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Towards Controllable Explanation Generation for Recommender Systems via Neural Template

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Explanation for Recommender Systems

- Explain why an item is recommended
- Benefits of Explanation (Tintarev and Mashoff. Handbook'15)
 - Increase users' confidence in the system (**Trust**)
 - Help users make good decisions (**Effectiveness**)
 - Convince users to try or buy (**Persuasiveness**)
 - Help users make decisions faster (**Efficiency**)
 - Increase the ease of use or enjoyment (**Satisfaction**)
 -

Motivation

- Textual explanation
 - Template-based
 - Generation-based

Combine their merits!!!

- Introduce features to maintain the controllability
- Employ generation method to produce flexible “templates”

Controllable, but inflexible

CF
EFM

Customers who bought this item also bought.
You may be interested in *variety*, on which this product performs well.

Flexible, but uncontrollable

Flexible and controllable

Att2Seq
NETE

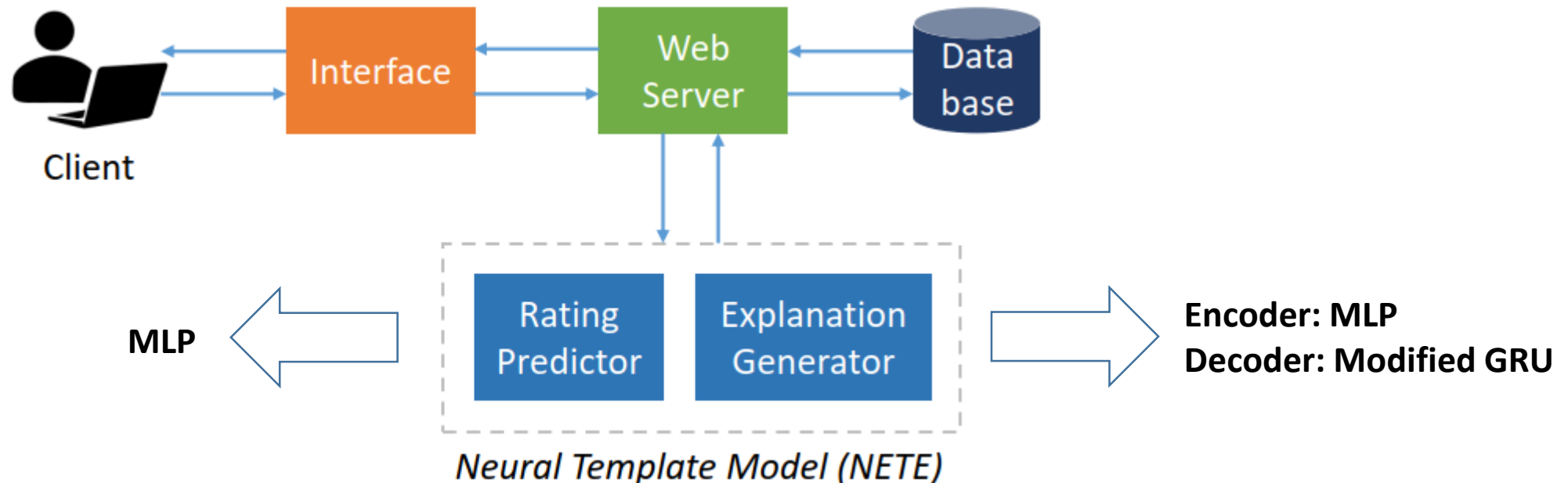
I'm not sure if i need to go back.
They have a *variety* of things to choose from.

Reference

They have a huge *variety* of things.

System Architecture

- With requests, the server returns
 - Predicted rating
 - Generated explanation
 - Target user review



Datasets

- TripAdvisor (hotel)
 - For demonstration
- Yelp2019 (restaurant)
 - For human evaluation
- The explanation is a review sentence containing features.

