FlawFinder

A Modular System for Predicting Quality Flaws in Wikipedia

TECHNISCHE UNIVERSITÄT DARMSTADT

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CLEF 2012 Labs and Workshop, Notebook Papers, September 2012. Rome, Italy., September 17–20, 2012

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Introduction

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UBIQUITOUS KNOWLEDGE PROCESSING

DIPF
Educational Research and Educational Information

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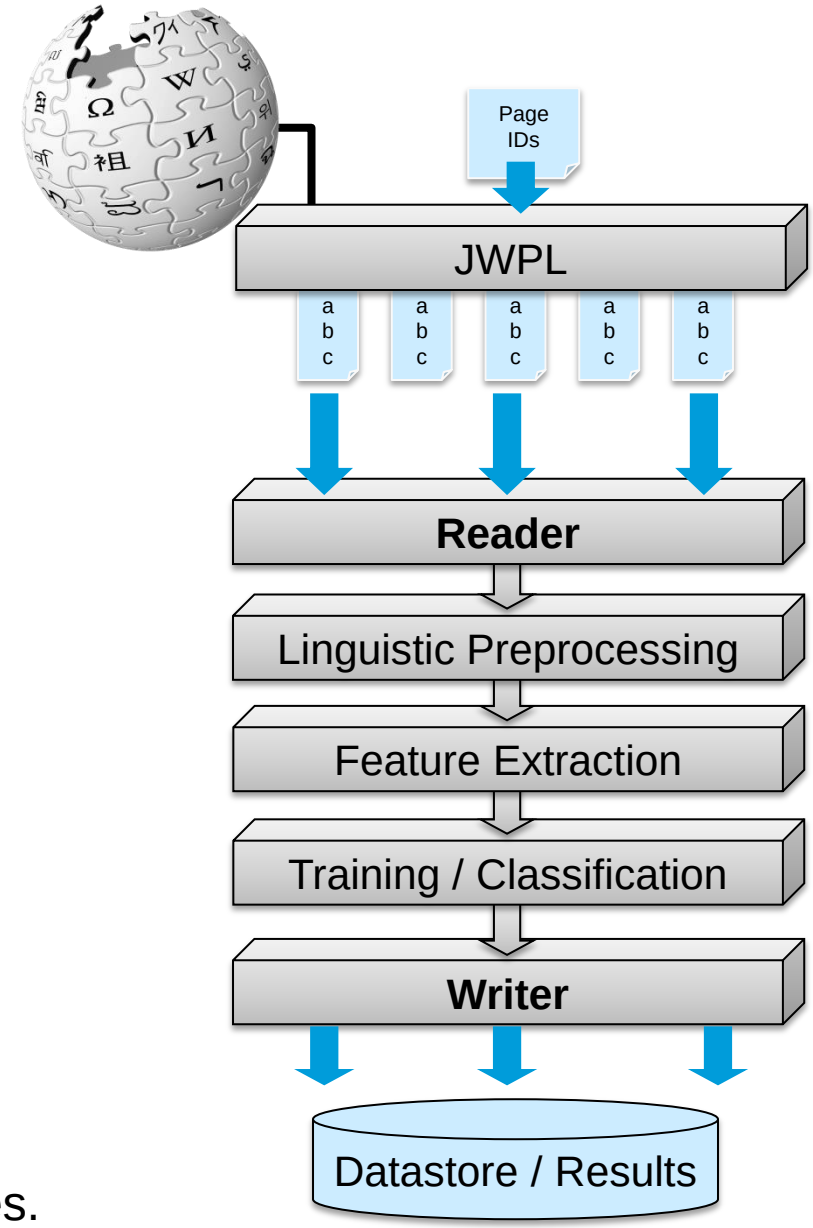
FlawFinder



Task-based system with
Multiple processing pipelines.

