Project Proposal Template

Proposal #1

Project Title: 'Tell me something I don't know': Generating self-insights for creative writers with NLP

Project Owner Details :

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Executive Summary:

The intersection of Creativity and AI is an area of strong current interest, both from the perspective of creative writers (adopters and resisters) and AI model developers. This project examines whether AI-adjacent natural language processing techniques, such as semantic clustering, sentiment analysis and stylometric analyses such as key word identification, can support writers' self-knowledge without requiring them to provide their personal writings to commercial large language models. Students on this project will learn NLP techniques which are also relevant to AI models (e.g. semantic clustering in Nomic.AI's Atlas commercial product). The product will be a web interface which enables writers to upload their texts for analysis (including easy-to-read visualisations of textual patterns), with the input text being deleted once analysis is complete to preserve the writer's privacy and intellectual property.

Potential options include stylometric analyses such as keyness for identifying frequently used keywords in a set of texts, sentiment analysis, semantic clustering (if the quantity of text data suffices), and insights into sensory and perceptual preferences as evident in the writer's language (e.g. visual/auditory/tactile/olfactory etc)

Background:

Creative writers develop their practice through a process of reading, writing, and reflecting on their writing. Self-reflection provides insights that emerging writers can use to further develop their personal writing vision and to refine their writing practice. This project will explore how stylometric NLP tools could support emerging writers by offering them language-based insights into personally important themes (semantic domains), perspectives, keywords and sentiments that they may not be aware of in their own writing.

Many creative writers are concerned about commercial AI replacing creative workers. This project seeks to establish an alternative vision, exploring the possibility that NLP techniques (smaller scale versions of the AI text analytics used in LLMs) may offer valuable insights to creative writers, by supporting their self-knowledge and development through a web-based tool that doesn't require them to input their texts to a major generative AI model. If successful, in the longer term, such an alternative model could lead to the development of a suite of tools designed specifically to support emerging creative writers. (See https://goblin.tools/ for a model of such a tool, developed to meet the needs of neurodiverse populations; or Scrivener software for an alternative word processing tool designed specifically to meet the needs of writers).

Objectives:

To establish a web-based tool that can ingest a writer's work, analyse it with a suite of NLP tools, provide appropriate visualisations and keyword summaries to the writer, before deleting the work to protect the writer's intellectual property and privacy.

Constraints and Limitations: Because it would contradict the goals, commercial LLM/LMM APIs cannot be used to process texts in this project. If open source LLMs or pre-trained embeddings are used, ideally they will be ones that exclude copyrighted work (to the extent that this can be ascertained).

Scope (Prioritised must-haves (***), nice-to-haves (**) and optional outcomes (*))

Set up a simple web interface to enable a student (or any other person) to upload their creative work to a local server (from which it will be deleted after analysis) and obtain outputs and visualisations which support their understanding of key themes, words, sentiments, etc. in their writing, which they can download and use to refine and deepen their work.*** Text analysis options might include:

1. Keyness statistics, which indicate the words that most distinctive in a text or set of texts.*** (see example below)
2. Words clustered into the top 10-50 topics or semantic areas using Principal Components analysis on word embedding (number of topics would depend on the size of the text uploaded; see example below)***
3. SentiArt sentiment lexicon ratings (or other sentiment analysis engine outputs) indicating overall sentiment and top associations between words in their texts and negative/positive sentiments and the five core emotions**
4. Lancaster sensorimotor norms lexicon matches for keywords and/or stats on matches for their entire texts.*

Appendix

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1. Semantic cluster analysis

Example clusters of semantically related words from a PCA analysis of word + 300-dimensional word embeddings run over a set of poems. These clusters suggest that the writer has a strong affinity for visual observation (cluster 0); for describing kinds of movement and comings and goings (Clusters 1 & 2); and for nature as a spiritual experience (Cluster 3). These may be themes that the writer can then reflect on further and deepen.

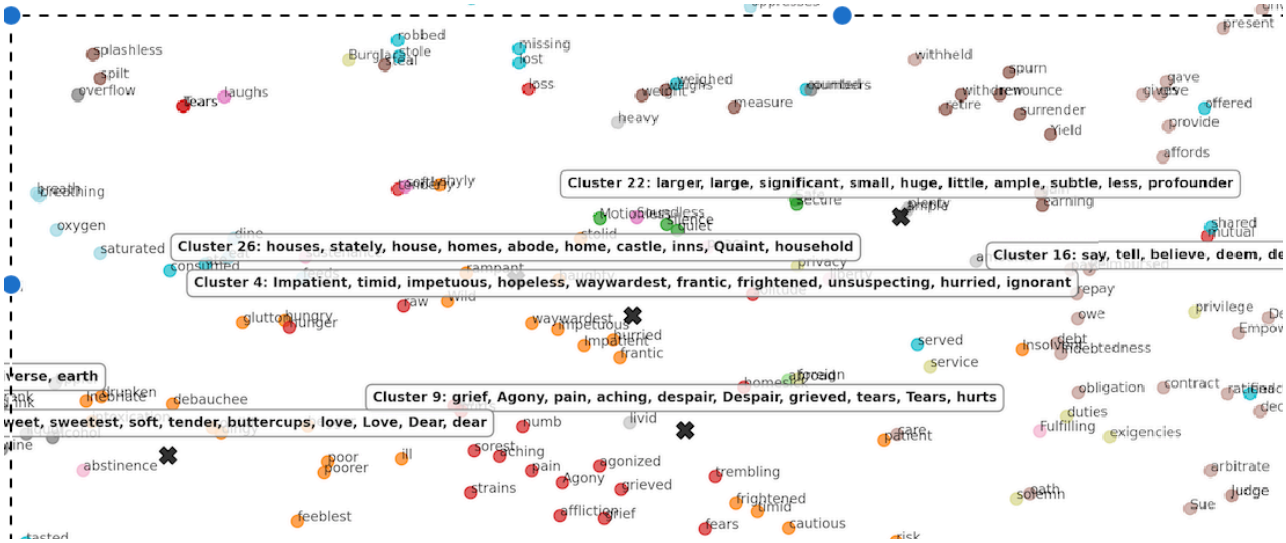
Cluster 0:
- seen
- noticed
- looked
- found
- observed
- saw
- viewed
- see
- spotted
- showed

