Teach Me How to Argue: A Survey on NLP Feedback Systems in Argumentation

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Overview

Context

- Computational models for argumentation assist users in improving their critical thinking skills.
- These models provide different explanations, which differ in terms of effective feedback.

Challenge

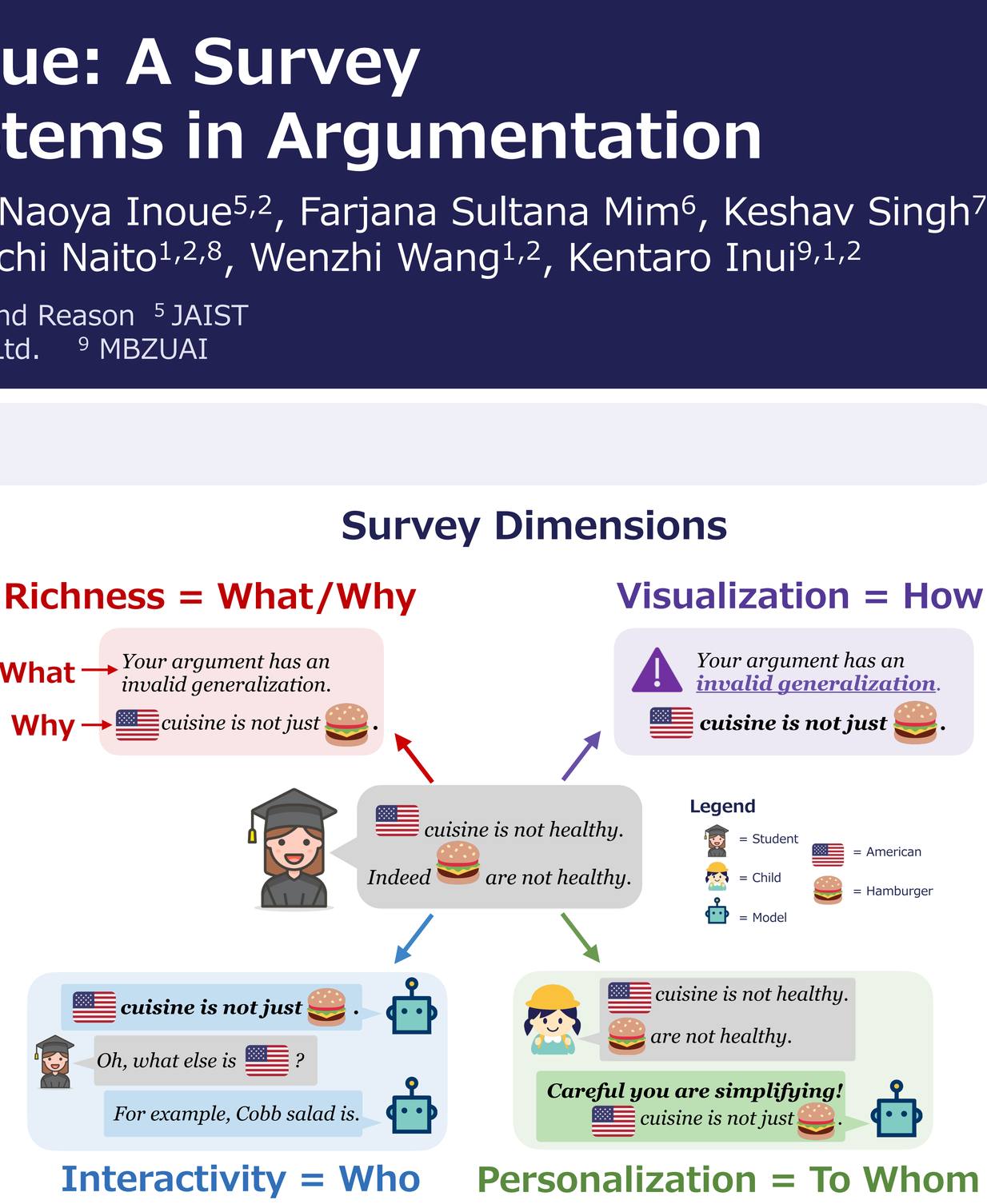
- How to clearly explain and present feedback from argumentative systems to efficiently help users enhance their critical thinking?

