

Mine, Assess, Enhance: Dialogue-based Adaptive Argumentative Writing Support

Thomas Huber and Christina Niklaus and Siegfried Handschuh

University of St. Gallen
firstname.lastname@unisg.ch

Abstract

Ongoing SNF
(Schweizerischer
Nationalfonds) project.
Goals:
(1) automatically judge the
quality of arguments,
(2) develop an
argumentative writing
support system for
students
(3) that can debate with
students about
controversial topics and
(4) give interactive
feedback about the quality
of students' arguments.

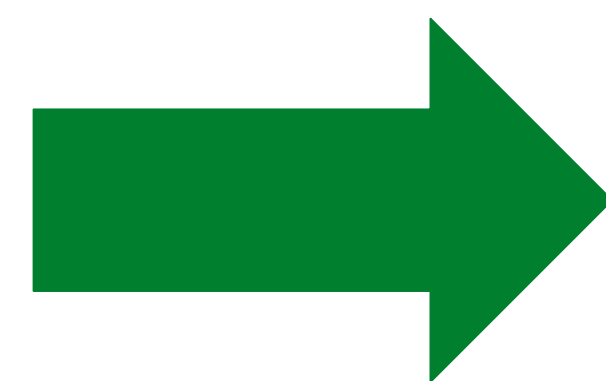
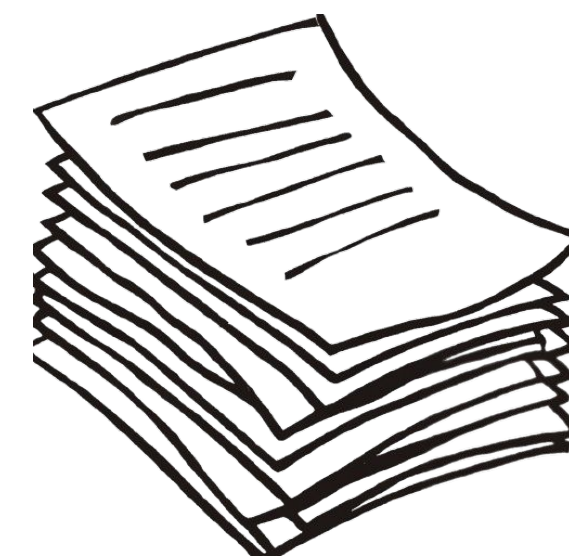
Work Packages

Quality Assessment

- What constitutes argumentation quality?
 - How can this be operationalized?
 - How can existing arguments be improved?

Existing datasets

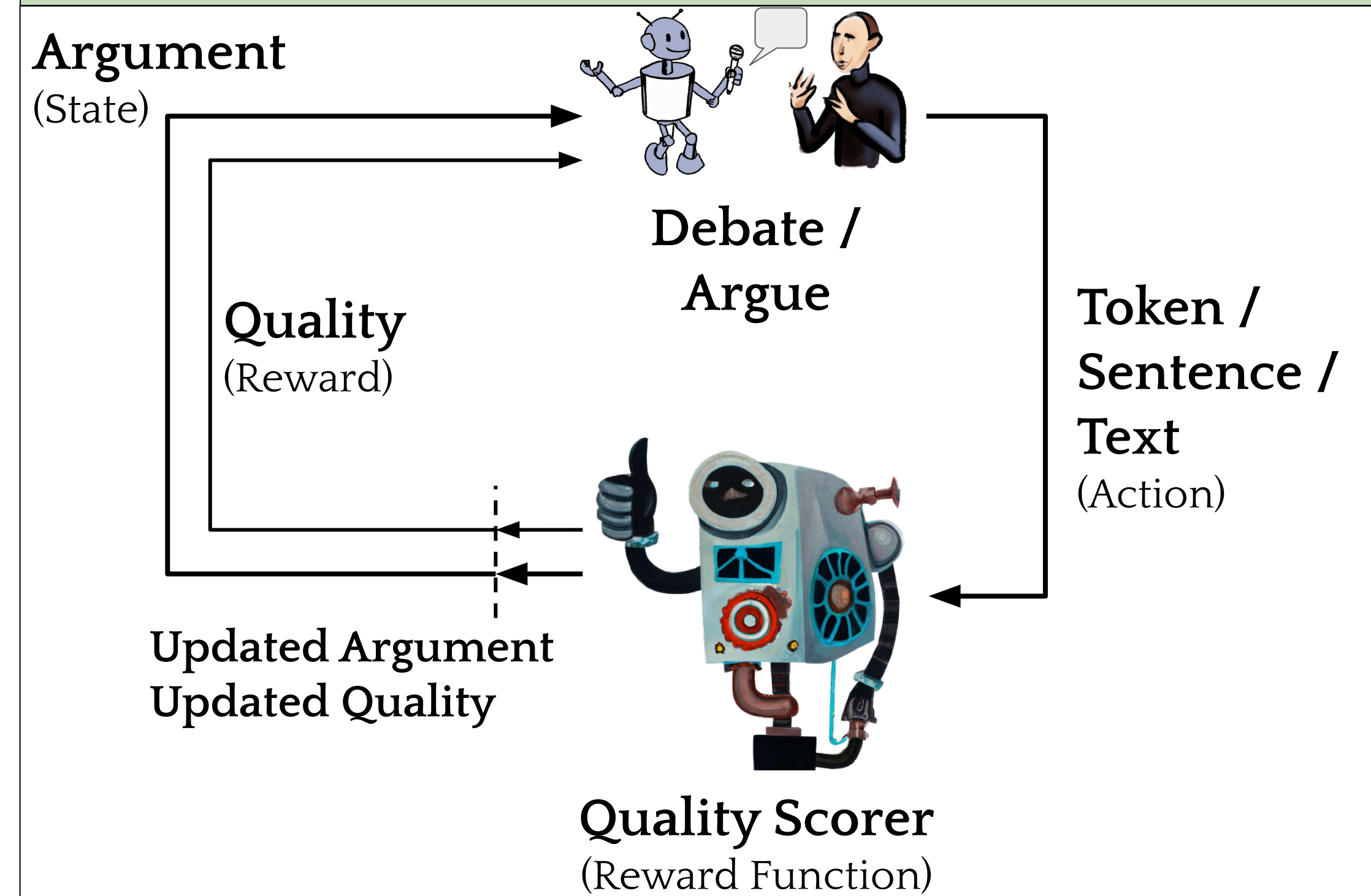
Too small for LMs
Complex annotation schemes
Only for essays or only short
texts
Often: All of the above



