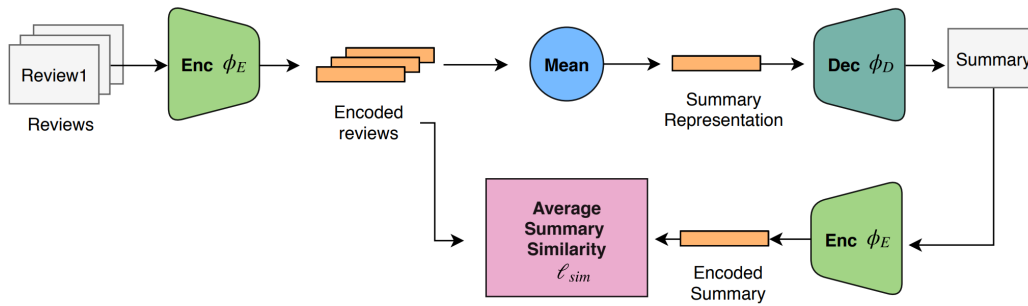
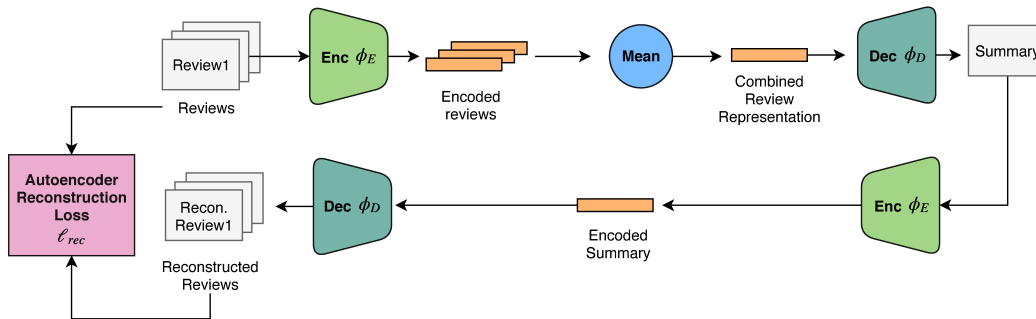


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002 **MeanSum : A Model for Unsupervised Neural**  
003 **Multi-Document Abstractive Summarization:**  
004 **Appendix**  
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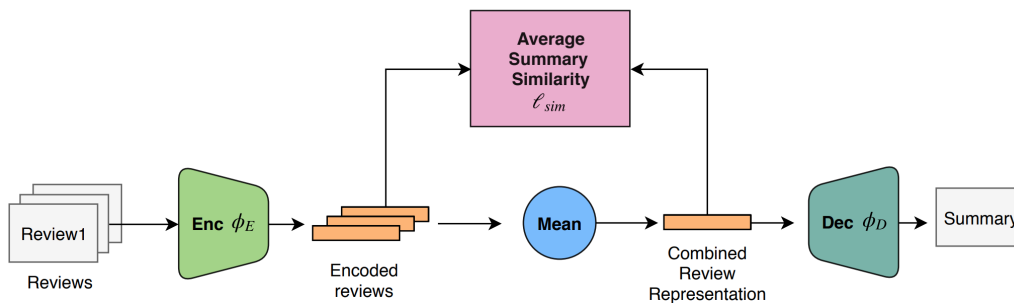
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011 **A. Model Variations**  
012



024  
025 *Figure A.1. Model Variant: No Autoencoder*  
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039 *Figure A.2. Model Variant: Reconstruction Cycle Loss*  
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053 *Figure A.3. Model Variant: Early Cosine Loss*  
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## B. Experimental Setup

### B.1. Mechanical Turk Experiments

To obtain higher-quality responses, workers were selected with the following criteria: (1) Masters Qualification (granted by Mechanical Turk depending on a worker’s performance across tasks over time), (2) at least a 95% HIT approval rate, (3) at least 100 HIT’s approved, and (4) worker’s location is the United States.

#### B.1.1. COLLECTION OF HUMAN-WRITTEN SUMMARIES

Workers were presented with eight Yelp reviews and asked to write a summary that “best summarizes both the content and the sentiment of the reviews.”. To produce summary-reviews, we asked workers to “write your summary as if it were a review itself (e.g. ‘This place is expensive’ instead of ‘Users thought this place was expensive.’” and keep the length of summary reasonably close to the average length of the presented reviews. We also suggested that the users refrain from plagiarizing the original reviews by not copying more than 5 or so consecutive words from a review – extracting text is allowed, but we aimed to prevent low quality “summaries” that simply copied from the reviews.

#### B.1.2. EVALUATION OF QUALITY OF SUMMARIES

The results were collected through two separate experiments on Mechanical Turk. For both experiments, the order of the models were randomized so as to prevent ordering biases (e.g. summaries from the first model receiving higher ratings).

