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Enhancing diversity in the content creation process at Wikipedia

WP5

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Project review Y1

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Agenda

1. Overview
2. Problem scenarios
3. Solution including reuse of R&D results
4. Mockup demo
5. Outlook

Overview

Problem scenarios

Solution including reuse of R&D results

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Overview

Overview

- The goal of Wikimedia's case study is to support Wikipedia editors in maintaining and improving the site, and to support readers in understanding the quality and biases of a given article.
- We are creating tools and extensions to support editors in the management, understanding, and decision-making about complex and heated controversies on Wikipedia.
- We want Wikipedia to offer high quality articles on both highly visible and as well as on more obscure topics.

Diversity challenge (1) – authorship

- Not everyone contributes to Wikipedia
- Standard authorship has a strong spot at
  - Male
  - Academic background
  - 25-50 years of age
  - Developed countries
- Bias is a vicious circle
- Wikimedia Foundation targets for 2015 include:

„ Support healthy diversity in the editing community by doubling the percentage of female editors to 25 percent and increasing the percentage of Global South editors to 37 percent“

Diversity challenge (2) – lemma selection

- Defining the scope of Wikipedia boils down to editorial decisions such as: An article for every episode and character and location of "The Simpsons" vs. a single article on the entire TV series.
- These decisions will influence:
  - the audience composition
  - the authorship recruitment
  - the internal and external perception of the project

Diversity challenge (3) – data inconsistency

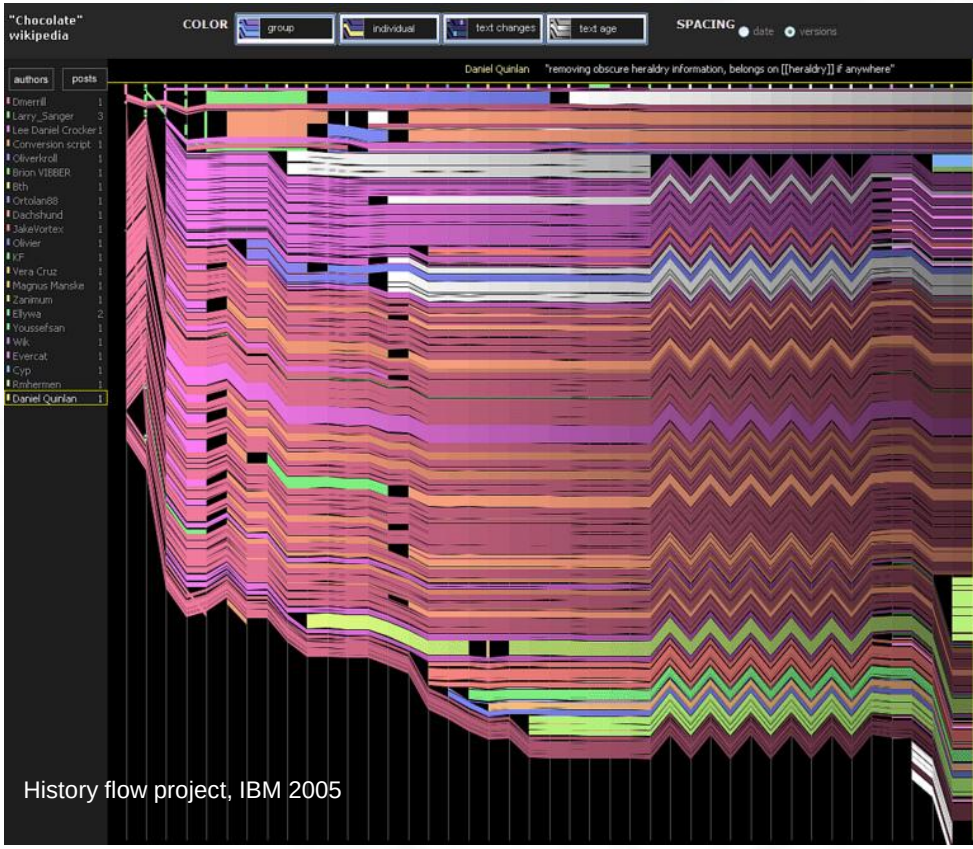
- Variations in the number of „people of Muslim faith“