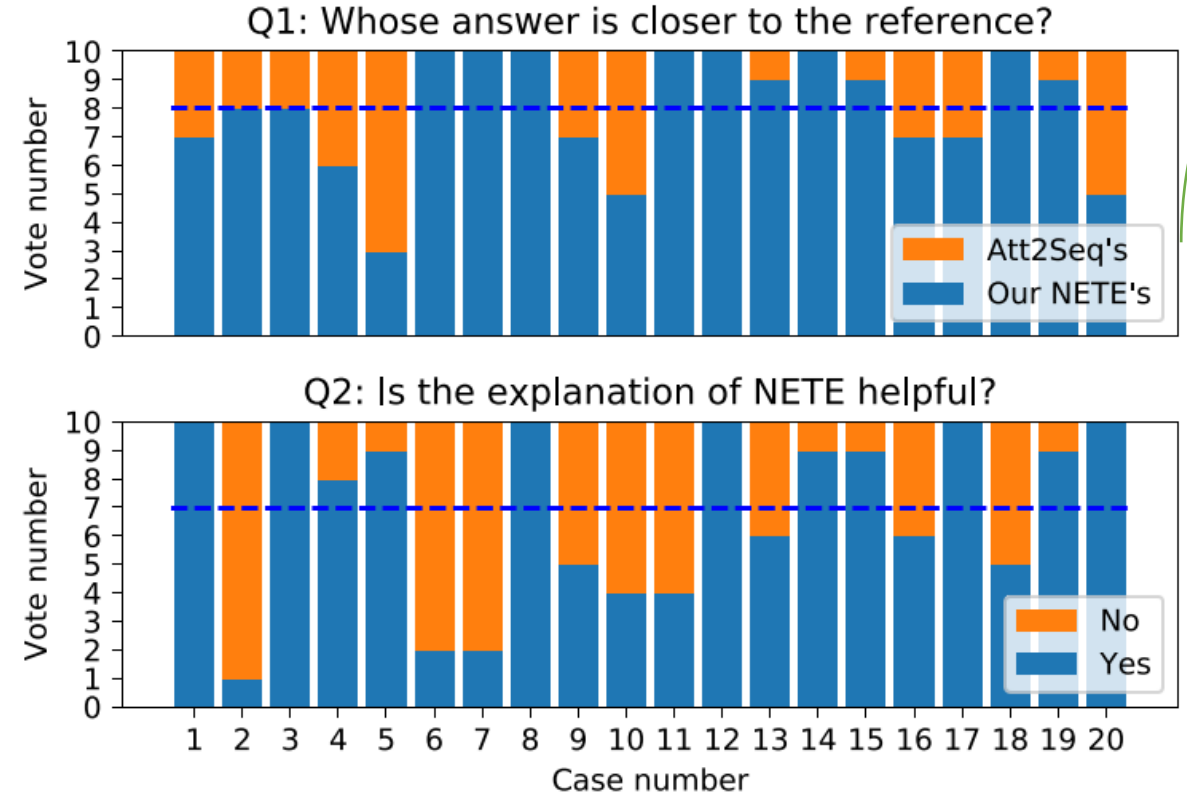


	TripAdvisor	Yelp2019
# of users	9,765	27,147
# of items	6,280	20,266
# of reviews	320,023	1,293,247
# of features	5,069	7,340
Avg. # of reviews / user	32.77	47.64
Avg. # of reviews / item	50.96	63.81
Avg. # of words / explanation	13.01	12.32

Human Evaluation

- 10 volunteers were invited.
- Each question contains 20 cases.
- NETE's explanations are
 - **High-quality** relative to Att2Seq
 - **helpful** to better understand the products

Attribute-to-sequence (Dong et al. EACL'17)



Demonstration

Neural Template Demo

Please select user and item below.

User:

Item:


Rating:

Please input (update) rating and select feature below.

Sentiment (Rating):

Feature:

Explanation:



Teresa_y828

Pleasant experience, wonderful staff, delicious food

Review of **Royal View Hotel**

★★★★★ Reviewed December 15, 2019

Very friendly and attentive staff. **Spacious and comfortable rooms compared to other ones in Hong Kong.** We got a free room upgrade to a room with a scenic view of the ocean and bridge from Hugo, which was very nice of him. They offer an extensive array of food for the breakfast buffet with a full spread of Chinese (congee bar, noodles, fried rice..) and American (hash browns, cereal, scrambled eggs, toast). The hotel's breakfast makes for a particularly nice start to the day. The proactive and generous hospitality made for an enjoyable stay.

Massive thanks to Hugo again!

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Case Study

- Controllable
 - Fill the feature in the explanation like a template
 - Capture the variance of three different types of input
- Flexible
 - Produce diverse expressions

Rating	Feature	Explanation
4		<i>The view from some rooms and higher floors is hard to beat.</i>
<u>4.09</u> (+1)	floors	Ask for higher floors .
2.00 (-1)	floors	It was not a high floor .
<u>4.09</u> (+1)	rooms	The rooms are very comfortable.
2.00 (-1)	rooms	The rooms are not very comfortable.
3		<i>Rooms on the higher floors have a nice view.</i>
<u>3.73</u> (+1)	floors	Rooms on the higher floors are better.
2.00 (-1)	floors	I was given a room on the higher floors and the rooms are very spacious.
<u>3.73</u> (+1)	rooms	The rooms are spacious and the rooms are very comfortable.
2.00 (-1)	rooms	The rooms are very small and the rooms are very spacious.

Conclusion

- We present a **neural template** explanation generation system that is both controllable and flexible, as confirmed by the demonstration.
- The human evaluation shows that it produces high-quality and useful explanations.
- Future Work
 - Verify its controllability quantitatively
 - Integrate more features to make the explanations more expressive

References

- [1] Tintarev, Nava, and Judith Masthoff. "Explaining recommendations: Design and evaluation." *Recommender systems handbook*. Springer, Boston, MA, 2015. 353-382.
- [2] Dong, Li, et al. "Learning to generate product reviews from attributes." EACL'17.

Q&A

Thank you!