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

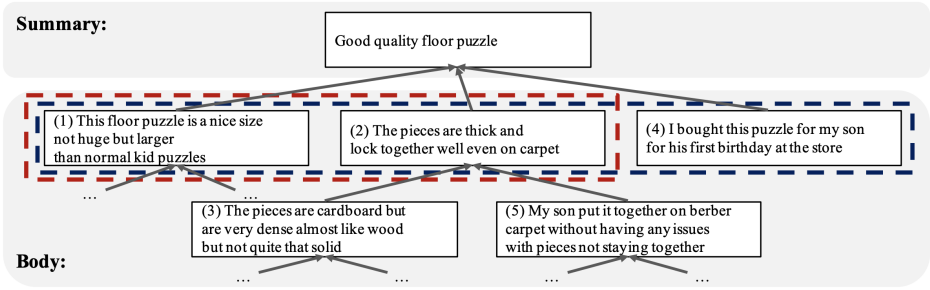


Figure 1: Example of the discourse tree of a jigsaw puzzle review. StrSum induces the latent tree and generates the summary from the children of a root, while DiscourseRank supports it to focus on the main review point.

  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 balenced 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?

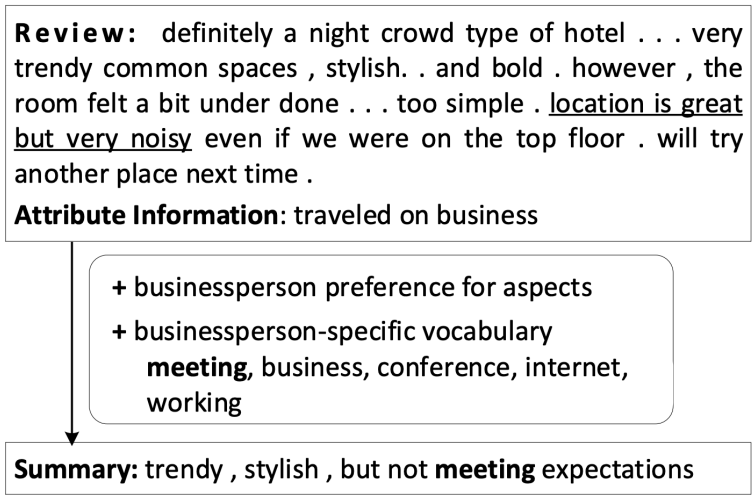
Table 1: A product review and the example questions.