Lang	Lemma	Figure (in bn)
EN	Islam	Over 1.5
EN	Major religious groups	1.3 – 1.65
EN	Claims to be fastest-growing religion	1.57
HE	Islam	1.4
LB	Islam	1.1 – 1.5
ID	Islam	1.25 – 1.4

- Variations in borders drawn on maps in various Wikipedia language editions (Kashmir, Sea of Japan)

Diversity challenge (4) – editor behaviour

- Certain editing behaviours can lead to biased articles
  - e.g. a dominant editor group in an article that wins an edit war, 'pushing out' minority views
- Newcomers and 'outsiders' to an article can encounter problems adding content, especially mayor changes



History flow project, IBM 2005

Work done in the first year

- Definition of use case scenarios
- Collection of existing approaches in quantitative metrics for quality assessment
- Collection of bias-inducing editor behavior patterns and development of methods to the detect them
- Metric definition in order to evaluate the development of Wikipedia article quality
- Engagement with the Wikipedian and Wikimedian community to explain the scope and the public benefit of the RENDER project
- Participation in Wikimedia community events to outline the current state of the RENDER project and to invite feedback from scientifically minded authors

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Problem scenarios

Problem scenarios

Main Goal:

- Improvement of the quality, the value and the trustworthiness of Wikipedia by supporting Wikipedia users (readers and editors)

Use Case Scenarios:

- UC1: Display warnings to the reader when detecting bias
- UC2: Notify authors that an article needs to be updated
- UC3: Lower the barrier for readers to extend and/or correct articles

UC1: Bias detection and notification

- A regular visitor to Wikipedia opts into a tool that will display warnings whenever an article is shown with detected bias.
- The user is given a summary of the detected bias and detailed information on how the bias warning was triggered.
- The user is now in a position to engage in article editing to fix or amend the article in order to improve its quality and remove the biased parts.

UC2: Notification framework

- A retired professor of linguistics with advanced Wikipedia expertise and good standing as an author has committed herself into maintaining the entire topic in Wikipedia.
- Using a dedicated tool, she is given a list of articles that show signs of being outdated, incomplete or biased.
- The professor is now able to maximise impact of her work, focussing on the most deserving articles in her field of expertise.

UC3: Lowering the barrier

- A student has a long time history of passively reading Wikipedia articles in the course of his studies.
- Dedicated tools are now providing him with information to understand which facts are missing in the article and are offering him resources that contain the missing information
- The user is now given a clear path to turn passive involvement into active and productive participation

