Linguine

Open source natural language processing & visualization

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Coach: Larry Kiser | 2015-2016

Overview

Linguine aims to allow language science students to explore automated language analyses such as syntactic or semantic analyses.

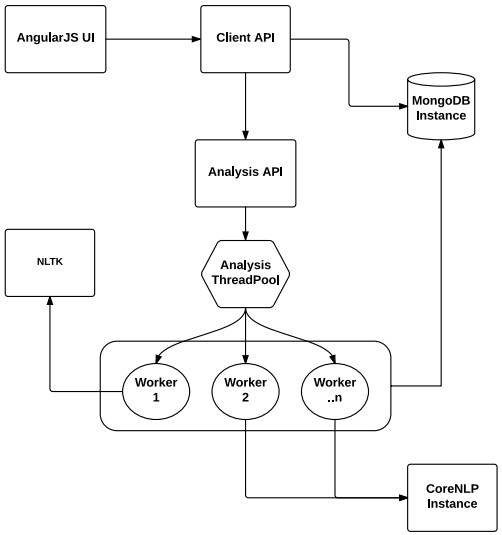
This project built upon prior senior projects that created a user interface and web API. This year's project focused on linguistic analysis functionalities as well as system stability and performance.

Contributions

- Implemented 5 additional analysis types
- Implemented visualizations for all analysis types
- Made multiple usability improvements to UI
- Implemented concurrency on Python backend
- Integrated Stanford CoreNLP and Illinois Curator
- Enabled users to work while analysis is processing

Technologies

Architecture



Python API
Performs analyses with Stanford CoreNLP, NLTK

NodeJS API
Handles front end interactions such as corpus upload and analysis creation

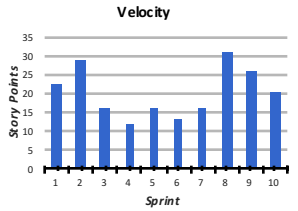
Analysis Thread Pool
Conducts analyses using a group of background server threads

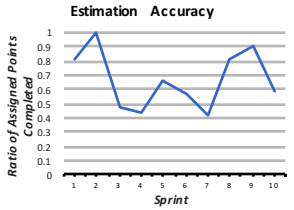
Methodology

We followed a Scrum methodology, using two week sprints. Several of our team members had experience using Scrum and we were likely to do much of the development independently, so it was the most appropriate choice.

In Fall, we met twice a week and remotely on the weekends. In Spring, we met in person three times a week to increase productivity.

We began each sprint with a sprint planning meeting to assign story points to each of our user stories. We used burndown charts to track our velocity and estimation accuracy.

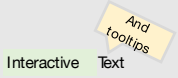




Analyses & Visualizations

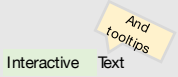
Term Frequency Analysis
Compute word frequencies in a text

Named Entity Recognition
Identify words by classes such as organization, place, or time expression



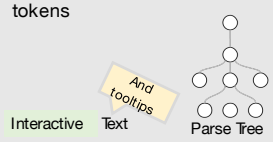
Coreference Resolution
Locate expressions that refer to the same entity in a text

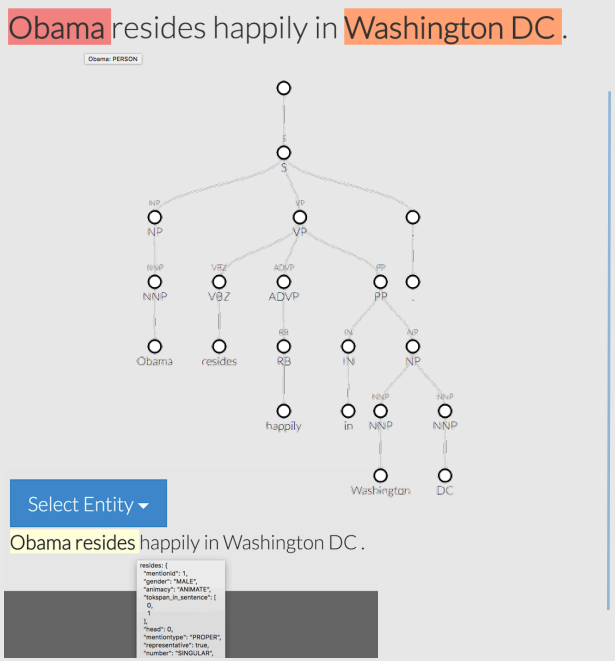
Relation Extraction
Find relationship triples between words

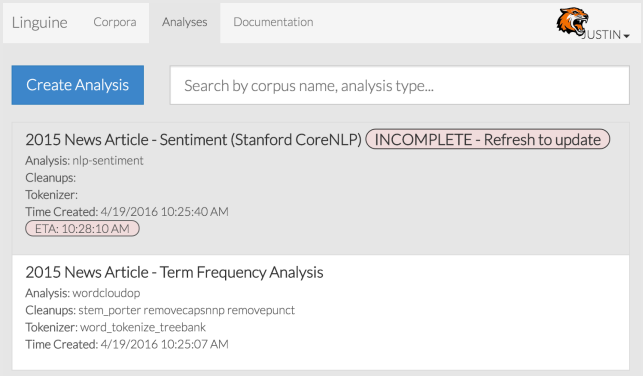


Parsing & Part of Speech Tagging
Construct a dependency parse tree and label words by part of speech

Sentiment Analysis
Estimate the sentiment of a text along with its sentences and tokens







Lessons Learned

- Consider a distributed computing model when working with computationally expensive operations
- As many system critical bugs as possible should be flushed out prior to user testing
- When inheriting a project, set aside enough time for potential rework or bug fixing
- Sponsor time is valuable - meetings need to focus on what the sponsor needs