- 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



- 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

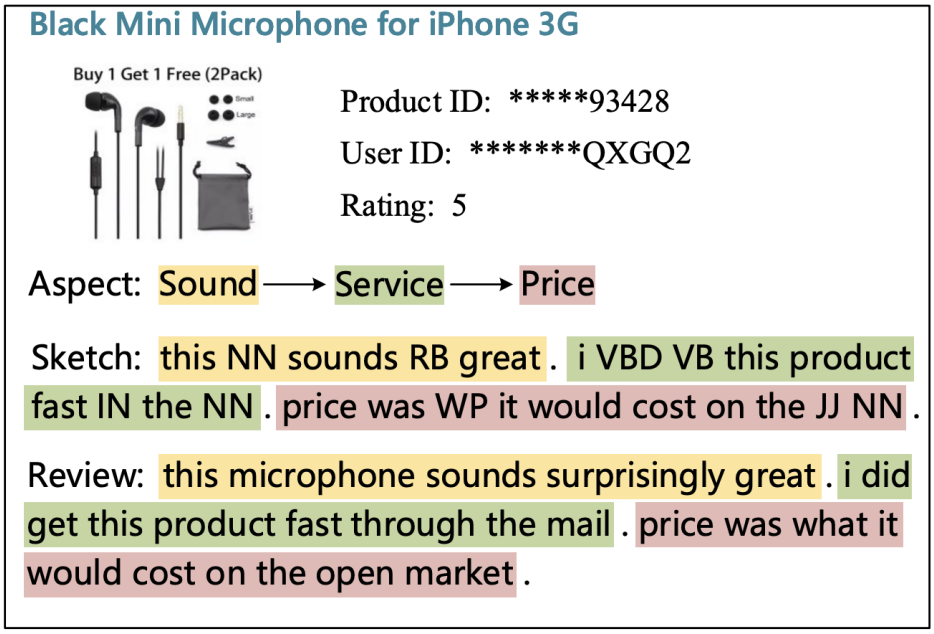
3. attribute-aware summary decoder

[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

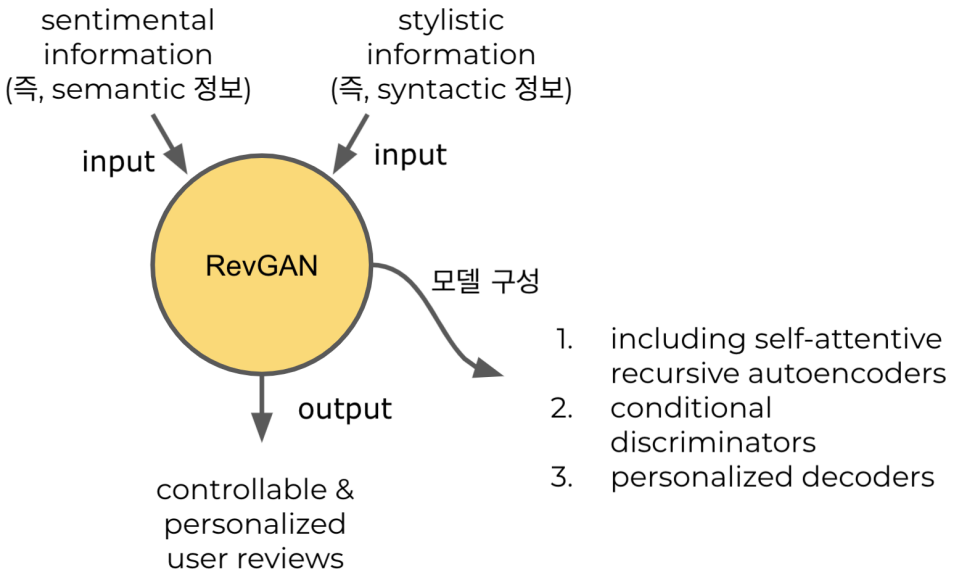
> The method(coarse-to-fine generation) first generate a rough sketch in the coarse stage and then use the sketch to get the final result in the fine stage
> (in An Improved Coarse-to-Fine Method for Solving Generation Tasks paper)



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.**

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

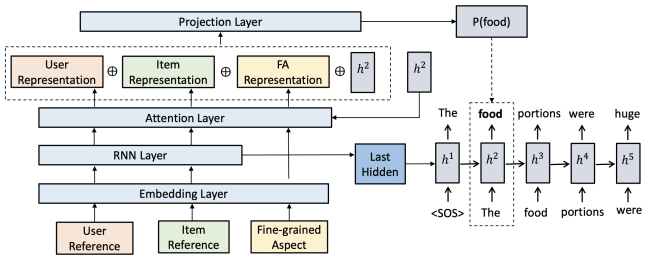


Figure 1: Structure of the reference-based Seq2Seq model with Aspect Planning

2. aspect-conditional masked language model → this can generate diverse justifications based on templated extracted from justification histories.

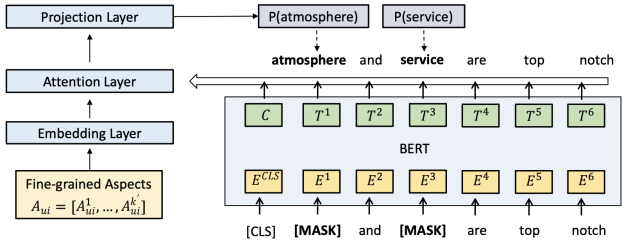
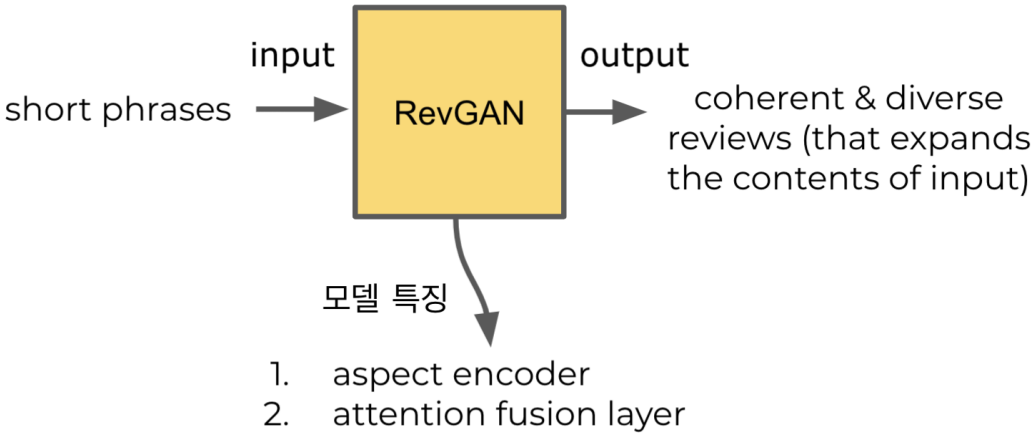