Contribution

- **Survey**: 108 works arranged in 4 unique dimensions:

Richness, **Visualization**, **Interactivity**, **Personalization**

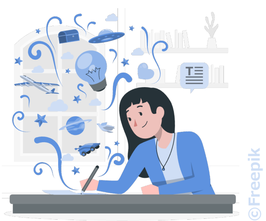
Survey Dimensions



Current and desired argumentative systems

Richness

Visualization



Interactivity

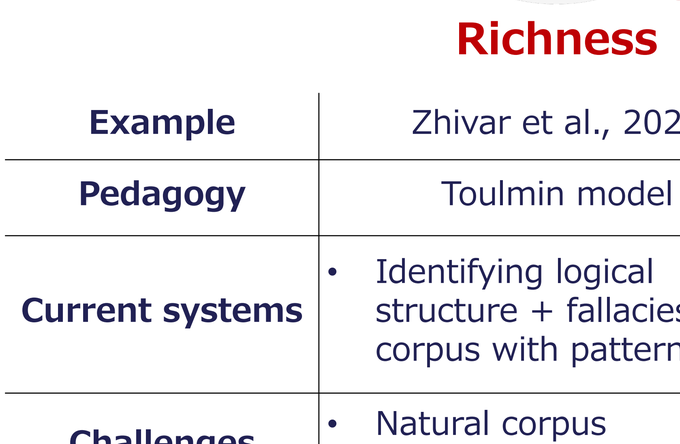
Personalization

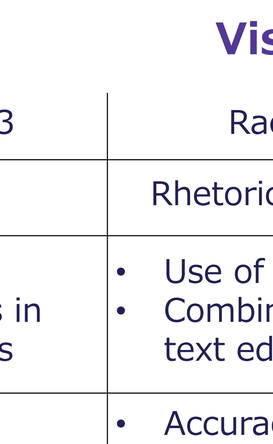
	Richness	Visualization	Interactivity	Personalization
Example	Zhivar et al., 2023	Rach et al., 2020	Wambganss et al., 2021	Wachsmuth and Alshomary, 2022
Pedagogy	Toulmin model	Rhetorical structure theory	Collaborative argumentation	Socratic questioning
Current systems	• Identifying logical structure + fallacies in corpus with patterns	• Use of chatbots • Combining visual aids and a text editor	• Use of chatbots • Tracking and annotating class discussions	• Selection of a proficiency level • Customization of tags
Challenges	• Natural corpus • Logical reasoning	• Accuracy • User-friendliness	• Gap between chatbots and personalized teaching methods	

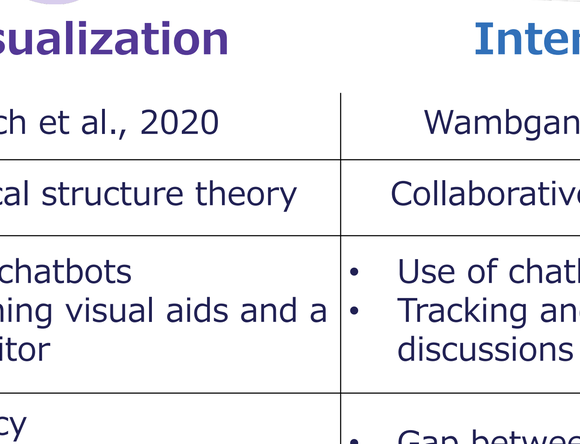
General challenges: ⚠ Standardized evaluation ⚠ Ethics ⚠ Collaboration among NLP & educational experts ⚠ Domain Adaptation

Towards addressing some challenges

Related work







	Persua	ArgueTutor	ArguVantage
Graphical interface	+	−	+
Easy access to previous feedback and exercices	+	−	+
User-friendly, intuitive interface	−	+	+
Interaction between the system and the user	−	+	+
User dashboard + Teacher view	−	−	+

Future Work

Our next steps:

- **Goal:** prototype a system to improve students' critical thinking skills
- **Measure:**

f(feedback + interface) = Effects on learning critical thinking

References mentioned in this survey can be found here:

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