In the first experiment, in which workers were asked to evaluate how well the summary reflected the information and sentiment of the original reviews, we presented the eight reviews being summarized and the extractive and abstractive summaries next to them.

In the second experiment, in which workers were asked to evaluate the fluency of the summaries, we presented summaries from four different models. The original reviews were not shown, as the questions were simply assessing the linguistic quality of the summaries themselves.

The definitions of the five dimensions of fluency were taken from (Dang, 2005) and defined as follows:

1. Grammaticality: The summary should have no date-lines, system-internal formatting, capitalization errors or obviously ungrammatical sentences (e.g., fragments, missing components) that make the text difficult to read.
2. Non-redundancy: There should be no unnecessary repetition in the summary. Unnecessary repetition might take the form of whole sentences that are repeated, or

repeated facts, or the repeated use of a noun or noun phrase (e.g., "Bill Clinton") when a pronoun ("he") would suffice.

3. Referential clarity: It should be easy to identify who or what the pronouns and noun phrases in the summary are referring to. If a person or other entity is mentioned, it should be clear what their role in the story is. So, a reference would be unclear if an entity is referenced but its identity or relation to the story remains unclear.
4. Focus: the summary should have a focus; sentences should only contain information that is related to the rest of the summary.
5. Structure and Coherence: The summary should be well-structured and well-organized. The summary should not just be a heap of related information, but should build from sentence to sentence to a coherent body of information about a topic.

## C. Additional Results

Table C.1. Yelp results on validation split of reference summaries with  $k = 8$  reviews being summarized.  
Vs. Reference Summaries

Model		ROUGE-1	ROUGE-2	ROUGE-L
<b>MeanSum (ours)</b>		29.26	3.98	<b>16.75</b>
<i>Baselines</i>	No training	22.37	2.10	13.25
	Extractive (Rossiello et al., 2017)	25.24	2.83	13.99
	Best review	27.95	3.43	15.62
	Worst review	17.80	1.64	11.34
	Multi-Lead-1	28.10	3.70	14.36
<i>Model Variants</i>	No pre-trained language model	27.07	3.32	15.54
	No auto-encoder	–	–	–
	Reconstruction cycle loss	26.72	3.77	16.47
	Early cosine loss	15.65	1.34	9.75
	Untied decoders	–	–	–
	Untied encoders	<b>29.94</b>	<b>4.28</b>	16.22

Table C.2. Yelp results on test set of 100 random val-test splits of reference summaries, with  $k = 8$  reviews being summarized.

Model		ROUGE-1	ROUGE-2	ROUGE-L
<b>MeanSum (ours)</b>		29.14±0.402	3.85±0.235	16.37±0.250
<i>Baselines</i>	No training	21.81±0.485	1.88±0.152	12.61±0.248
	Extractive (Rossiello et al., 2017)	25.00±0.456	2.83±0.211	13.92±0.287
	Best review	27.95±0.458	3.44±0.190	15.47±0.259
	Worst review	17.34±0.463	1.64±0.165	11.19±0.285
	Multi-Lead-1	27.49±0.423	3.72±0.205	14.37±0.242
<i>Model Variants</i>	No pre-trained language model	26.64±0.446	3.19±0.193	15.41±0.235
	No auto-encoder	–	–	–
	Reconstruction cycle loss	26.03±0.549	3.69±0.238	16.17±0.326
	Early cosine loss	14.99±0.372	1.30±0.102	9.36±0.214
	Untied decoders	–	–	–
Untied encoders	29.62±0.456	3.91±0.238	16.08±0.259	

D. Varying  $k$ 's effect on automated metrics

The effect of varying  $k$  at train and test time is shown for sentiment accuracy in Figure D.1 and word overlap in Figure D.2. Overall, we find that the sentiment accuracies are largely stable for all methods. Similarly, we find that the abstractive model also has relatively stable Word Overlap scores, with a small decline as the number of reviews being summarized at test time increases. However, the extractive baseline method appears to decrease as  $k$  increases – as the variance in content increases with greater  $k$ , it may be harder to extract sentences that reflect all of the reviews.