Cluster 1:
- walk
- ride
- run
- running
- strolled
- rides
- miles
- rowed
- wander
- rambles

Cluster 2:
- went
- Went
- came
- Came
- gone
- Brought
- moved
- passed
- got
- come

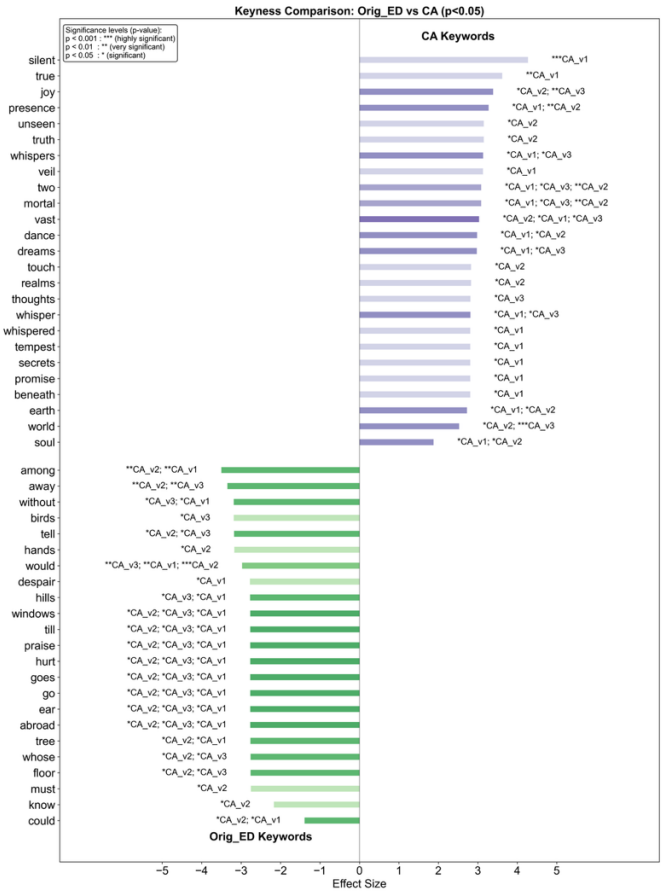
Cluster 3:
Nature
nature
nature's
Nature's
soul
Soul
spirit
life
Life
Wisdom

A visualisation of some clusters (fragment of a larger diagram):



1. **Keyness analysis**

The example below compared poems from two authors (Emily Dickinson poems in the public domain and Claude AI versions of the poems), showing which words were over-represented (i.e. are distinctive keywords) in each set of poems.


Keyness Comparison: Orig_ED vs CA (p<0.05)
Significance levels (p-value):
p < 0.001 : *** (highly significant)
p < 0.01 : ** (very significant)
p < 0.05 : * (significant)
CA Keywords
silent
true
joy
presence
unseen
truth
whispers
veil
two
mortal
vast
dance
dreams
touch
realms
thoughts
whisper
whispered
tempest
secrets
promise
beneath
earth
world
soul
***CA_v1
**CA_v1
*CA_v2; **CA_v3
*CA_v1; **CA_v2
*CA_v2
*CA_v2
*CA_v1; *CA_v3
*CA_v1
*CA_v1; *CA_v3; **CA_v2
*CA_v1; *CA_v3; **CA_v2
*CA_v2; *CA_v1; *CA_v3
*CA_v1; *CA_v2
*CA_v1; *CA_v3
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*CA_v3
*CA_v1; *CA_v3
*CA_v1
*CA_v1
*CA_v1
*CA_v1
*CA_v1
*CA_v1; *CA_v2
*CA_v2; ***CA_v3
*CA_v1; *CA_v2
among
away
without
birds
tell
hands
would
despair
hills
windows
till
praise
hurt
goes
go
ear
abroad
tree
whose
floor
must
know
could
**CA_v2; **CA_v1
**CA_v2; **CA_v3
*CA_v3; *CA_v1
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*CA_v2
*CA_v2
*CA_v2; *CA_v1
Orig_ED Keywords
−5
−4
−3
−2
−1
0
1
2
3
4
5
Effect Size