

English Writing Proficiency Predictor

The Erdos Institute, Fall 2022 Bootcamp

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Overview

Goal: Assess the writing proficiency of 8th-12th grade English Language Learners through creating an app that grades their essays based on **six** analytic measures.

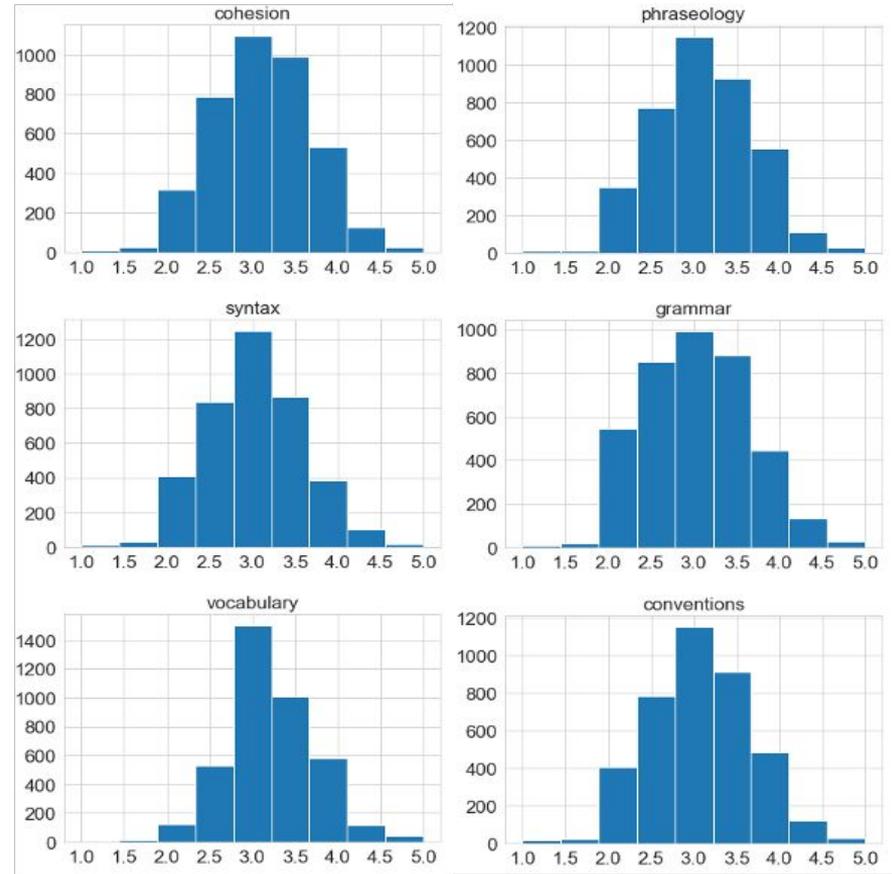
Stakeholders: English language teaching centers and schools as institutes; teachers and students individually.

KPI: Accuracy of scoring the essays measured by MCRMSE, or the mean column-wise root mean squared error, where each column corresponds to one of the 6 fields being evaluated.



Dataset description

- The training dataset consists of 3,911 essays of 8th-12th grade English Language Learners (ELLs). The testing dataset consists of 3 ungraded essays.
- Each measure represents a component of proficiency in essay writing, with greater scores corresponding to greater proficiency in that measure. The scores range from 1.0 to 5.0 in increments of 0.5.
- All measures seem to be normally distributed.



An Example with Perfect Scores

I agree with Michelangelo's statement as I have found through experience that it benefits me more to set high expectations and not reach my goal, rather than settling on a low goal and achieving it. When setting high goals, I find that I learn more and progress my abilities further than I do with a lower goal. This is because setting high goals requires confidence, challenges, and pride.

Firstly, hard work is required to achieve high goals, and requires confidence. Confidence involves having trust and believing that you are capable of accomplishing something. I have found that when I set high goals, I feel more confident in my abilities.

Conventions: Consistent use of appropriate conventions to convey meaning (e.g., spelling, capitalization, and punctuation).

Grammar: The rules by which words change their forms (i.e., word classes and grammatical morphology).

Vocabulary: skillful use of topic-related terms and less common words (to convey precise meanings).

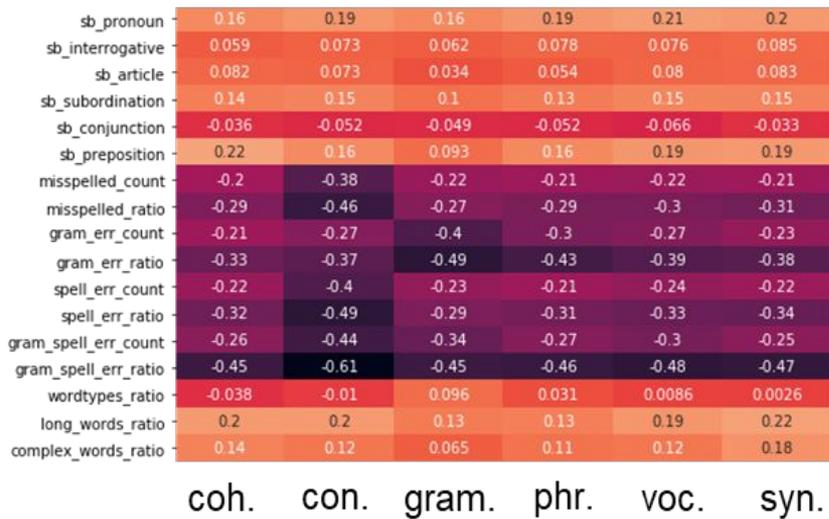
Phraseology: Flexible and effective use of a variety of phrases (e.g., idioms, collocations, and lexical bundles).