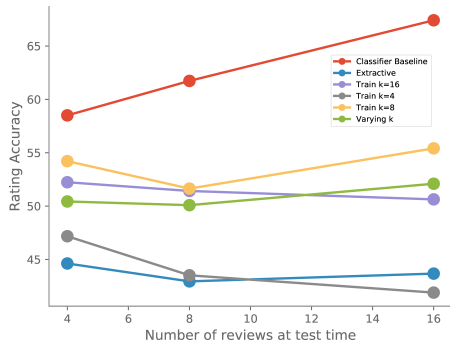


Figure D.1. Sentiment accuracy with varying  $k$  at train and test time

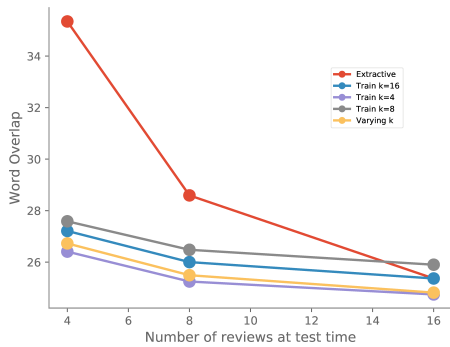


Figure D.2. Word overlap score with varying  $k$  at train and test time

## E. Examples

### E.1. Additional Examples

#### Original Reviews

Woww! My order: Chicken Schwarma with a side of hummus and pita. Order of falafel. Cucumber drink. Side of garlic sauce. Side of cucumber sauce. Absolutely clean filling. Taste delicious! Will have you craving for more. I can't believe I hadn't heard of this restaurant sooner. After the fact I realize this place is all the rave! </DOC> I tried to order steak kebob but they made beef kebob. I asked for tzaziki on the side but they covered all the meat with tzaziki. Taste is more like middle eastern. Not Mediterranean. Price is good. Taste is okay. </DOC> Now this place is really good i always drive past it but today i decided to stop an check it out it is really good healthy an fresh </DOC> I was thinking this would be more of a sit down restaurant where you order from the table instead of a chipotleish style of Mediterranean food. Thought there would be more room inside for eating. The only thing good I had was the cucumber chiller which I would go back for. Not so much the food/service. </DOC> Parsley Modern Mediterranean is wonderful. Very responsive staff. Food is wonderful. I usually get the wraps (chicken or beef are my go-tos). Babaganoush and the warm pita bread is pretty amazing. </DOC> Very delicious food in love with cucumber drink, couldn't decide what I wanted and one specific Gentelman whipped up something very amazing for me! By the name of Jamil great service! Thanks you and will definitely be back! </DOC> This is Chipotle for Mediterranean food. And it. is. delicious. I've only been here once because the location is very inconvenient for me and I'm extremely lazy about driving more than 5 minutes to go anywhere, but if it were closer, I'd be here all the time. (It's probably better this way, I have very little self-control.) If you like spicy - get the hot sauce. Mix it with the white sauce, you won't be disappointed. </DOC> The food always taste fresh and leaves me very full without feeling tired. They have had a groupon for a very long time making this place an incredible value. This is my favorite Mediterranean place.

#### Reference Summary

Fresh food, high quality food, delicious and Mediterranean.. what more can one ask for. I loved eating here and I really enjoyed the food here. It's one of those places that once you eat there you want to keep coming back, and you will. Prices are good. If you want to customize your order they'll do it for you. Awesome place.

#### Extractive Summary

Now this place is really good i always drive past it but today i decided to stop an check it out it is really good healthy an fresh I was thinking this would be more of a sit down restaurant where you order from the table instead of a chipotleish style of Mediterranean food. Very delicious food in love with cucumber drink, couldn't decide what I wanted and one specific Gentelman whipped up something very amazing for me!

#### Unsupervised Abstractive Summary

Everything is so good I had the chicken souvlaki with a side of rice. Best decision I've ever had. Not a bad place to eat, but they have a large selection of local food which is nice. My wife and I'll be back for sure.

Figure E.1. Reference summary written by Mechanical Turk worker vs. extractive and abstractive summaries

**Original Reviews: Mean Rating = 4**

**Crepe on point!** Just the way it is supposed to be. **Owner very patient and has great customer service.** Will return. </DOC>  
**Small place** but **friendly** cheap tasty and fast! Sat on the barstool by the window with my gf and we were enjoying our time there.  
Would recommend to anyone looking for a decent breakfast </DOC> The **crepes were pretty good but** my 4 and 7 year old  
preferred the ones that I make at home. **Service was good** though and coffee was above average. Breakfast for 4 came out to  
\$47 which was a bit much considering I spent only a fiver more for a killer dinner for four last night at Amelio's. </DOC> We  
had a **ham and cheese crepe as well as a Nutella, strawberry, and banana one, and they were great.** The **crepe was tasty** and  
chewy, as well as the fillings. **Each crepe** also came with a since sized portion of fresh fruit. Worth a try if you are looking for a  
**crepe** near downtown. </DOC> The **service is friendly.** It's a **small, homely place.** **Great crepes** at a reasonable price. </DOC>  
**Quaint little shop** halfway under ground, colorful inside. Only two workers when we went. Lots of options, both sweet and savory.  
My husband got the thyme and sesame seed **crepe, which was amazing.** I got the spinach and egg crepe. It was quite boring, but  
the original had cheese on it and I had them hold the cheese, so that's my fault. I'd definitely like to come back for a sweet crepe or  
perhaps a thyme crepe all for myself :-)</DOC> favorite one, surprised me every time. Starter and choco-strawberry are great  
choices. Surprise is great too! </DOC> I ordered the **crepes with nutella and strawberries and it was honestly so good.** And I  
love the place as well, it's **small yet cozy.** My new go to breakfast place because it's so close to my house and pretty cheap for such  
**delicious crepes.**