Own annotation scheme for
short and long texts +
creation of dataset

Generation and Feedback

- Training an LM to write strong
arguments?
- Providing feedback to improve
arguments?
 - Debate participation?



Project Overview

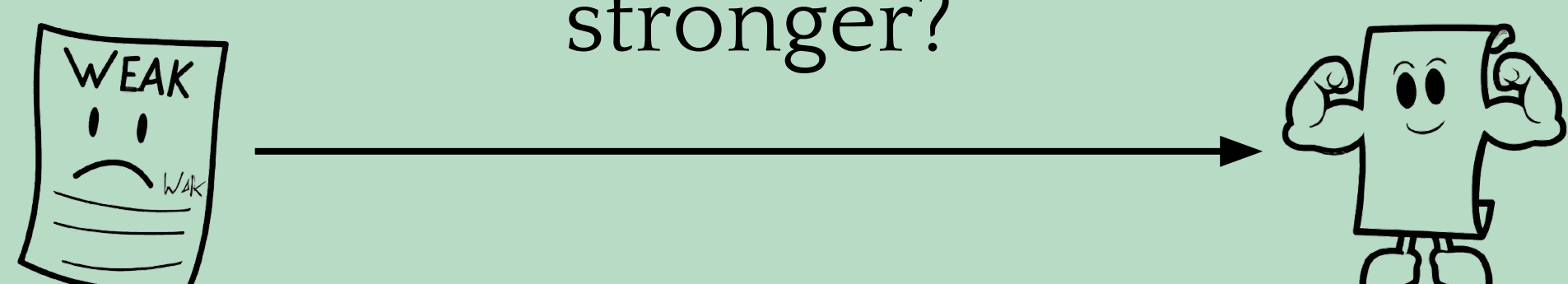
Argument Quality Dataset

- Survey in progress:
 - Ways to measure
 - Existing datasets
- Preliminary findings:
 - Often simple annotation schemes
 - Or very complex (+ small datasets)
 - Low annotator agreements

Task: Argument Improvement

- On both syntactical and content-based level
- Related to / an extension of Claim Optimization Skitalinskaya et al. (2022)

Given an argument,
how can we make it
stronger?



Reinforcement Learning

- Quality scorer can be used as reward function
- Ramamurthy et al. (2022) present RL4LMs library
 - Train LMs with RL
- RL algorithms have nice properties
 - Such as proven (theoretical) convergence to optimal solutions
- Relatively unexplored in the context of ('directly') controlling LM output
- Goal:
 - Explainable / understandable scorer
 - Used to train LMs through RL
 - But also used to give feedback to humans!
 - Explore RL properties in the context of LMs (convergence, Nash equilibrium, ...)

Project Vision

- The project will result in a tool that can:
 - Participate in debates as active participant
 - Write coherent and strong arguments
 - Rate argumentative texts, both short and long
 - Provide concrete and specific (non-generic) feedback

Current Status (2023)

- Argumentation Quality Survey in progress
- Investigation of different RL algorithms
- BEA 2023 Shared Task participation, using RL approach

References

Skitalinskaya, Gabriella, Maximilian Spliethöfer, and Henning Wachsmuth. "Claim Optimization in Computational Argumentation." *arXiv preprint arXiv:2212.08913* (2022).
Ramamurthy, Rajkumar, et al. "Is reinforcement learning (not) for natural language processing?: Benchmarks, baselines, and building blocks for natural language policy optimization." *arXiv preprint arXiv:2210.01241* (2022).