Improving Peer Feedback Prediction: The Sentence Level is Right*

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References

Introduction and Research Goal

Peer feedback has mixed quality w.r.t helpfulness
• Helpful feedback should identify problem and provide solution
• Instructor guidance and review prompts have limited impact
• Post-hoc identification of low-quality reviews is time consuming

Approach: develop prediction models that work at sentence level
•Provide fine-grained prediction output for instructional feedback and visualization
•Comment labeling is improved by aggregating from predicted sentence labels

Example of Student Comments and System Intervention

Your comments need to suggest solution. Please check my comments.

2. Student response

Hypothesis: Strain yields better predictive performance than Ctrain (grown in next two sections)

Approach: development prediction models that work at sentence level
•Fine-grained prediction enables detailed scaffolding intervention
•Prediction models determine whether comments contain problem or solution ideas
•Problem and solution text spans are italicized and bolded respectively to help students during scaffolding
•Students are asked to view their comments to provide solution

Experimental Setup

•Prediction task: classify review comments regarding feedback types
•Compare two approaches
•Trained using comments (CTrain) - learns prediction model using labeled review comments
•Trained using sentences (STrain) - learns prediction model using labeled sentences then aggregates sentence prediction output to create comment labels

Sentiment classification + comment relabeling are for multiclass feedback type classification

Three Binary Classification Tasks

•Problem v. non-problem
•Problem class = problem + combined comments
•Solution v. non-solution
•Solution class = solution + combined comments
•Criticism v. non-Criticism
•Criticism class = problem + solution + combined comments

Aggregating sentence labels improves comment feedback type prediction

Three-way Classification Task

•To be implemented in SWoRD (making the early conjecture example in the previous section)
•Solution-only class = solution + combined comments
•Non-criticism class = non-criticism comments

Conclusions and Future Work

•Proven advantages of sentence classification for peer feedback type prediction
•Provide fine-grained output for instructional feedback and visualization
•Improve peer feedback type prediction performance
•Proposed prediction features are generic and show potential generality

Sentence-level annotation introduces minimal additional cognitive workload
•Annotators have already read comment and noticed text spans

Future work
•Analyze prediction features
•Human-engineered rules for solution and problem text
•Evaluate the approach in paper peer review data