Cohesion: Well-controlled text organization (e.g., conjunctions, transitions, etc.).

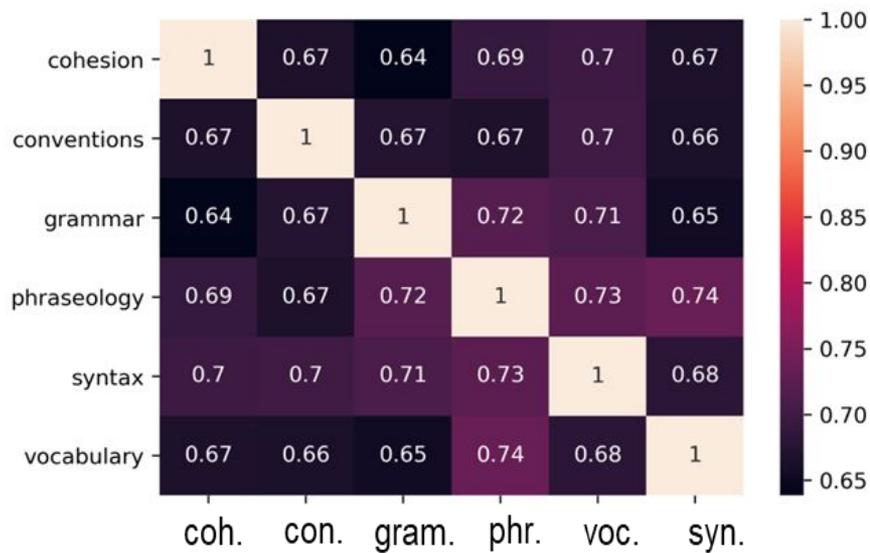
Syntax: Flexible and effective use of a full range of syntactic structures including simple, compound, and complex sentences.

Feature Extraction and Exploratory Data Analysis

- Packages “LanguageTool”, “PyEnchant” and “Readability” helped extract several language features like:
 - Density of spelling/grammar mistakes (*grammar and conventions*)
 - Noncommon words (*vocabulary*)
- Correlation (features to scores)

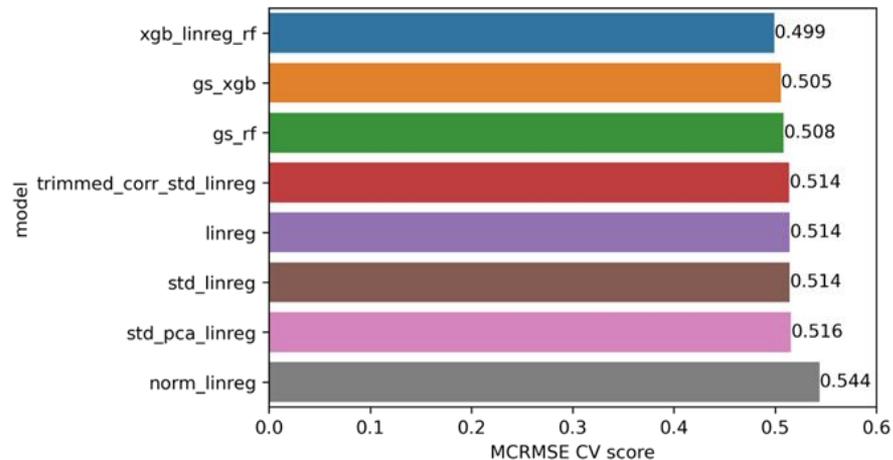
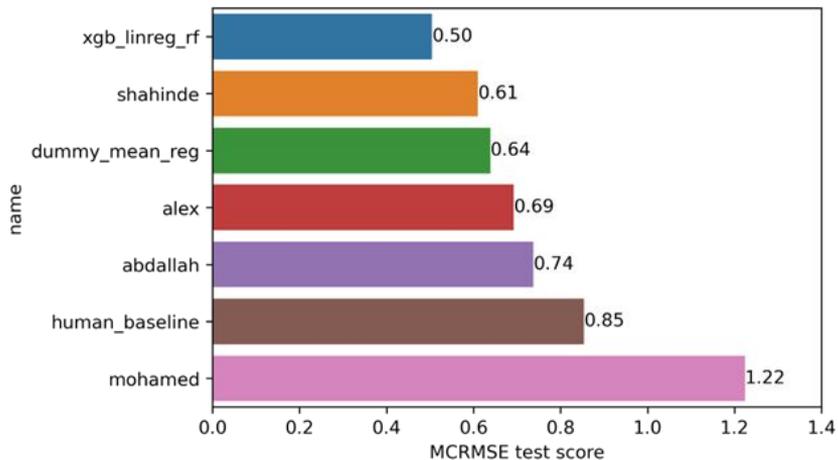