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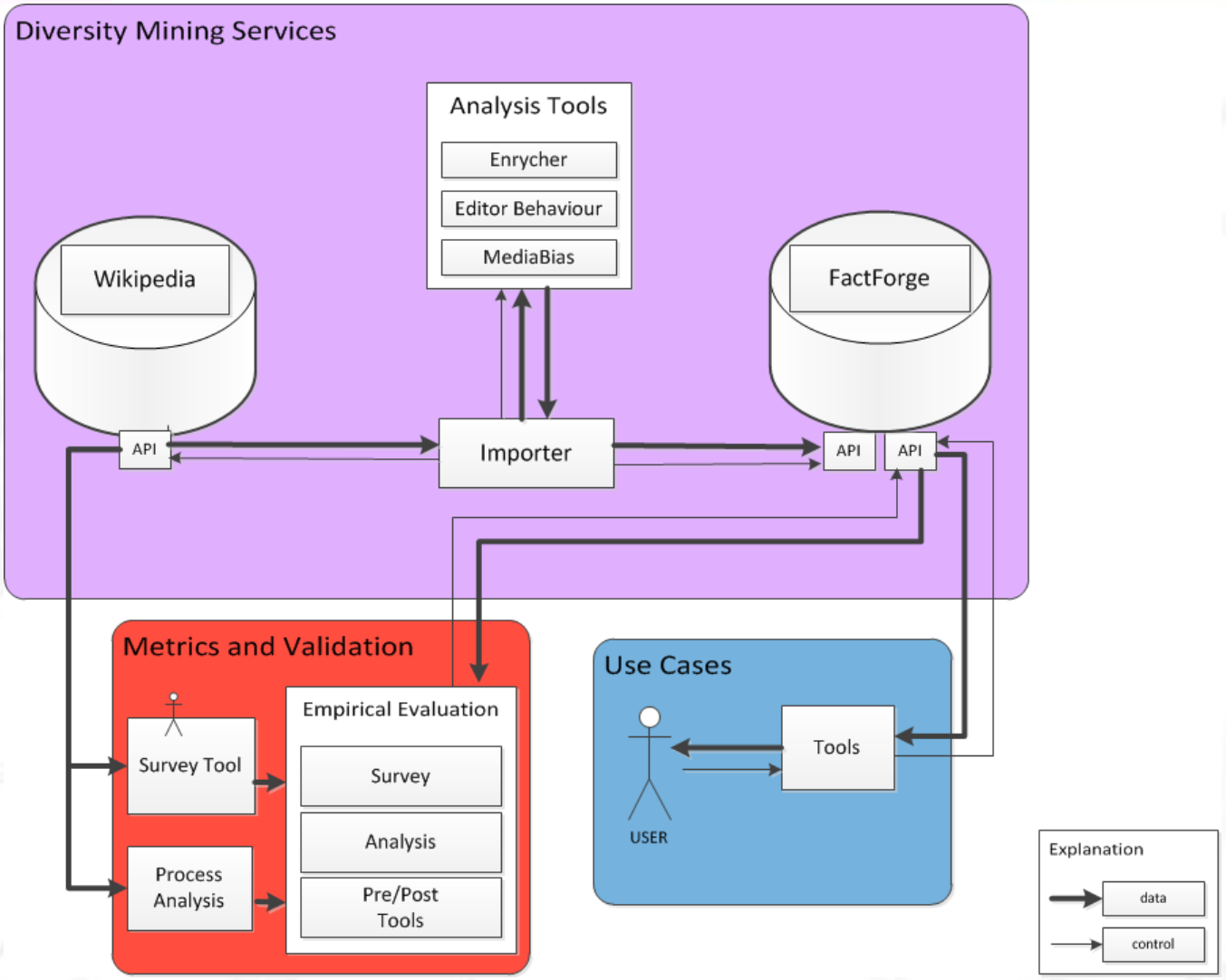
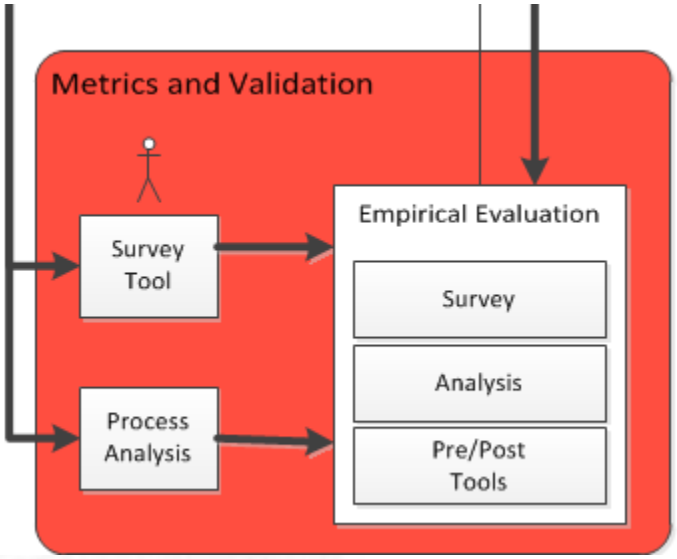
Overview of solutions including reuse of R&D results

Overview of solutions including reuse of R&D results



Metrics and validation (1)



Evaluation of results from Enrycher, behavioral analysis and others

2 approaches to use Wikipedia's assessment expertise:

- assessment survey with Wikipedia users
- analysis of templates and the results of WMF Article Feedback Tool

Metrics and validation (2) - Content

- Analysis of Wikipedia's content development and quality

  - Fact coverage/ completeness:
    - Article length (number of words) compared to articles in other language versions
    - Number of articles which
      - ✓ have a bigger fact coverage compared to other language versions
      - ✓ have a lack of facts compared to at least one external source like a news article
  - Timeliness
  - Objectivity