**Extractive Summary: Predicted Rating = 5**

I'd definitely like to come back for a sweet crepe or perhaps a thyme crepe all for myself :-)</DOC> favorite one, surprised me every time.  
My new go to breakfast place because it's so close to my house and pretty cheap for such delicious crepes.

**Unsupervised Abstractive Summary: Predicted Rating = 4**

The **crepes and service are great.** My only complaint was that the **seating was limited, so it could be a little more intimate.**  
**Service was friendly and attentive.** I'll be back to try out other items on their menu.

Figure E.2. Extractive and abstractive summaries are both classified positive.

E.2. Model Comparison

**Original Reviews: Mean Rating = 4**

This spot is amazing i dont understand negative reviews such a great spot with authentic food loved it. </DOC> This place is dirty. There are roaches in the dining and restroom areas. They refused to refund my order. The people who work there are rude and useless. There is no reason to waste your time or money on eating here. </DOC> I come to this place a lot. Sam is the man and the quality of lamb kabob is amazing. You can't beat the price. Plus they got free Wi-Fi and plush couches to lounge on afterwards and have some tea and do some work. I highly recommend it. </DOC> Talk about friendly customer service! From the moment we walked in, we were greeted nicely and immediately felt welcome. I came here with my baby girl and boyfriend. We tried the beef, chicken and lamb kabobs. All were great but my favorite by far was the ground beef. It was so tender, flavorful and delicious! The freshly made bread and hummus was great too. Even my baby girl loved it. We will definitely be back again for more! </DOC> First time i stopped by i tried the chicken shawrma also the appetizer sampler ( 3 flafel, humus and baba ghanosh ) and the bread was made fresh worth to give it a shot </DOC> This place is amazing and their food is out of this world!! The food is so good and fresh! Customer service is great since its under a new management !!! Love the people that work there! Cant wait to go with my friends there for their hookah nights!! </DOC> I've had gyros in many places but I can sincerely tell you that this place makes the best gyros I have ever tasted and The Baklava delicious I will definitely return to this place and recommend it to anyone. </DOC> Lunch: Beef & lamb shawarma. Comes with pita, hummus, tzatziki, salad and...onion salad? with lemon wedge. Meat was a bit on the tough side & heavily seasoned. A bit spicy—guess I'm a wimp today. Needed the tzatziki. Other than that I enjoyed it.

**Extractive Summary: Predicted Rating = 5**

First time i stopped by i tried the chicken shawrma also the appetizer sampler ( 3 flafel, humus and baba ghanosh ) and the bread was made fresh worth to give it a shot This place is amazing and their food is out of this world!!

**No Training Summary: Predicted Rating = 4**

I've only come here for lunch. The soup is always fresh and seasoned deliciously, always packed full of flavor. Service is spotty and sometimes they rush you out of the line at the bar. Open kitchen is clean and neat, and the servers are always nice.

**Early Cosine Loss Summary: Predicted Rating = 1**

This place is so good and the food. And my only the places, Chicago, i go the meat the Chicago places always always deli deli always always deli deli always the grocery, the grocery is always clean and the Best always always clean and the lamb with the lamb (i always with lamb meat with the lamb meat i the lamb (with the lamb lamb (i the the the ( (the always the (the the the grocery (the the the Best (the always the Best (i always the the most the the grocery, the the the Best grocery i the the Best the the the the to-day today today today today today today today today today today today today today today today today today today today

**Unsupervised Abstractive Summary: Predicted Rating = 5**

Some of the best Mediterranean food I've had in a long time. My favorite is the chicken shawarma and it was so tasty!! Also their homemade pita bread is a must try! If you are looking for a place to take your business, make sure you check out this place as it is a lot of food.

