

Exploratory Analysis of Research Publications With Human Steerable Black-Box Models

This research was supported in part by



Abstract

Motivation

Not possible to read the constant release of publications and those that came before.

Desired Solution

Automated approach to synthesize knowledge embedded inside document collections

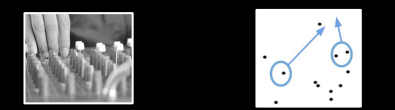
Problem

Fully automated methods are attenuated by significant well known challenges.

Value

Novel encoder approach for steering "black-box" machine learning models that enhances the explainability of the complex required pipelines.

Model Manipulation



External controls

Direct adjustment of Parameters

Requires deep knowledge about models

Not intuitive

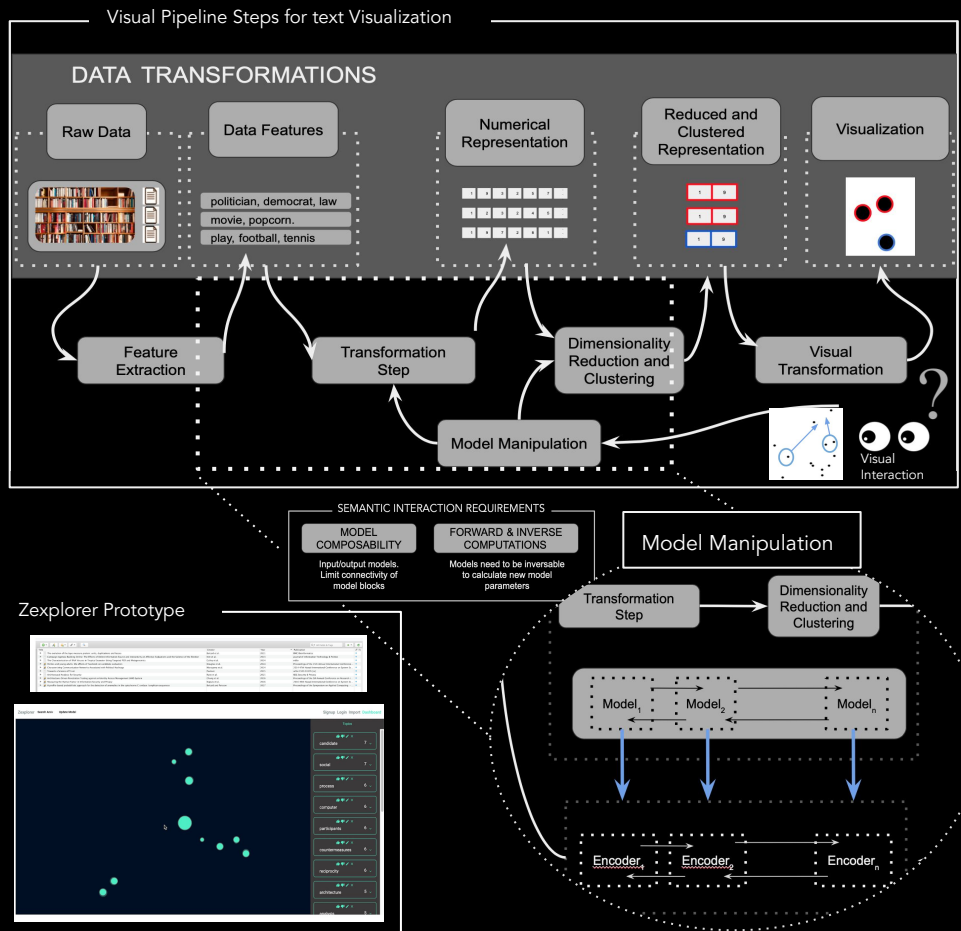
Visual Interaction

Direct adjustment of the visualized elements.

Automatic changes in the model parameters

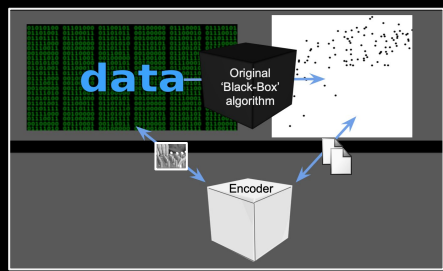
Only applicable to linear models

Alberto Gonzalez Martinez, Troy Wooton, et al. 2020.



Main Contributions

- Approach to embed user knowledge and questions into the models of a visual analytic system.
- General Approach to perform back and forward computations in semantic interaction Pipelines.
- Presented approach improves explainability of 'black-box' textual pipelines models.
- A prototype system Zexplorer to explore large document collections of research papers.



Summary

Substantial research

Many works of research tackle the idea of semantic interaction.

Limitations

Semantic Interaction relies on linear models to be able to traverse their pipelines.

Main Contribution

A general approach in Semantic Interaction to provide Inverse Computations for black-box algorithms has not been previously discussed in the literature.

Prototype

As an example of use we have applied this approach to steer the original model of UMAP to mimic user specified projections.