Data Import

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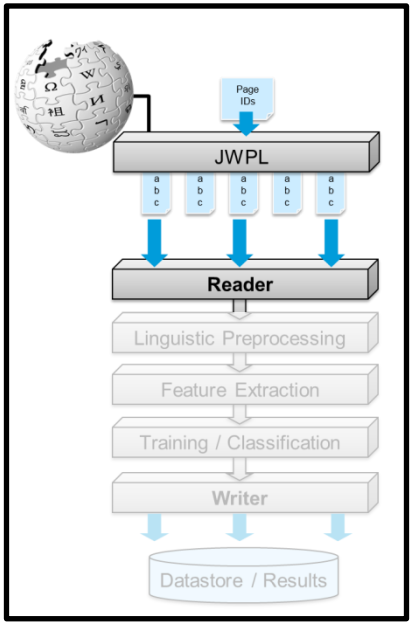
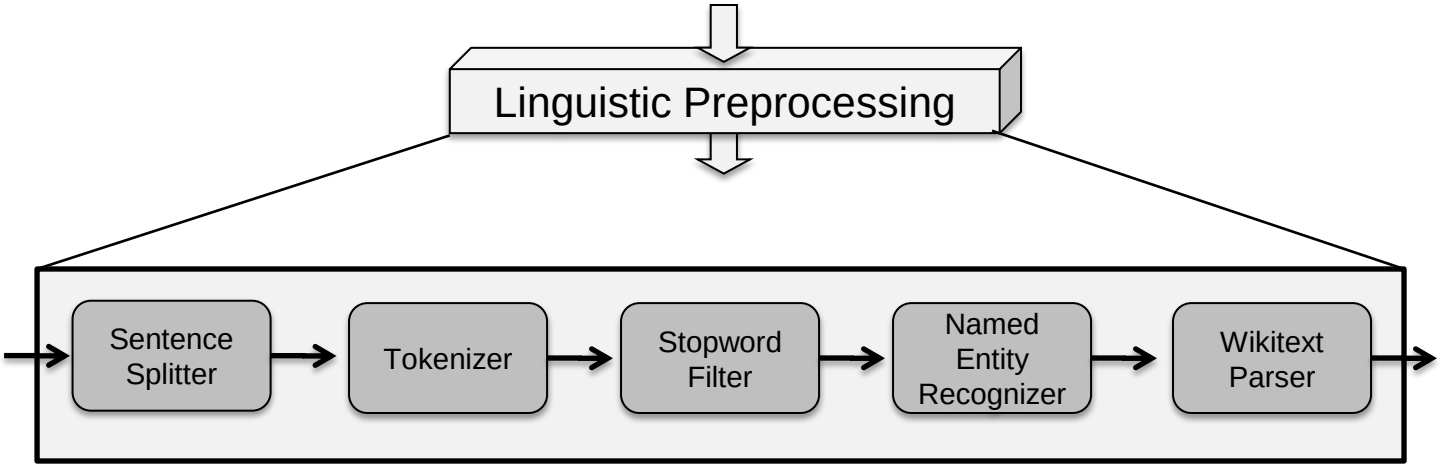
- Document retrieval via **Java Wikipedia Library** and **Wikipedia Revision Toolkit**
  - article text
  - revision history
  - revision meta data (authors, edit comment, timestamps)
  - links (in/out, internal/external)
- JWPL database based on Wikipedia data dump from January 4th, 2012.

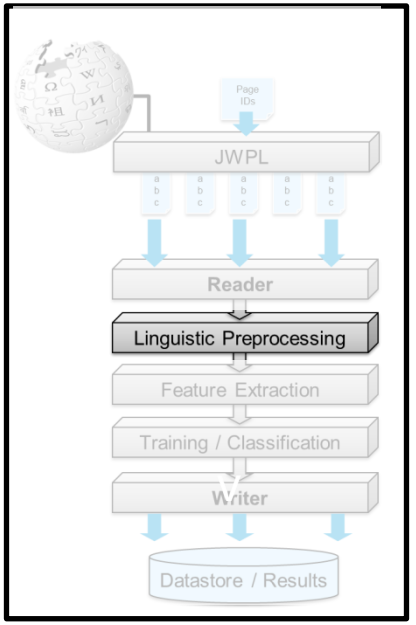


http://jwpl.googlecode.com

Preprocessing

- UIMA-based NLP components for preprocessing from the Darmstadt Knowledge Processing Repository



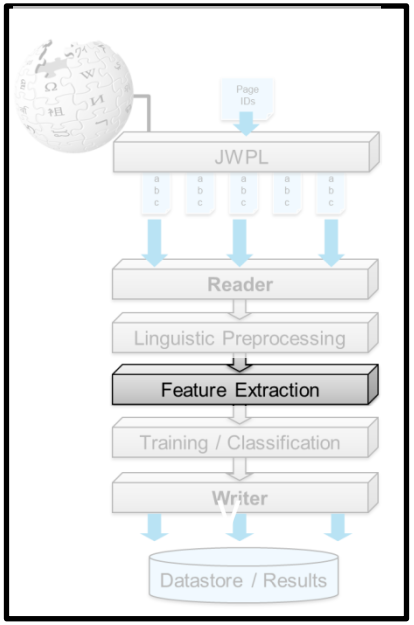


http://dkpro-core.googlecode.com

Features

- NGram features
- Structural features
- Reference features
- Network features
- Named entity features
- Revision-based features
- Other features