Figure 2: Structure of the Aspect Conditional Masked Language Model

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



[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

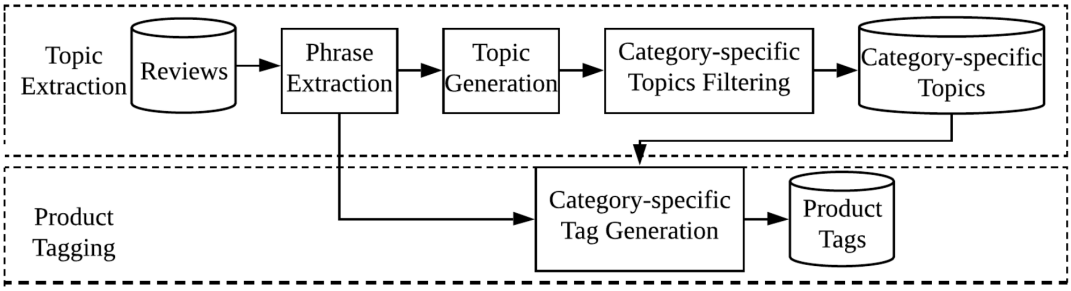


Figure 1: Category-specific topic extraction and product tagging pipelines

[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

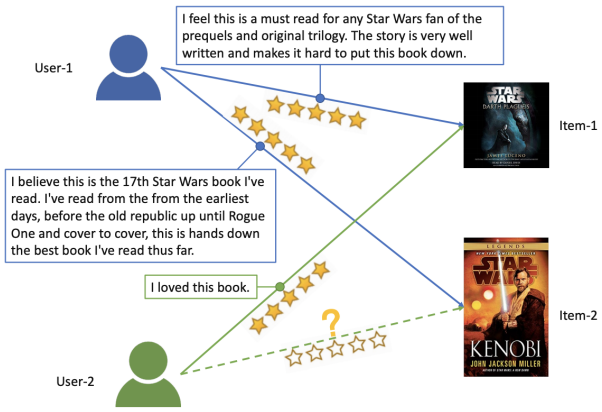


Figure 1: Two example users and items.

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

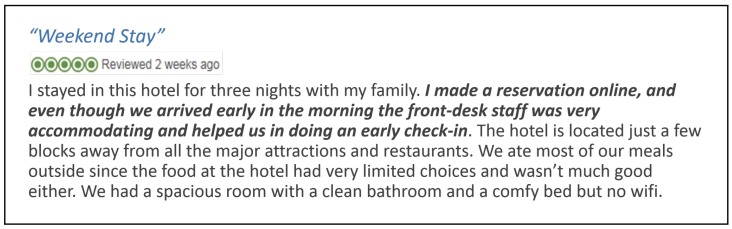


Figure 1: A sample hotel review

- 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)

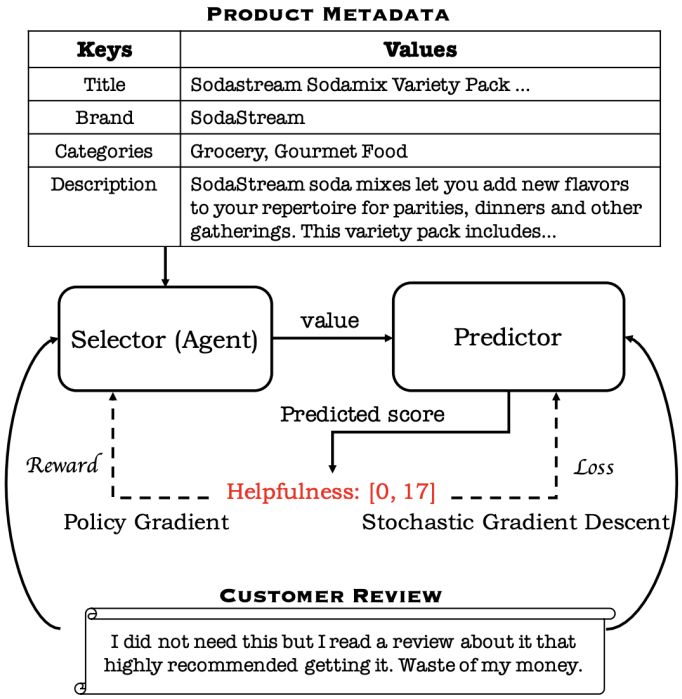
Attribute	L	P	A	Review Text	Notes
usually a wait	Y	Y	0.08	... Just be prepared to wait or otherwise get lucky and find a seat at the bar ! ...	Missed by BoW
has outdoor seating	Y	Y	0.17	If you want to eat in front plan on waiting after signing up to the list on busy mornings , but the back patio is just 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



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