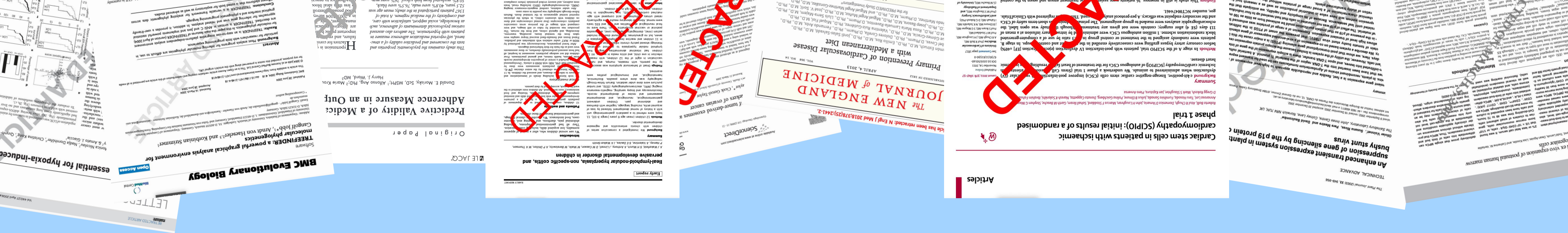
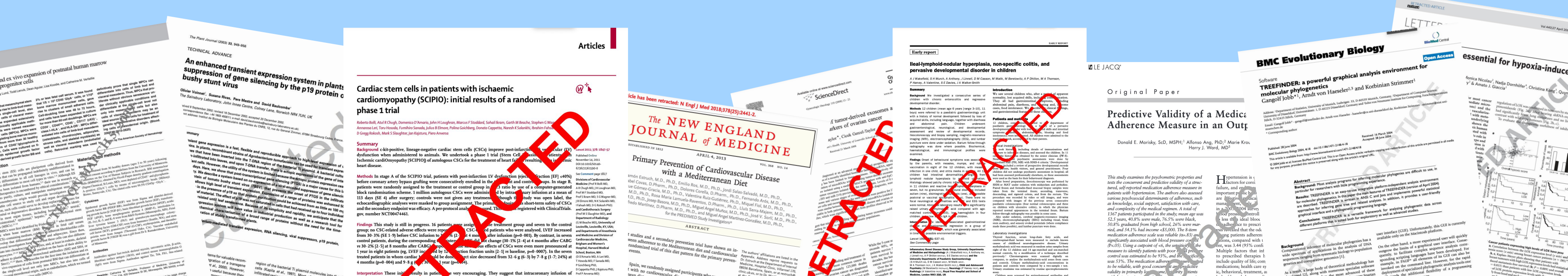


Predicting Paper Retractions

William Davis and Jack Kendrick



Motivation

- In theory, articles published in peer reviewed journals should hold up to scrutiny. When reading a paper, it is often taken for granted that the research is credible and trustworthy.
- However, sometimes bad papers fall through the cracks and end up being retracted.
- Retractions indicate seriously flawed and unreliable research, errors, fraud, ethical issues, or other serious concerns

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The Plant Journal (2003) 33, 949–956

TECHNICAL ADVANCE

An enhanced transient expression system in plants
suppression of gene silencing by the p19 protein
bushy stunt virus

Olivier Voinnet, Susana Rivas, Pere Mestre and David Baulcombe

The Sainsbury Laboratory, John Innes Centre, Colney Lane, Norwich NR4 7UH, UK

Articles

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LE JACQ

Original Paper

Predictive Validity of a Medica
Adherence Measure in an Outp

Donald E. Morisky, ScD, MSPH;[1] Alfonso Ang, PhD;[2] Marie Krou
Harry J. Ward, MD[5]

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TREEFINDER: a powerful graphical analysis environment for molecular phylogenetics

Gangolf Jobb*[1], Arndt von Haeseler[2,3] and Korbinian Strimmer[1]

nature

RETRACTED ARTICLE

LETTER

Vol 440|27 April 2006

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Monica Nicolau, Nadja Dornhöfer, Christina Kong, Quynh-Thu
& Amato J. Giaccia

Can we identify papers at a high risk of retraction?

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*Data From RetractionWatch

Starting Small: PLOS One

- We concentrated on the journal PLOS One
- Relatively well known and respected, but has a high number of retractions

Rank	Journal	Retractions*
1	2011 International Conference on E-Business and E-Government	1280
2	2011 5th International Conference on Bioinformatics and Biomedical Engineering	1084
3	PLoS One	944
4	Journal of Physics: Conference Series	878

The Dataset

- ➔ We collected data from the OpenAlex database using the PyAlex API
- ➔ ***Huge*** amounts of data available (including retractions)
- ➔ We used the raw data from OpenAlex to build features of interest
  - ◆ Fraction of authors that have previous retractions, whether any authors come from institutions with many retractions, etc.
- ➔ Our dataset consists of papers published in 2010-2020: 424,223 papers, with 797 retractions

Challenge: Retracted vs Non-Retracted Classes are massively unbalanced

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Our Approach

- → Baseline logistic regression model
- → Compare more baseline to nearest neighbour, random forest, and SVC classification methods.