Metrics and validation (2) - Content

- Analysis of Wikipedia's content development and quality
  - Fact coverage/ completeness
  - Timeliness:
    - Number of edits per day compared to the average
    - Number of articles which are
      - ✓ not reverted during the last day/week
      - ✓ without reverts but high editing in at least five language versions
      - ✓ out-dated compared to publishing dates of external sources (at least five days older)
  - Objectivity

Metrics and validation (2) - Content

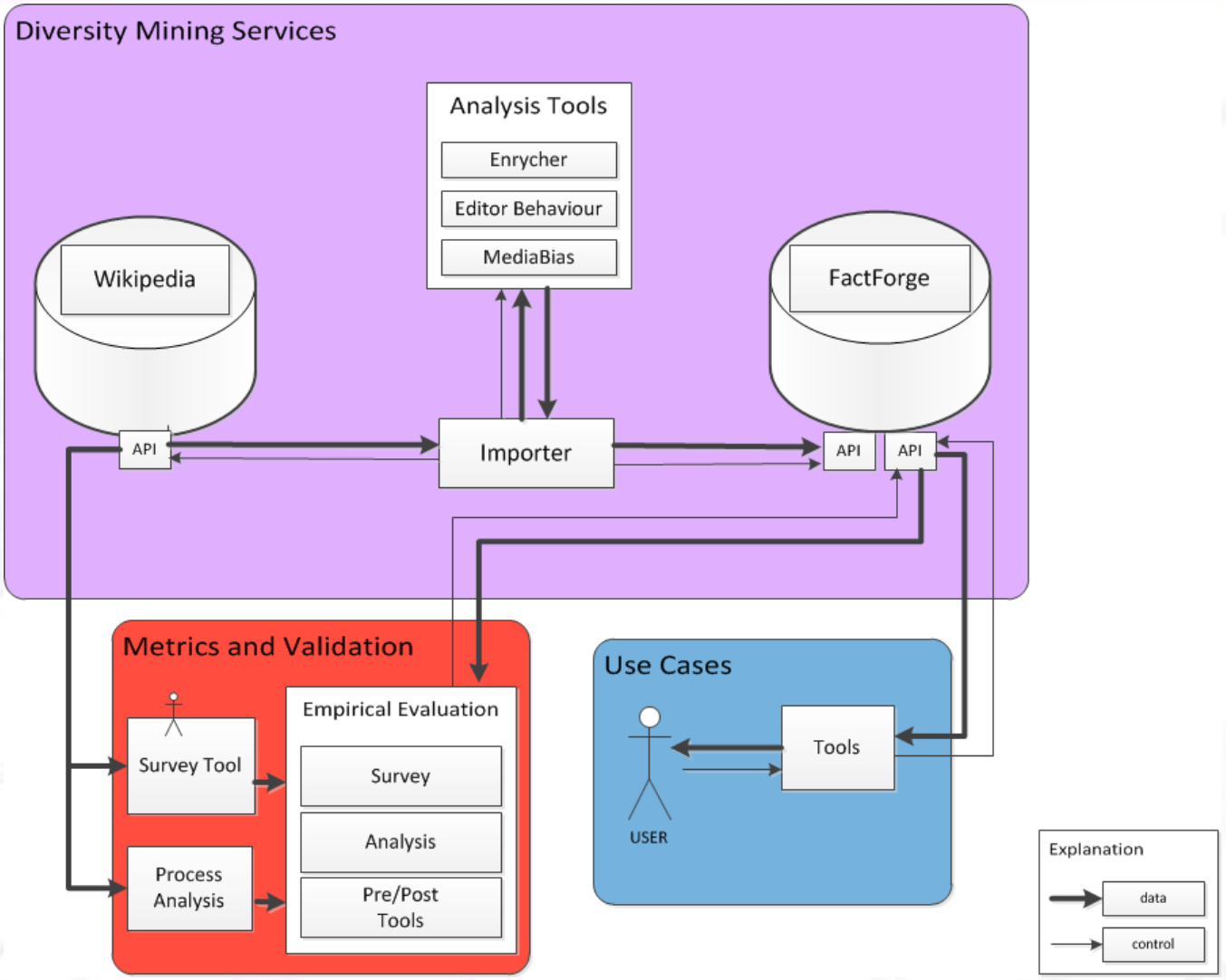
- Analysis of Wikipedia's content development and quality
  - Fact coverage/ completeness:
  - Timeliness
  - Objectivity:
    - Number of articles:
      - ✓ containing subjective words or expressions
      - ✓ identified as opinionated by JSI's algorithms
      - ✓ classified as opinionated by containing biased references