Figure E.3. Example summaries from different baselines and model variations

## E.3. One Business, different reviews grouped by rating

I usually don't write reviews unless It is terrible. One word horrible , longest wait ever and considering how Hungry u would Think the food tasted better. when we received our chicken pork and brisket tacos it was sooo dry. I don't understand How they call this place a bbq Because it tastes nothing like it. I will never ever come Here again. </DOC> Impossible to find. Snooty hipster waitstaff. Cash only and a \$4 fee arm. I don't care how good your food is. </DOC> Prices have gone from \$4.75 & up for one taco to \$6 & up. Not worth it. Go to Las Palmas or Doce instead. </DOC> Made a reservation, was seated 30 minutes late. Waited 15 minutes for a server. Got the rib plate, dry on the inside and greasy on the outside. Also was scolded for looking at the gluten free menu for some reason. But that's ok not going back. Thanks I see why you are one of the lower reviewed establishments in the city. I'll do my part as well in contributing to that. </DOC> hipster hell!!!! horrible obscure music, skinny jeans everywhere, crappy food, and no heat!!!! servers had disgusting nose piercings. only go to this place if you love participation trophies and bernie sanders </DOC> Why would you have at the top of your website "NO RESERVATIONS" and then when we show up ask if we called ahead and then tell us it will literally be a three hour wait to get in? Oh I didn't call to get on the list? Why the hell would I think there was a list your site straight up said no reservations so why would I bother to call? Lawrenceville sucks now anyhow. </DOC> Ordered a captain and Coke. Was informed they don't have captian and.They don't have Coke. Told them to make as best they cold. Got the worst watered down rum and Coke I've ever had and got charged \$30 for the 3 pathetic drinks we ordered. Absolute worst and I've lived in several areas even NYC. </DOC> My first experience was good. The food was above average, but the wait time was pretty long. Went for a 2nd visit for lunch today and ordered two tacos but had to leave before eating, because the order still hadn't come after 35 minutes! The waitress wasn't very nice when asked about the delay in serving my order. The place was only half full. Maybe others have had the same experience I had and made the same decision not to go back

Figure E.4. Negative Reviews: Rating = 1

Great for take out but atmosphere is a low point. We hadn't been to Smoke since it was in Homestead so I was ready for a yummy taco. The food did not disappoint. Both my favorites, brisket and chicken apple were delicious. Service was fine. But the music was obnoxiously loud combined with ambient noise to the point that conversation was impossible and digestion questionable. As I walked past the kitchen I noticed it was quieter there. We took our order to go. The new place looks hip but I couldn't enjoy it. Sorry we couldn't stay because we really like you guys. Missing the quiet little place in Homestead that was all about good food. </DOC> I think I could've read a Russian novel in the time between when I placed my order and received my food. Seriously, that was a crazy long wait to get the food. We're talking about a few tacos, it really shouldn't take that long. And, our seating area was drafty. Plus the music was too loud. And for what you get, it's a bit pricey. However, the tacos are quite tasty. Three of the four of them were very good (the chorizo was so-so). The pork was indeed smoky; the chicken was appealing too. If they could improve their operation in the other areas, they'd be a four star place. </DOC> This was our first visit to Smoke during a weekend trip. Cool, unique neighborhood. The inside of the place is a simple and rustic but welcoming. Service was friendly. It is cash only which I find to be a nuisance... Also BYOB, at least for now. We started with the bowl of cheese. It was delicious but we agreed that half the portion at half the price would be more suitable for two people. The tacos were good. We had chicken, pork, and brisket. I enjoyed the bbq flavors but found the tacos to be each a little one-noted for 6-7 bucks a pop. </DOC> I went on burger night therefore the menu was limited but it was nice and they had a few non-burger options. Also there was no wait for a table around 8pm. I had the appetizer fries with brisket and it was more than enough food to fill me up. I also had the Big Fiz tobdrink (St. Germaine and grapefruit cocktail) and found it to be so light and refreshing. It's a great summer cocktail and perfect to lighten up a big heavy meaty meal. </DOC> A couple of years ago this place would have been awarded a five star, but I'm afraid it's gone down hill. They reduced their taco options and expanded into burgers and plated meals. We decided to sit at the bar and bypass a 30+ minute wait. I ordered the brisket taco and pork taco. The meat in the tacos was dry and overwhelming with sauce, it poured out on the tray while eating them. The mac and cheese side was bland and lacked salt. Maybe we just hit this place on a bad night. I will go back again to make sure, but this trip was disappointing. </DOC> Decent food. Great service. Menu is hit or miss depending on the day you go. Great idea but inconsistent food. </DOC> Overhyped for the price. Solid food and half decent service. I tried it out on a whim and it wasn't all that it was hyped to be. The best part of the place is the smell of the food cooking. If you enjoy the hipster beard crowd this is the place for you. Not bad but nothing that makes me want to go out of my way to revisit. </DOC> Great tacos and queso, atmosphere is cute, but the wait is intolerable and the staff is unfriendly, which took away from the experience.