Key Performance Indicators: F_1-score, Precision, and Recall

Baseline Model

- → Used **forward stepwise subset selection** to choose features.
- → The most informative feature is the proportion of authors on a paper that have been previously retracted
- → Second most informative feature is a measure of how many retractions any institution associated to the paper has received.
- → Results of subset selection correspond to our intuition on features that correlate to a risk of retraction

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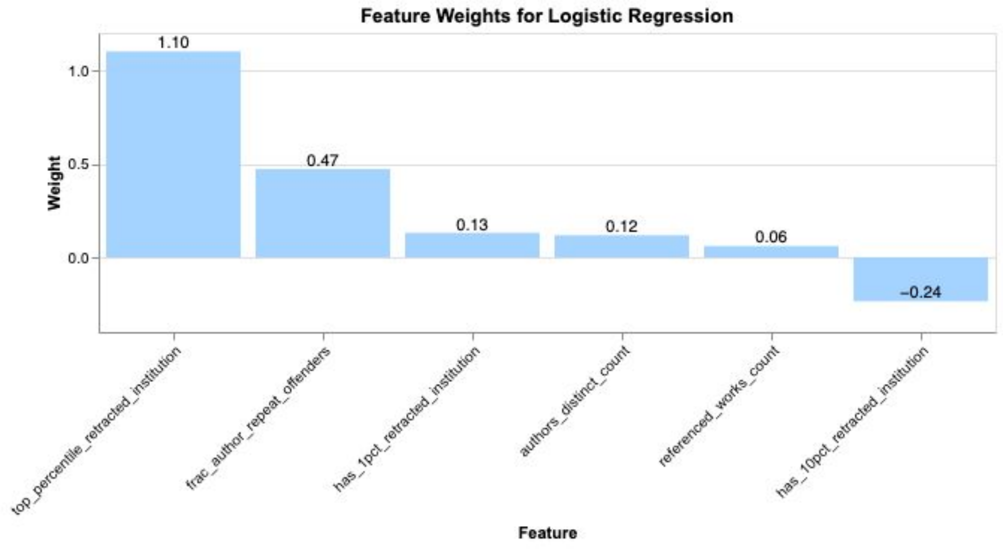
Baseline Model

F_1-Score:	0.169
Precision:	0.394
Recall:	0.107



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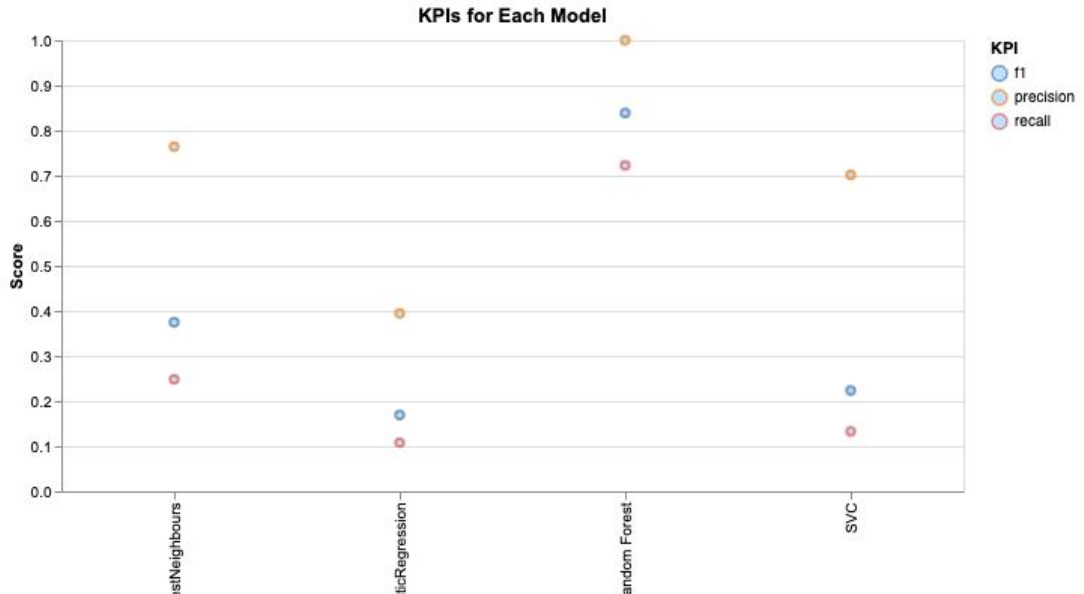
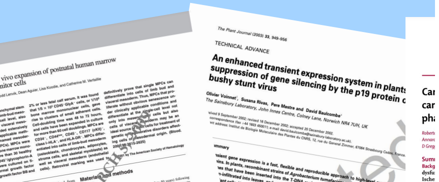
Model Selection

- → Tested k-Nearest Neighbors (k = 1, 2,…., 10), random forests, and support vector classification.
- → We used stratified 10-fold cross-validation to choose hyperparameters.





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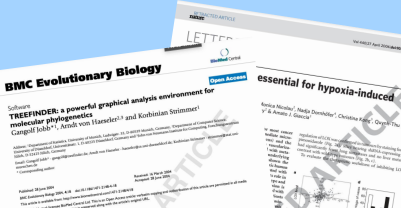

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Results

→ Random Forest classification far outperformed our other models in training.

Final Model: Random Forest with 500 estimators, max depth of 20

F_1 :	***0.289***
Precision:	***0.691***
Recall:	***0.182***
Accuracy:	***0.998***

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Future Directions

- → Expand dataset to include other journals and features relating to funding sources, journal publishers, etc.
- → Investigate papers published in the post ChatGPT-era. Can we use ‘Contains AI generated text’ as a feature?

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Acknowledgements

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- ➔ Thank you to the Erdos Institute for providing us with this excellent bootcamp.

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