Metrics and validation (3) - Editor behavior

- Analysis of article-based editor behavior patterns and their development

  - Existence of editing patterns indicating bias:
    - Measured based on
      - ✓ Correlations of the chance of an edit getting reverted with editor, edit and article features
      - ✓ Social editor network metrics like centrality, clustering, density, etc.
      - ✓ Specific combination of behavioral mechanisms detected

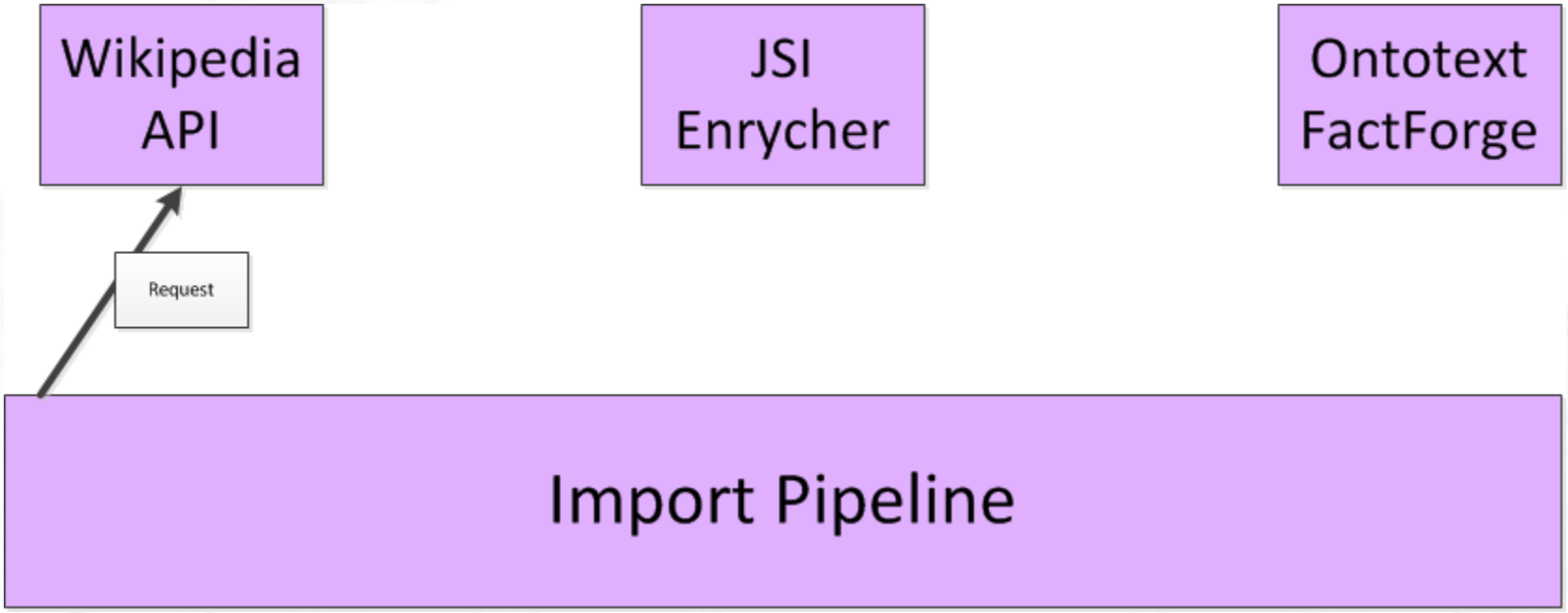
Overview of solutions including reuse of R&D results



Diversity mining services – import pipeline

Example for the import pipeline procedure:

API request: “Kalmar”