Figure E.5. Neutral Reviews: Rating = 3



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My second visit and just as impressed! The service has been awesome and they have been more than willing to accomodate me and my food allergies/restrictions even on a busy Friday night. So excited to be living right around the corner! </DOC> Best Tacos in Pittsburgh seems like wan praise. Like...prettiest girl in the trailer park. And I don't have a TON of experience with taco places (or trailer park girls), but I have some...and this is the best one. I try to avoid referencing other places relative to a place I'm rating, but suffice it to say that Smoke has competition, but as far as a more or less conventional ingredient taco goes...Smoke is it! (like Coke is it...see what I did there?) Nice beer selection. Very cool decor. Great location. Friendly servers. Great food. Win. </DOC> This food is so delicious. The best thing on the menu is definitely the queso. You absolutely cannot skip it. Prices are pretty reasonable. Only negative is that you always have to wait a super long time to get a table. </DOC> Great lunch today at Smoke. Good craft beer list on tap to start things out. The special today was a smoked mushroom taco which was exceptional. The brisket was tasty but the mac and cheese was to die for. </DOC> I dream about their chips and queso! Great tacos and plenty of options for vegetarians. I only wish there was a location closer to my house so I could go more often. </DOC> We have always enjoyed the food and vibe at this taco spot. We used to go to their location in Homestead often but are happy they are now located in Lawrenceville. BYOB is a plus, but don't forget it's cash only. I would recommend any of the tacos, they are all great. Also, we ordered the queso and chips. Absolutely amazing. Soft fried pita chips are so good. Eat it! </DOC> Awesome food, run don't walk. Generous portions, only downside was that dessert was crazy expensive. Maybe they could let you known in advance that the "Pie" is small and perfect for 2 people to share, but they will be charging you \$12. </DOC> Love this place. Great offerings with a barbecue twist. Best Mac n cheese I have ever tasted. Great service. Nothing bad to say.

Figure E.6. Positive Reviews: Rating = 5

## E.4. Qualitative Error Analysis

The common failure modes as follows, with examples of each below.

**Fluency errors:** Grammatical mistakes (e.g. incorrect use of ‘and’ or ‘but’) and repetition of phrases could perhaps be reduced with a more powerful language model, as state of the art language models use many more parameters.

**Factual inaccuracy:** Summaries sometimes make reference to named entities (e.g. the city the restaurant is located in) that are incorrect or not found in the original reviews. Factual accuracy is an ongoing area of research in the summarization field, and a loss function to penalize inaccurate statements may be helpful here.

**Rare categories:** Summaries appear to be worse for categories with limited data (e.g. parks in the Yelp dataset). This could potentially be addressed by up-sampling these reviews or fine-tuning towards specific categories.

**Contradictory statements** This sometimes occurs when there are both highly positive and highly negative reviews, leading to a summary with a positive statement immediately followed by a negative statement about the same subject. We could either separate these statements in a post-processing step, or train a model that is conditioned on the rating (and possibly other latent variables).

### E.4.1. ERRORS EXAMPLES

#### Original Reviews: Mean Rating = 4

First visit to this great little diner today.....the crab Benedict was laden with huge chunks of tasty crabmeat and accompanied by great hashed potatoes. Every item ordered at the table was perfect! The server was prompt and helpful and the place has that roadside diner ambiance although it's in the heart of the city. I'll be back in a few days, for sure. </DOC> This place was great. Great food, great service, and great atmosphere. Sat at the bar and got to watch the staff in action. True team effort. Everyone was happy to be there and happy to help...and it showed in the food. Will definitely be back and definitely recommend. </DOC> No knock against the food, it was very straight forward. The shredded hash browns were very bland, will need some sort of seasoning to eat them. Serves was very friendly as soon as we walked in. Was not able to accommodate my egg allergy when I asked if I could supplement something for the eggs that came with my country fried steak. Not getting anything higher unless they can go above and beyond. Fine but nothing remarkable. Also way too expensive, with ripe 35 for 2 peoples... Cmon it's a dinner... Stop it. </DOC> Kelly's actually catered a wedding I was at tonight and the food was fantastic! There was carrot ginger soup, mushroom risotto balls and create your own pasta. I had linguini, sausage, spinach, mushrooms and red onion with alfredo sauce. To Die For!!! Seriously one of the best things I have ever eaten. Really want to go to the diner to check out the full menu. I give the catering an A ++++ </DOC> This breakfast spot will make you want to come back day after day. Your heart and gut may not agree - but who cares! The breakfast bagel with hot sausage patty is my go to. I love the price, the atmosphere and the food even more. It's not fancy, but it really doesn't have to be. </DOC> Been here 2x for breakfast and 2x for lunch in last 2-3 months. Breakfast...had variety of different things. I would stick with anything eggs and meat. Had pancakes once and were a little greasy for me. Portions are BIG. If you leave full, shame on you. Lunch... fish sandwich - good tuna melt - real good (friend had it - tasted it - yummy) burger club - good (tried zucchini fries with it which were real good and portion was HUGE) For what it is...diner, it is well worth the stop!!! </DOC> Every time, I mean every time, Kelly O's hits the spot. I must say I am an early bird and hit the breakfast joints before 8 on the weekend. I wasn't really, really hungry, but they have a lil one breakfast that is one egg, one meat, some potatoes and Mancini toast. Just enough. I added a pancake for a taste of sweet. For the heartier eater, there are daily specials and a variety of large bfast plates. The key to Kelly O's is that the service is always prompt and icing on the cake is mancini toast. </DOC> Kelly-Os is a great Pittsburgh diner. The food is fairly priced, delicious, and fast. Their fresh-squeezed orange juice is the best orange juice ever. The French toast isn't anything special (and not recommended), but the pancakes are nice and fluffy. This is one of my boyfriend's favorite places to get Eggs Benedict in Pittsburgh. Some of the waiters/waitresses are nicer than others, so one thing they can work on is better overall friendliness. However, I always have a nice time with good company and great food.