- Correlation (features to scores)

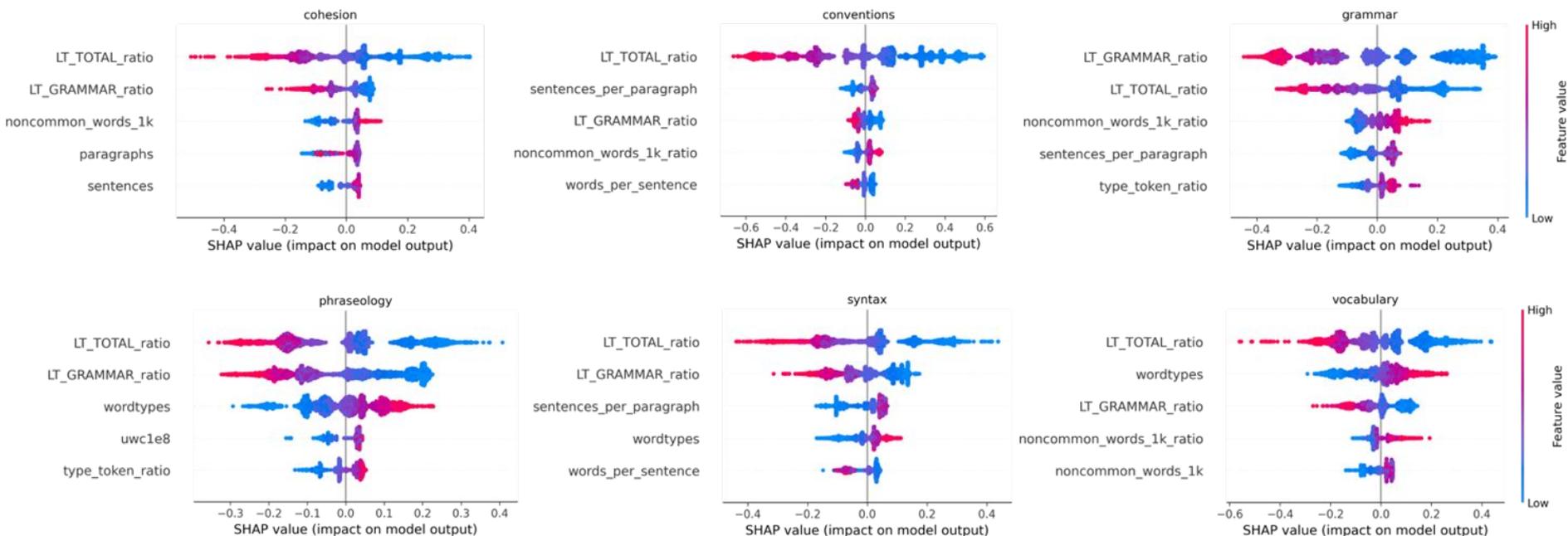


Models

	Human baseline	Classic ML model	DeBERTa ensemble
Description	manually graded a sample of the essays ourselves	Ensemble of random forest, XGBoost and linear regression, with a CV grid searched optimal hyperparameters	Deep learning model which scored highest in Kaggle
Mean col. RMSE	0.85	0.499 (0.486 on private Kaggle set)	0.433 on private Kaggle set



Feature Importance (top 5, XGBRegressor, SHAP)



The App (example of usage with video)

High-scoring example:

"Technology has always acted as a compelling and mysterious..."

voc.	syn.	phr.	gram.	con.	coh.
5.0	5.0	5.0	4.5	5.0	5.0

Low-scoring example:

"first i did think about in then i writer on paper..."

voc.	syn.	phr.	gram.	con.	coh.
2.0	1.0	1.5	2.0	1.5	1.5

Hugging Face Search models, datasets, users...

Models Datasets Spaces Docs Solutions Pricing Log In Sign Up

Spaces: alex42t/EssayChecker like 1 Running

App Files and versions Community Linked Models

English proficiency checker

Your essay will be scored according to six analytic measures: cohesion, syntax, vocabulary, phraseology, grammar, and conventions. Each measure represents a component of proficiency in essay writing, with greater scores corresponding to greater proficiency in that measure. The scores range from 1.0 to 5.0 in increments of 0.5.

Put an essay here...

Clear Submit

Your score

Examples

Hello, my name is Katherine, and I enjoy reading books. My favorite book is War and Peace by Leo Tolstoy.

Use via API Built with Gradio

Links

Demo App:

[Essay Grader App](#)

LinkedIn Profiles:

[Abdallah AlShafey](#)

[Shahinde Dogruer](#)

[Mohamed Mohssen](#)

[Alexander Timofeev](#)

GitHub Page:

[Project Hawthorn](#)