Diversity mining services – import pipeline

'''Kalmar''' is a [[cities of Sweden|city]] in [[Småland]] in the south-east of [[Sweden]], situated by the [[Baltic Sea]]. It had 62,767 inhabitants in 2010<ref name="scb" /> and is the seat of [[Kalmar Municipality]]. It is also the capital of [[Kalmar County]], which comprises 12 municipalities with a total of 233,776 inhabitants (2006).
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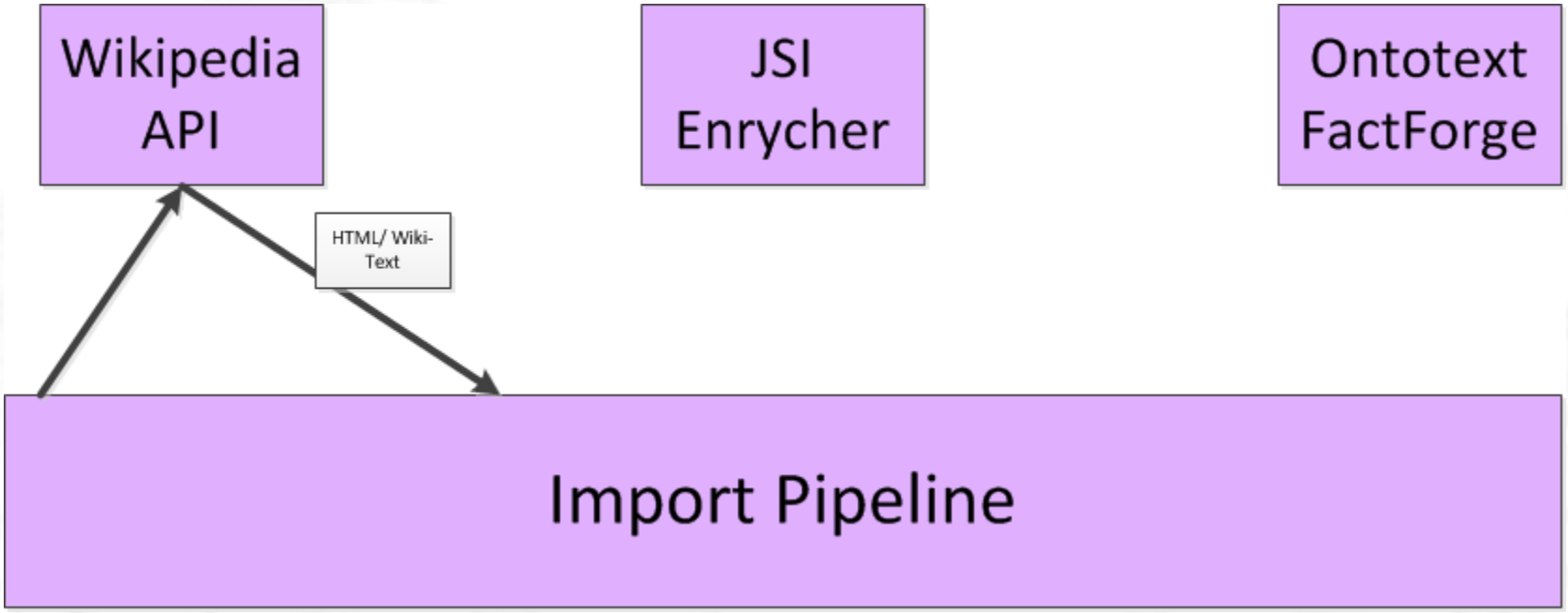