#### Unsupervised Abstractive Summary: Predicted Rating = 4

Last time I was here, the server was really nice and helpful. For breakfast it's a **great place to eat, eat, breakfast or lunch**. The place is a bit small but it's not too far from home. Dinner for two of us was amazing. **I had a side of mashed potatoes and gravy with a side of potatoes and gravy**. Both were delicious and the onion rings were also very good. A great spot to eat in **downtown Phoenix**.

Figure E.7. Example of repetitiveness and factual inaccuracy (restaurant is in Pittsburgh)

**Original Reviews: Mean Rating = 4**

Affordable, efficient and always do a great job. Even my boyfriend got his brows done here once. Highly recommended! </DOC> Needed legs and lady parts taken care of in a jiffy. this place was near home and priced reasonably. I was looking for somewhere new to replace the closer establishments on bloor where front of house welcome is underwhelming and treatments rushed and often not that great. Naheed was awesome. She was attentive and thorough and was a real sweetie. when I mentioned I'd never had an eyebrow threading before, she began to explain the process and before I knew it, she gave me my first threading at no extra charge! So happy. Personable experience that had me walking away feeling good. Thank you Naheed! </DOC> My eyebrows got butchered from a threading shop on Gerrard (in little India) so I worked extremely hard to grow them out. After reading some of the other reviews, I decided to check this place out and I was NOT disappointed. Hamilda was the one that reshaped and cleaning up my brows. She did a great job and really knew what she was doing. This will be my new spot for eyebrows! </DOC> After reading various positive reviews here on Yelp, I scheduled a morning appointment. Naheed, the owner, welcomed me as her first customer of the day. It was my first time getting eyebrow threading done. She was quick, professional and approachable, and made me feel welcome and comfortable. We actually also did a wax as well. Which was thorough. It's best to get an appointment, as there were walk-ins waiting after I was finished. Thanks again Naheed, I plan to come back again when I'm due for one of your services again, you deserve 5 stars. </DOC> Love this place! Both Naheed and Nadia are amazing at what they do! The place is clean and walk-ins are always welcome. The prices are super reasonable and there's always deals on for even more saving! So far I've only been for waxing and haven't left with any complaints. Gonna try out eyebrow threading next. </DOC> They did such a great job threading my eyebrows!! She charged about \$11 for eyebrow threading. I forget the name of the lady that did my eyebrows :/ but she did such an excellent job! </DOC> The most amazing threading place ever! Ive been trying to find a threading place in canada for so long and finally found my regular to go place! They do an amazing job shaping the eyebrow, they are really the experts!!! Defiantly torontos best threading place! </DOC> I don't recommend this place for eyebrows threading! She literally butchered my eyebrows and wasn't receptive at all. She works way too fast and is not meticulous at all. Too bad!

**Unsupervised Abstractive Summary: Predicted Rating = 5**

My brows were beautiful and well done. **It's the closest place to my house for me, but I'm not sure if it is a sign or a very small place. But when it was time to sign up for the appointment, it's great people!** and they are great for brows and feet!

