



Analyzing Intern and Mentor Open-ended Responses about Intern Performance

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Research Objective

According to various national studies, there is a career-readiness gap for college grads entering the workforce. Leveraging AI tools and strategies to study the differences in how employers and students articulate related career competencies might help to further explore the issue.

Project Overview

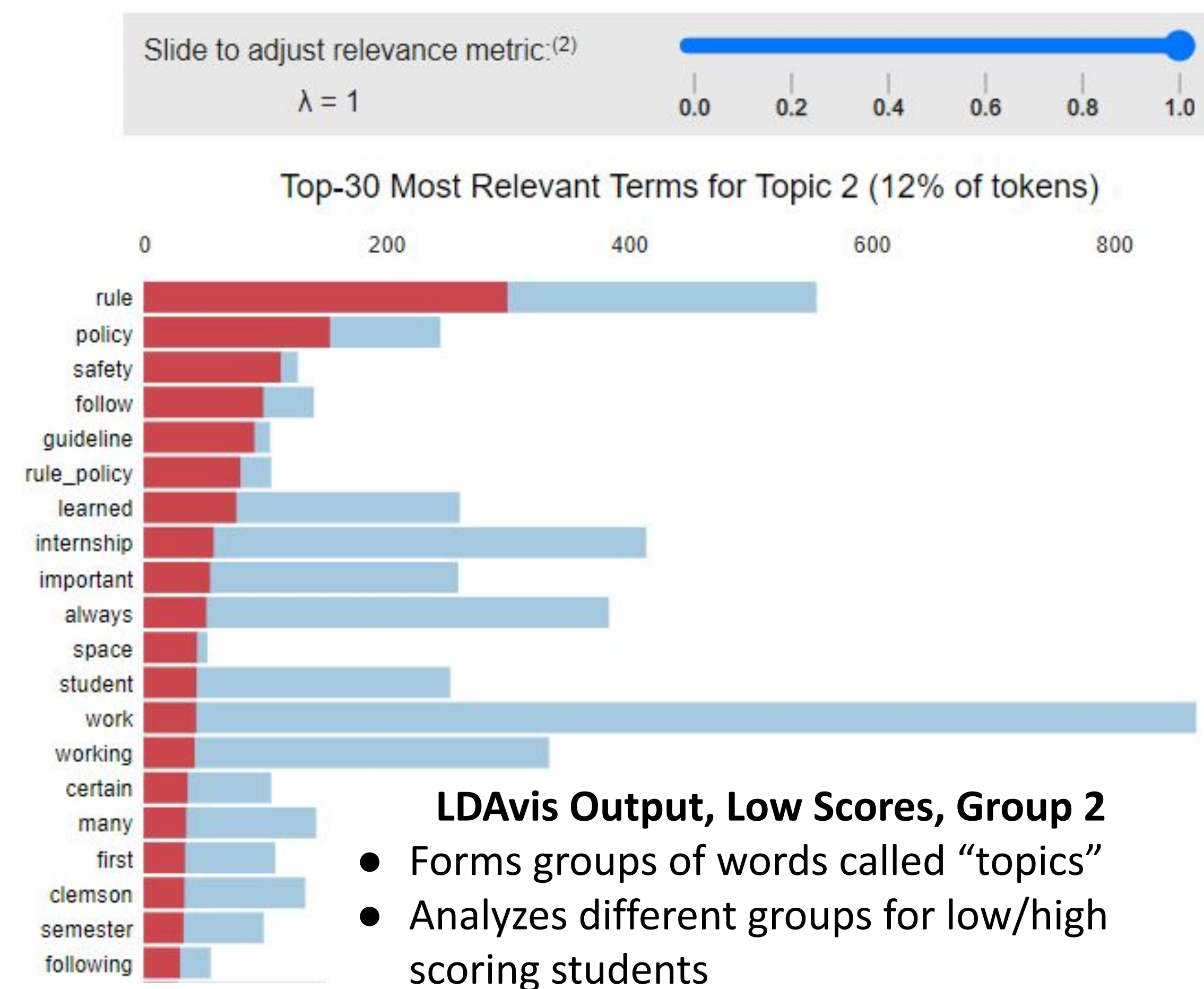
There is a disconnect between types of workers student interns see themselves as and types of workers their mentors see them as.