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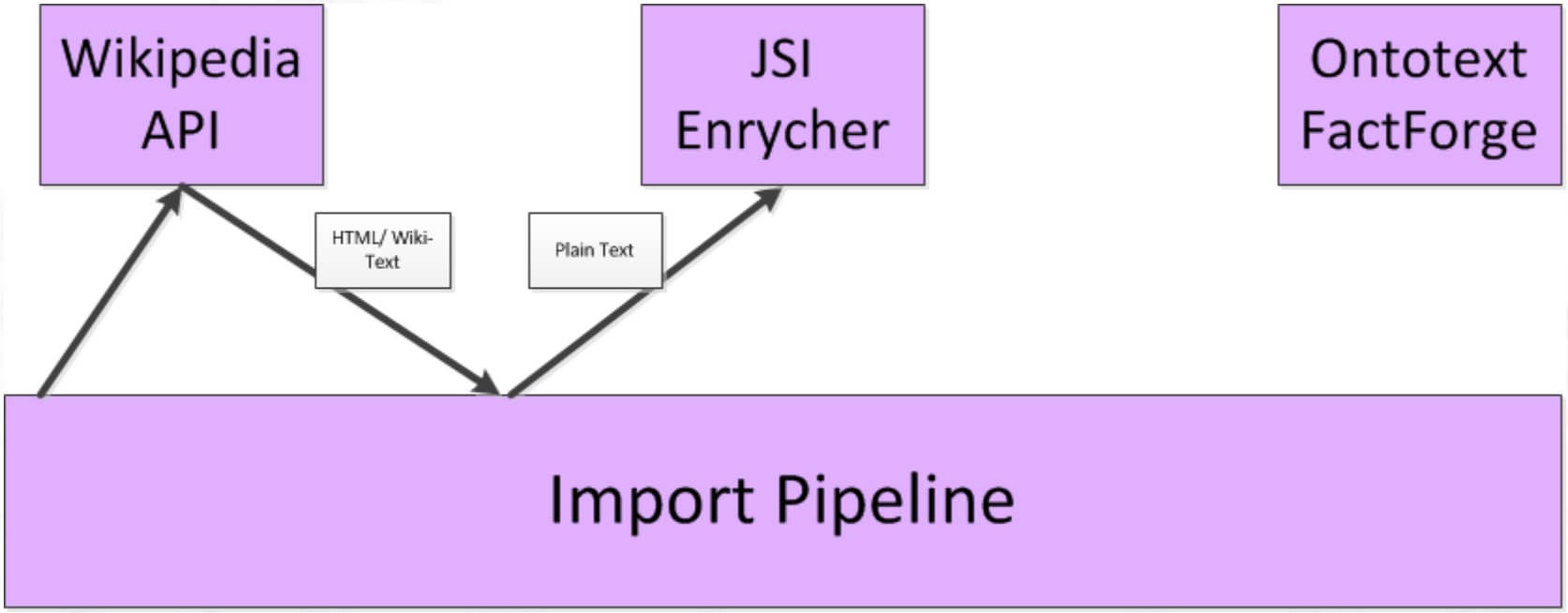
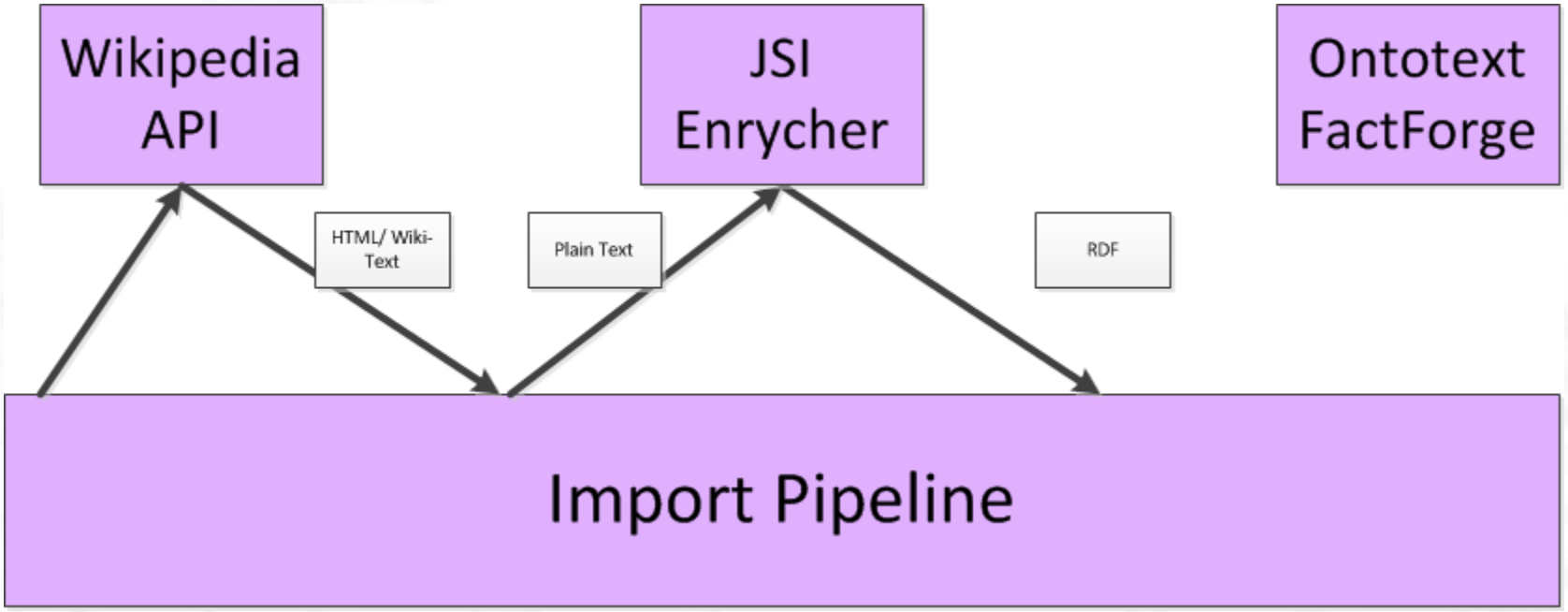