- 32 feature types in 7 categories
- ClearTK framework
  - „plug and play“ feature extractors
  - independent from utilized ML toolkit
- Information Gain approach for feature selection
- Unsupervised discretization of numeric features



http://cleartk.googlecode.com

Classification Approach

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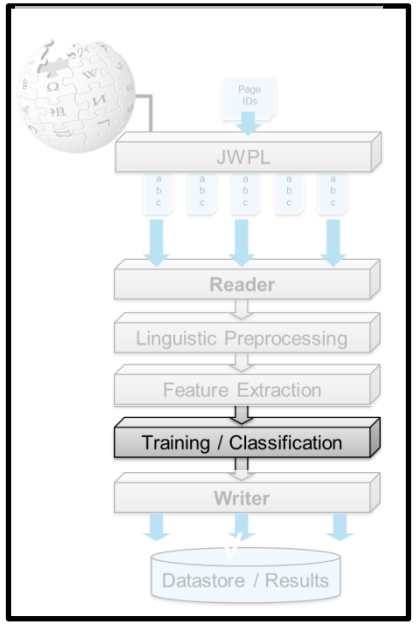
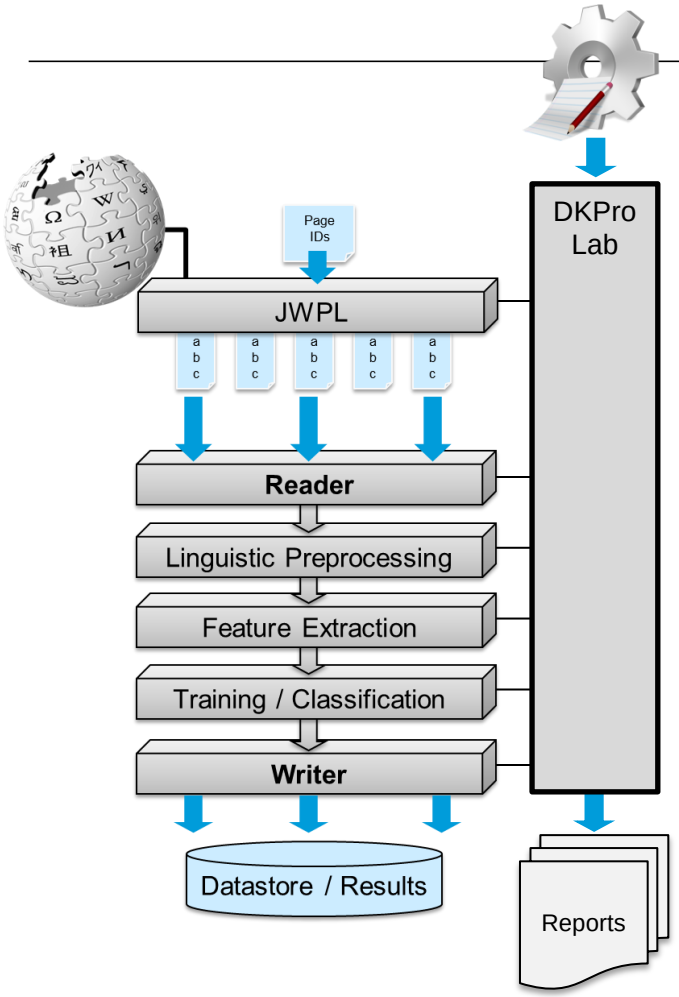
- Binary classification
  - Naive Bayes
  - AdaBoost with depth-limited C4.5 decision trees as weak classifiers
- Negative instances
  - Random sample of untagged articles
- Evaluation
  - 10-fold cross validation on 1000 documents
  - Stable sampling of negative instances in one evaluation run



MALLET
machine learning for language toolkit

Parameter Optimization



- The overall system is a „pipeline of pipelines“.
- Individual pipelines can be parameterized

Parameter optimization:

- Find best parameter setting across all pipelines
- Report on performance for pipeline configurations

DKPro Lab:

- Task based processing
- Parameter injection
- Global configuration
- Report probes gather statistics for global report

http://dkpro-lab.googlecode.com

Error Analysis and Evaluation

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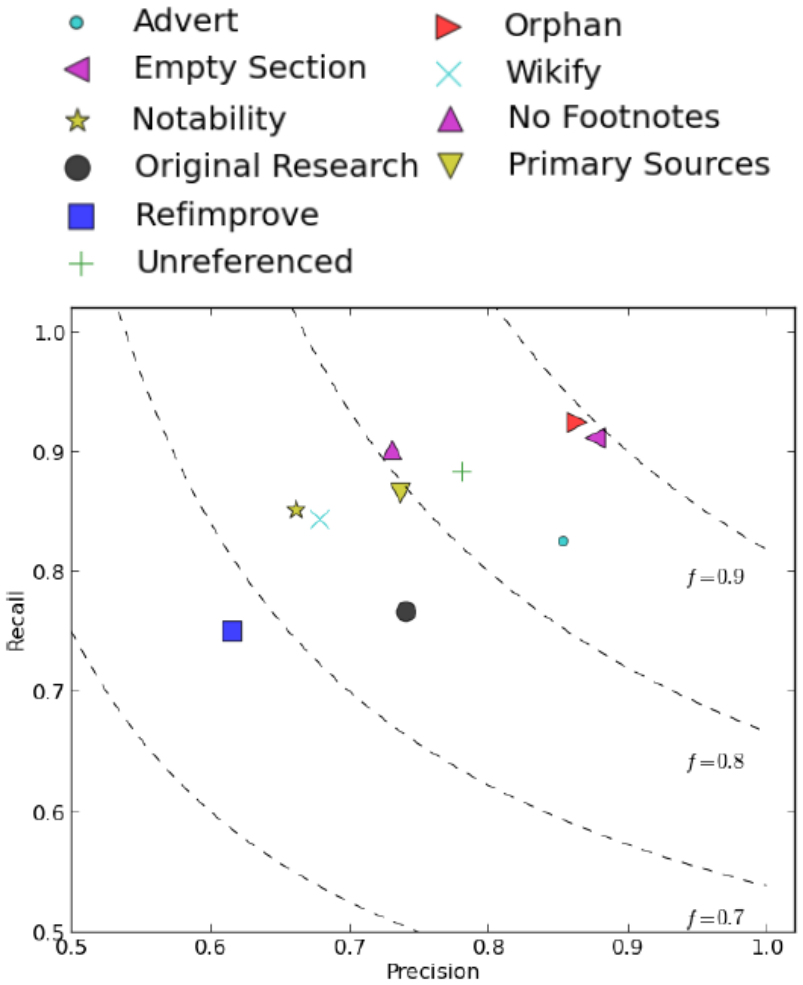
Common error sources

- Outdated labels (positive instances)
- Missing labels (negative instances)

- Unclear label definitions
  ➔ esp. reference flaws are often confused

- Section-scope and article-scope flaws mixed



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Conclusions & Outlook

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- Use article revision in which tag was first inserted
  - Solves outdated label problem
- Use revision history for identifying negative instances
  - Solves missing label problem
- Separate treatment of section- and article-scope templates
- Real world application: multi-flaw classification
  - problems with overlaps in flaw definitions

Thank you for your attention!

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Ubiquitous Knowledge Processing Lab

LOEWE – Landes-Offensive zur Entwicklung Wissenschaftlich-ökonomischer Exzellenz

DIPF
Educational Research and Educational Information

VolkswagenStiftung

Emmy Noether-Programm
Deutsche Forschungsgemeinschaft DFG

http://www.ukp.tu-darmstadt.de

Features

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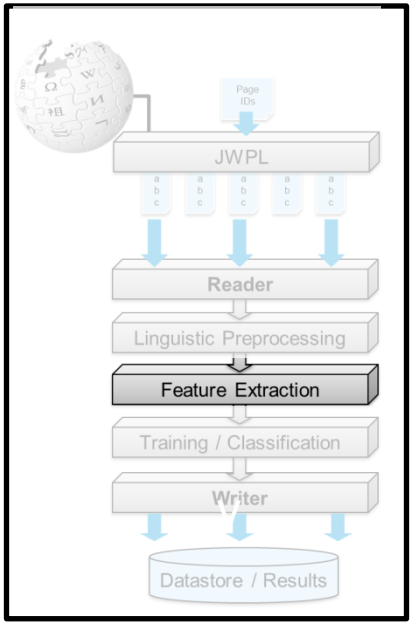
- Token-unigrams, bigrams, trigrams
- Extracted from article text w/o markup
- Min. frequency (5)
- Stopword filtered