Goals

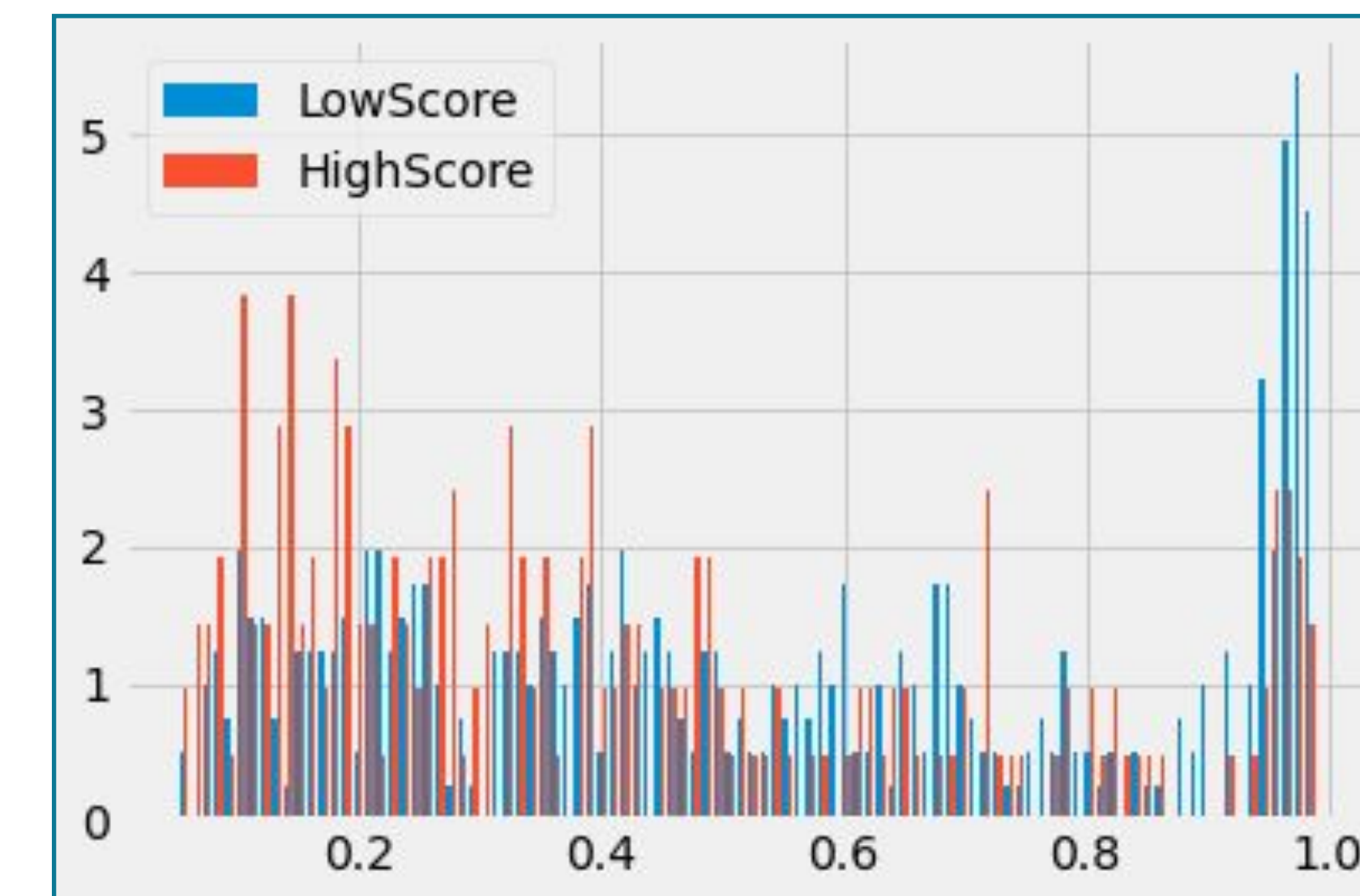
- Use machine learning techniques to classify open-ended responses
- Study disconnect between interns & mentors
- Focus on discussion of ethics and leadership

Data

- Ethics: 185 mentor, 4182 student
 - Response contains self score (1-5) and free text
 - High vs. low score, student vs. mentor
- Leadership: 472 student
 - Responses to 50 question survey, qualitative and quantitative responses
- Preprocessing of data: Tokenize and lemmatize the tokens
- Compute a bag-of-words representation of the data and calculate word frequency and relevance



Results



Visual Representation of Articulation Gap

- Comparison of low/high scoring students topic proportions
- Example shows low frequency of high scoring student's documents being included in this topic

Model Explainability Tools

- Classifier predicts if a response is a high or low scoring student
- Eli5 tools display the classifier weights associated with each class for every word in our corpus (right)

- Also output annotated lines from the classifier output (below)

y=0 (probability 0.988, score 4.801) top features

Contribution?	Feature
+5.273	Highlighted in text (sum)
-0.472	<BIAS>

ethic concern big moral picture integrity personal choice value good strive integrity individualistic ethic personal_choice

y=1 (probability 0.002, score -6.400) top features

Contribution?	Feature
-0.521	<BIAS>
-5.879	Highlighted in text (sum)

ethic concern big moral picture integrity personal choice value good strive integrity individualistic ethic personal_choice

y=High top features		y=Low top features	
Weight?	Feature	Weight?	Feature
+3.513	great	+2.744	field
+2.846	strength	+2.378	student
+2.829	dependable	+2.312	counseling
+2.492	reliable	+2.279	play
+2.245	demonstrated	+2.243	area
+2.226	trustworthy	+1.766	growth
+2.176	high	+1.627	honesty
+2.093	emily	+1.509	attendance
+2.023	jake	+1.478	role
+2.011	good	+1.469	observe
... 629 more positive 205 more positive ...	
... 5844 more negative 6268 more negative ...	
-1.070	important	-0.422	help
-1.104	mentor	-0.428	thing
-1.108	ethic	-0.433	lot
-1.149	hour	-0.435	make
-1.197	personal	-0.449	honest
-1.278	learned	-0.470	good
-1.334	sure	-0.477	mentor
-1.339	internship	-0.529	rule
-1.342	people	-0.640	information
-1.534	rule	-2.236	<BIAS>

Analysis

LDA Implementation and Use

- Latent Dirichlet Allocation allows observations to be grouped
- Split into low (2-3), and high (4-5) scoring students (dropped 1)
- HyperOpt tested multiple model classifier types (SVC, RF, LogReg)
- Topics are created; each document receives a score for each topic

Text Explainer Implementation and Use

- Text Explainer provides annotated lines from the test set
- Eli5 also shows weights of models of each word within a response

Key Issues

- Overall data size limits the models' learning
- Unbalanced classes with far fewer mentor than student responses

Solutions

- Add data from most recent term
- Pre-train models on other competencies and potentially on external datasets

Future Plans

Having this term developed tooling for identifying articulation gaps, we intend to use them to detect and explore articulation gaps in not only ethics and leadership but other competencies as well. We will apply statistical analyses to validate these articulation gaps. We intend to gather a larger dataset with which to improve our ML models. We intend also to explore options for publication of our methods and results.