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

Flexible, but uncontrollable
Flexible and controllable

| CF | Customers who bought this item also bought. |
EFM	You may be interested in *variety*, on which this product performs well.
Att2Seq	I'm not sure if i need to go back.
NETE	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

Neural Template Model (NETE)

MLP

Encoder: MLP
Decoder: Modified GRU
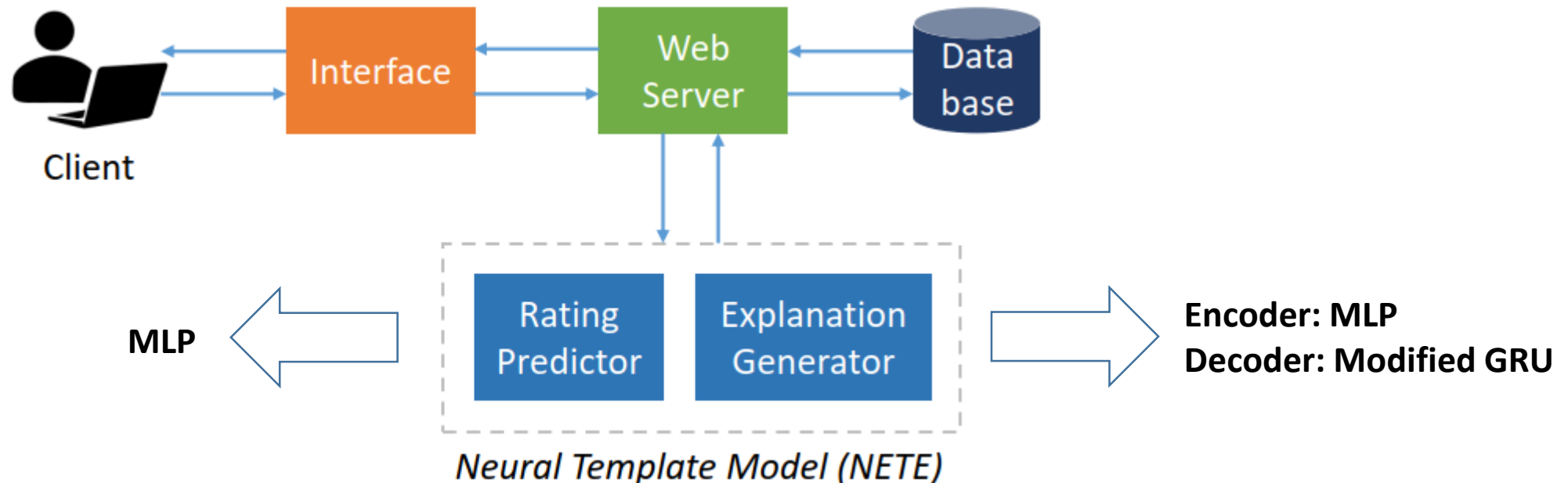
Datasets

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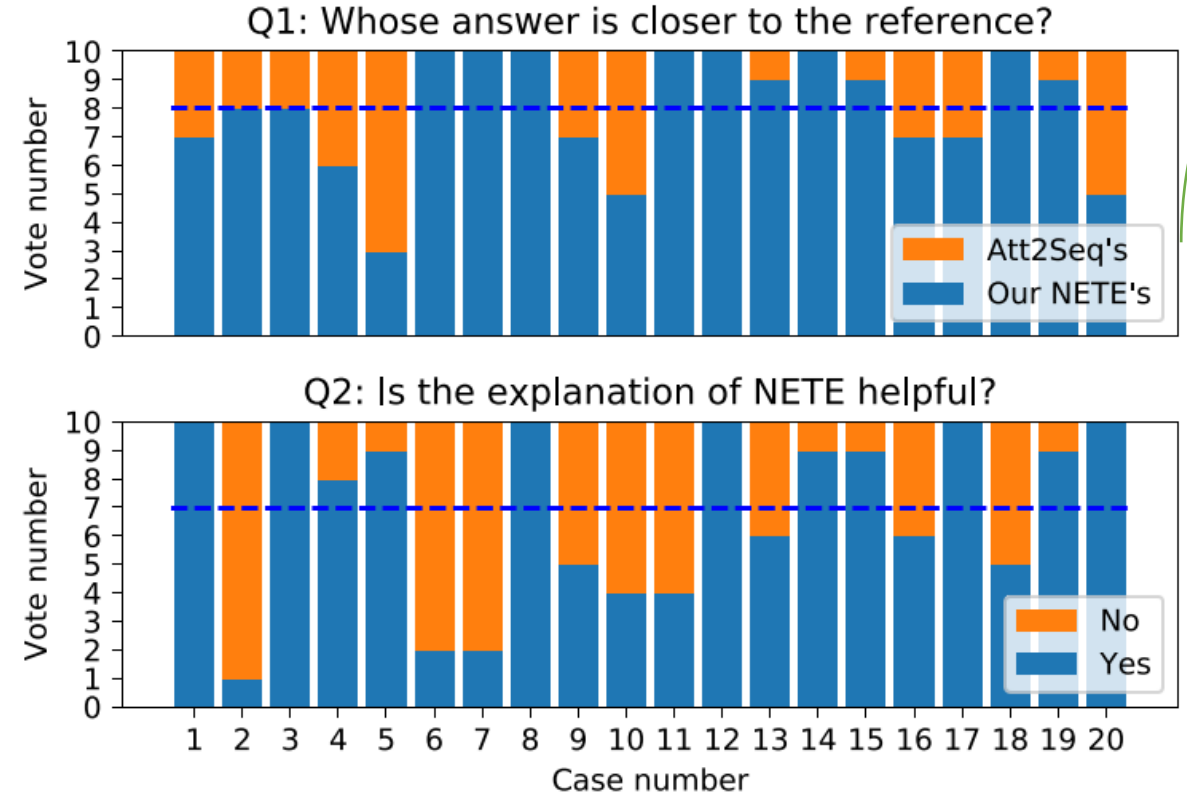- The explanation is a review sentence containing features.

	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

Demonstration

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		*The view from some rooms and higher floors is hard to beat.*
4.09 (+1)	floors	Ask for higher floors .
2.00 (-1)	floors	It was not a high floor .
4.09 (+1)	rooms	The rooms are very comfortable.
2.00 (-1)	rooms	The rooms are not very comfortable.
3		*Rooms on the higher floors have a nice view.*
3.73 (+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.
3.73 (+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!