Features

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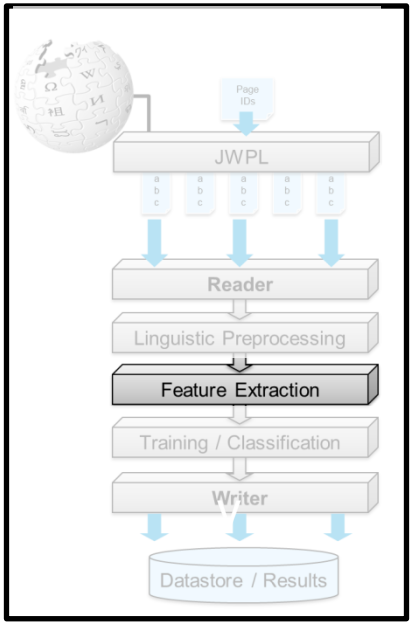
- Empty sections
- Number of sections
- Mean section length
- Markup to text ratio



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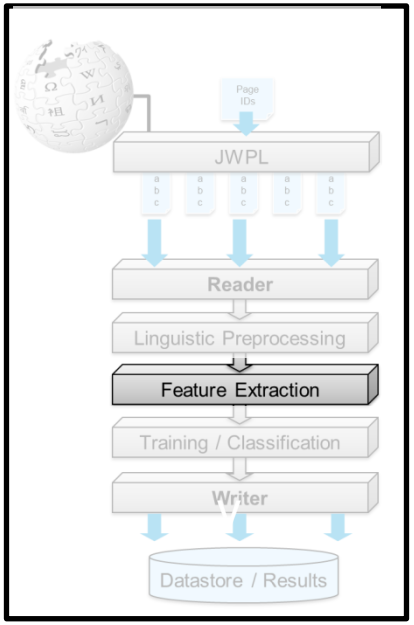
- Number of references
- Reference lists
- Reference to text ratio
- References per sentence



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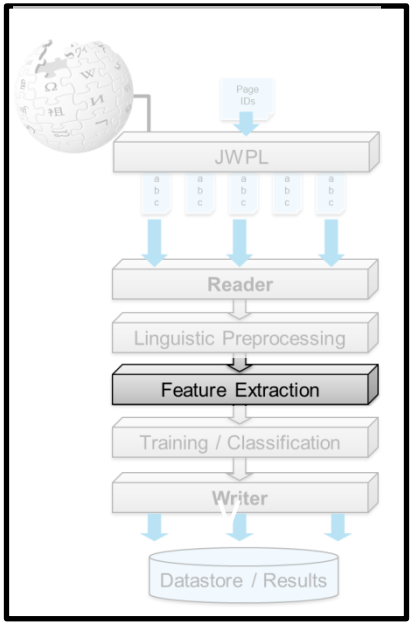
- External links
- Inlinks
- Outlinks



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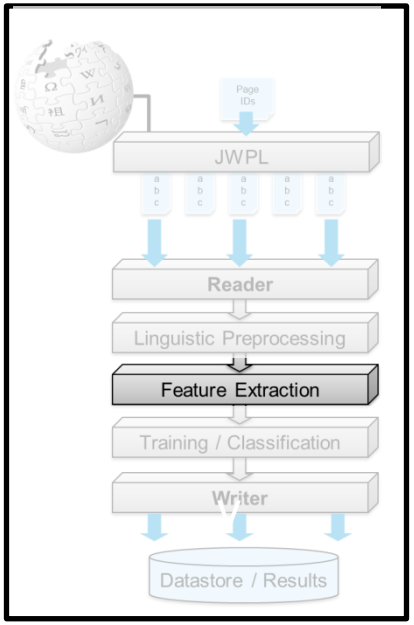
- NER types
  - Organization
  - Person
  - Location
- Absolute numbers and NER to text ratio



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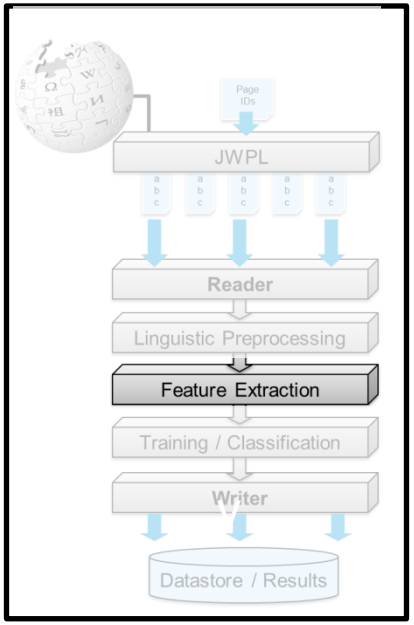
- Number of revisions
- Number of unique contributors
- Number of registered contributors
- Article age



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- Number of discussions on Talk page
- Number of sentences, tokens and characters