Figure E.8. Example of fluency problems

**Original Reviews: Mean Rating = 2**

Horrible service and please check your cat when you pick up from service, they have changed the wheels once and other time that have stolen the tools that a new car comes with. I will never buy a car from them anymore especially because the service department. </DOC> Was passing thru Las Vegas when my 2007 X5 4.8i had a belt tensioner failure. Limped to this dealer the next morning from my hotel and was kindly greeted by Larry. Years later...Horror strikes from the slipshod work this dealer did to my E70. </DOC> As many people here have mentioned this is not a place where you want to buy a car. DO NOT let the BMW name fool you, this is a sleazy used car dealership in disguise. The salesman are quick to sale you a car but will NOT get back to you when they deliver a car that was not promised. My car was missing a floor mat, the oil was not changed and has other issues. DON'T be fooled by the rep responding to bad reviews, thats just to save face. I have reached out several times and have yet to get a response. Save yourself the time and energy and buy a car from a professional dealership. DO NOT BUY from BMW of Las Vegas. </DOC> Bought a preowned BMW and their detail work is terrible. They left dirt in between buttons, and promised me that they would neutralize the perfume smell coming from the arm rest. I had to go several times to get this done, and it still wasn't done properly. On top of that there was a scratch they promised to repair and it never happened, they kept giving me odd times to go in during the week without a rental. They were not very understanding that I had to work and can't take days off for something that could of easily be fixed on their end. Never buy from them again, for them it's all about the \$\$\$ </DOC> Took my car in for routine servicing and when I picked it up later that day I noticed that my front splash guards were missing after the service team took my car through the car wash. I informed the service manager and he assured me that my car came in without splash guards until, I pointed out that that they had thrown them in the front seat and they were still dripping wet from the car wash. He reluctantly admitted his team had torn them off in the car wash and put them in the front seat. Overall just a extremely shady operation. </DOC> awesome awesome awesome these guys are great i have never had such a great experience thanks Trent!!!! </DOC> Great car buying experience. Got a really good deal on my new BMW and was treated like royalty by all the professionals at Las Vegas BMW. I highly recommend them. </DOC> Thanks for hooking us up with a wonderful certified pre-owned Beamer. Great dealership, BMW should be proud you all are representing them in Las Vegas.

**Unsupervised Abstractive Summary: Predicted Rating = 5**

**Took my car in for a Brazilian wax and transmission fluid.** They were very accommodating, the customer service was good and he was able to get me in the same day I called. He was very friendly and helpful in explaining what he was doing and what was going on in the morning. I will be going back to this dealership for sure.

Figure E.9. Example of worse quality on rare categories (Categories: Automotive, Auto Parts &amp; Supplies, Auto Repair, Car Dealers)

**Original Reviews: Mean Rating = 5**

My first time at a Dragon Pearl buffet. They had a huge selection of food from over the world and all tasted very good! My favourite was the deep fried oysters (make sure you choose ones with just a little batter). Unfortunately I didn't get to try their signature dragon pearl dessert...Friends told me that the Markham location had cold crab and frog legs, so I was looking forward to it at this location... they didn't have it! </DOC> Just one sentence : I love this restaurant over any restaurant not only in Toronto but over the country . Highly recommended because of many reasons, the food is such fresh that you can't find in even expensive restaurants . The atmosphere is very sexy and warm that you like to stay there for a long time chatting with you family and friends.on Tuesdays, there is a special promotion that is 11.99 \$ for lunch and 1.5 \$ for green tea per each person. I recommend the lobster in weekends which is given to you by a voucher . In sum, this restaurant put the Mandarin in real shame. Highly highly recommended. </DOC> This place is one of the best buffets that I have tried. They have a good variety of food and the service is amazing. On our second visit they were constantly clearing away places and replenishing napkins without asking. The roast beef was great and so was the fresh noodles, I highly recommend the beef szhewan </DOC> Great Chinese buffet in North Toronto. Prices are steep but a good pick for a lunch buffet </DOC> went there with friends for lunch. Food is average ,not impressive. renovation is really stylish though. </DOC> my parents really like this buffet. its actually pretty decent. the decor and unique and exquisite and adds to the atmosphere. theres a strangeness to it it makes you feel like your on vacation or something. hard to explain. the food and variety is good. and lobster, well how can you complain. all.in all hapoy experience everytime ive been there. my only complaint would be theres this stupid rule about ordering tea and not being able to get more than one glass to share with the table. like what the fcuk is that? to me thats just cheap and how much tea can one family drink anyway, isnt the idea to fill up on food, why would they worry about people taking advantage of tea. lol. </DOC> Wow is the first word that comes to mind about this place. Talk about everthing you can get in a Chinese restaurant but with a twist, there is also a Sushi bar which loved sushi is one of my fav go to fast food. By far one of the BEST buffets i have been to in a while . I am going to sit here and enjoy this moment. While i dig my fork in a bowl of sticky rice and savor this moment. </DOC> The ambiance is great here, food is replenished more frequently than other buffet places, so you don't find food sitting out for two long and end up being dry and disgusting. Though I believe the sister restaurant offers a bit more variety.

**Unsupervised Abstractive Summary: Predicted Rating = 4**

Sushi is good and not too pricey. **I'm not a big fan of the food, but the food is great** . They have a nice selection of dishes and different presentations. I would recommend this place to anyone who likes spicy food but not in a hurry to get a good meal. Very good value for the money.

Figure E.10. Example of contradictory statements

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