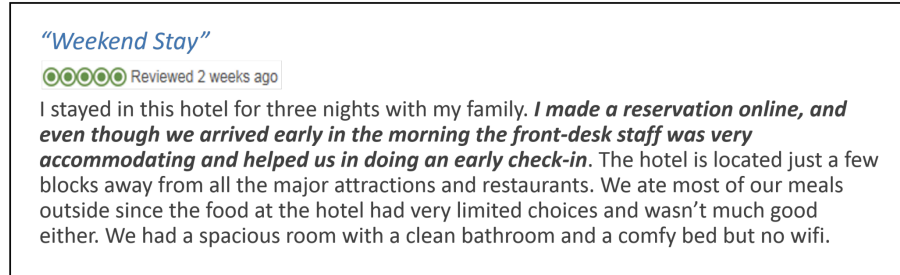
Figure 1: A sample hotel review

- 모델명 : SURF

  1. 리뷰에서 opinion 인식 → probabilistic graphical model 사용

  2. 다른 리뷰에서 1.에서 인식된 opinion과 유사한 opinion을 찾음 → similarity measure 사용

[task : 속성분류]

▼ Distantly Supervised Attribute Detection from Reviews [workshop paper]

- EMNLP 2018 workshop

- 특정 속성을 Detection하는 모델로, 속성 추출이 아닌 속성 분류

  - 특징 1 : crowdsourced attribute labels를 통해 학습 (DataSet)
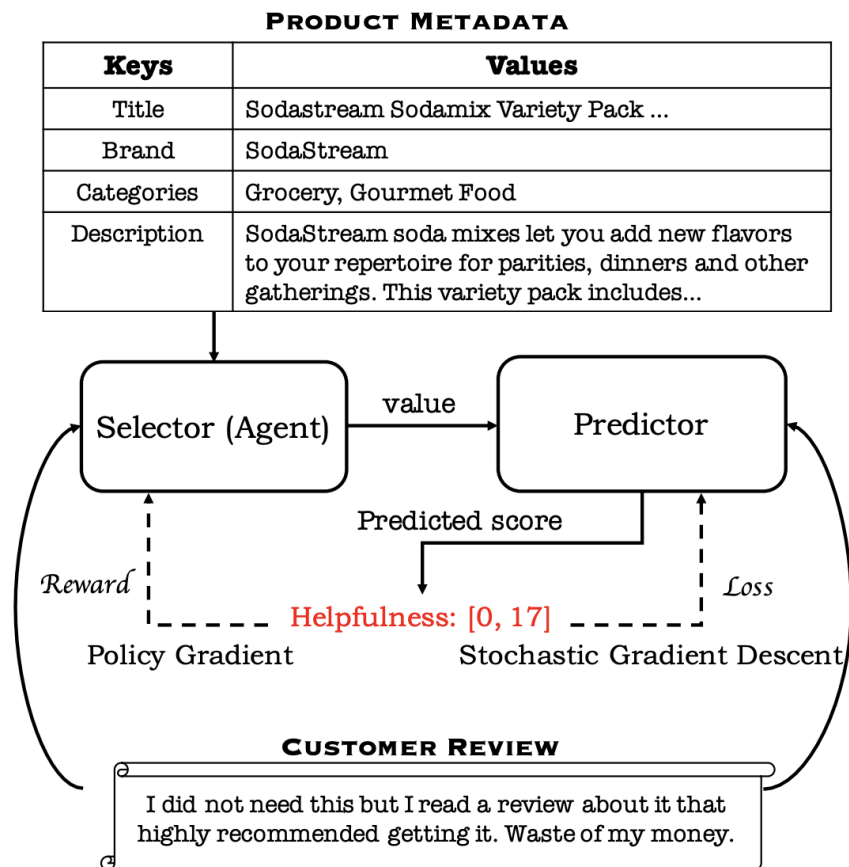
  - 특징 2 : review level attention 사용 (Model)

Attribute	L	P	A	Review Text	Notes
usually a wait	Y	Y	0.08	... Just be prepared to wait or otherwise get lucky and find a seat at the bar ! ...	Missed by BoW
has outdoor seating	Y	Y	0.17	If you want to eat in front plan on waiting after signing up to the list on busy mornings , but the back patio is just as nice ...	Missed by BoW
requires cash only	N	Y	0.11	... Remember they are Cash Only !	Wrong label
usually a wait	N	Y	0.06	Got there after 2 hr drive and found the owners on vacation and the place closed ...	Irrelevant
pay by credit card	Y	Y	0.25	Food and service is great Tanisha is a awesome sever	No related review
usually a wait	Y	Y	0.09	...Never a long wait for to go orders...	Tricky

Table 3: Attributes along with true label (L), prediction (P), review-level attention weight (A), and review text.

[task : Helpfulness Assessment : 리뷰 내용 평가 → 리뷰 필터링]

▼ Reinforced Product Metadata Selection for Helpfulness Assessment of Customer Reviews

- EMNLP 2019

- 강화학습을 이용하여 리뷰가 실제적으로 도움이 되는지 아닌지 평가하는 모델 → 리뷰 필터링으로도 사용될 수 있다고 판단

PRODUCT METADATA

Keys	Values
Title	Sodastream Sodamix Variety Pack ...
Brand	SodaStream
Categories	Grocery, Gourmet Food
Description	SodaStream soda mixes let you add new flavors to your repertoire for parities, dinners and other gatherings. This variety pack includes...

Selector (Agent) → value → Predictor

Predicted score

Reward — Loss

Helpfulness: [0, 17]

Policy Gradient   Stochastic Gradient Descent

CUSTOMER REVIEW

I did not need this but I read a review about it that highly recommended getting it. Waste of my money.

1. selector : metadata의 value 예측

2. predictor : selector을 통해 예측된 value를 입력으로 넣어, Helpfulness 예측

▼ Modeling and Prediction of Online Product Review Helpfulness: A Survey

- ACL 2018

- Online Product Review Helpfulness에 대한 survey

  1. provide an overview

  2. discuss gained insights

  3. provide guideline for future research

▼ Predicting the Usefulness of Amazon Reviews Using Off-The-Shelf Argumentation Mining [workshop paper]

- ACL 2018 workshop

- 목표 1 : 아마존 리뷰의 usefulness 예측

- 목표 2 : 목표 1을 위한 off-the-shelf argumentation mining ← 리뷰의 usefulness는 argumentative content와 연관이 있다고 판단하므로

[task : 코퍼스]

▼ The Multilingual Amazon Reviews Corpus

- 아마존 리뷰 코퍼스. 한국어 코퍼스는 없음.

결론 / 의견

- 최근 자연어처리에서 자연어 생성 연구가 활발하여, 리뷰 요약과 리뷰 생성 논문이 많았음

- 리뷰 요약과 리뷰 생성의 feature로 opinion과 attribute를 주로 활용

참고 자료

- 각 논문들