Diversity mining services – import pipeline



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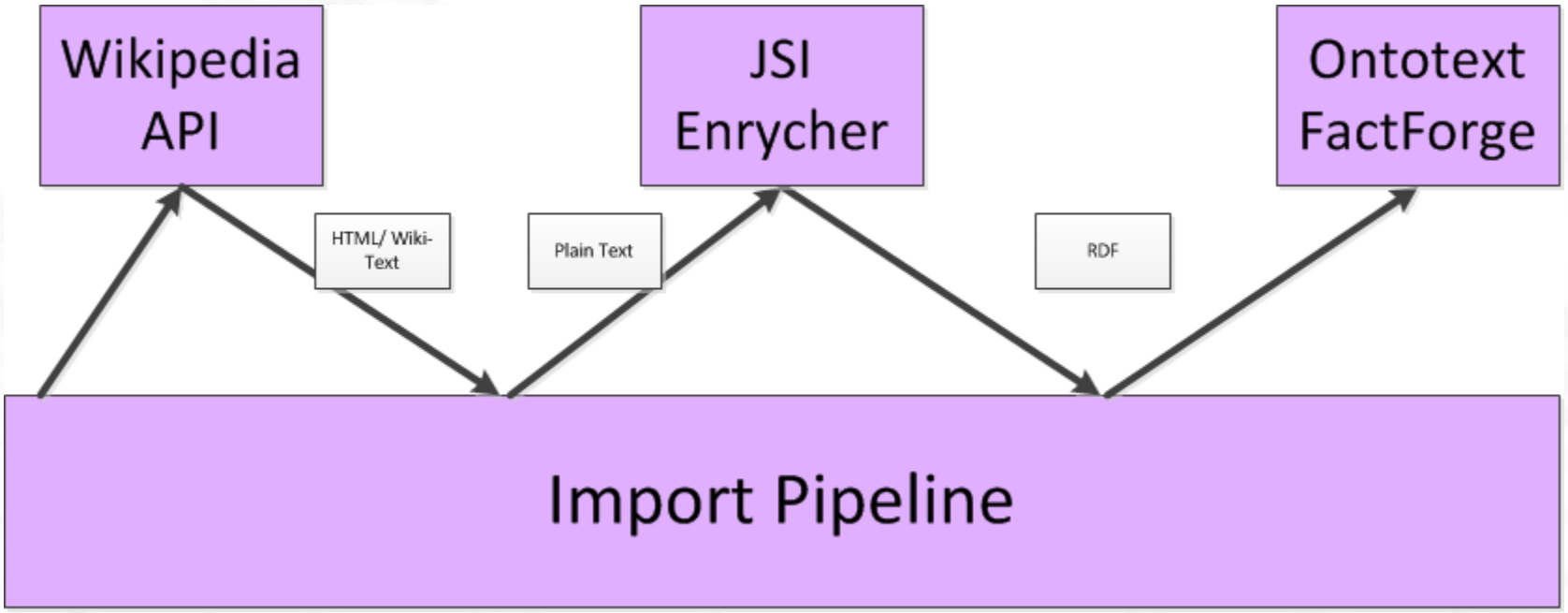
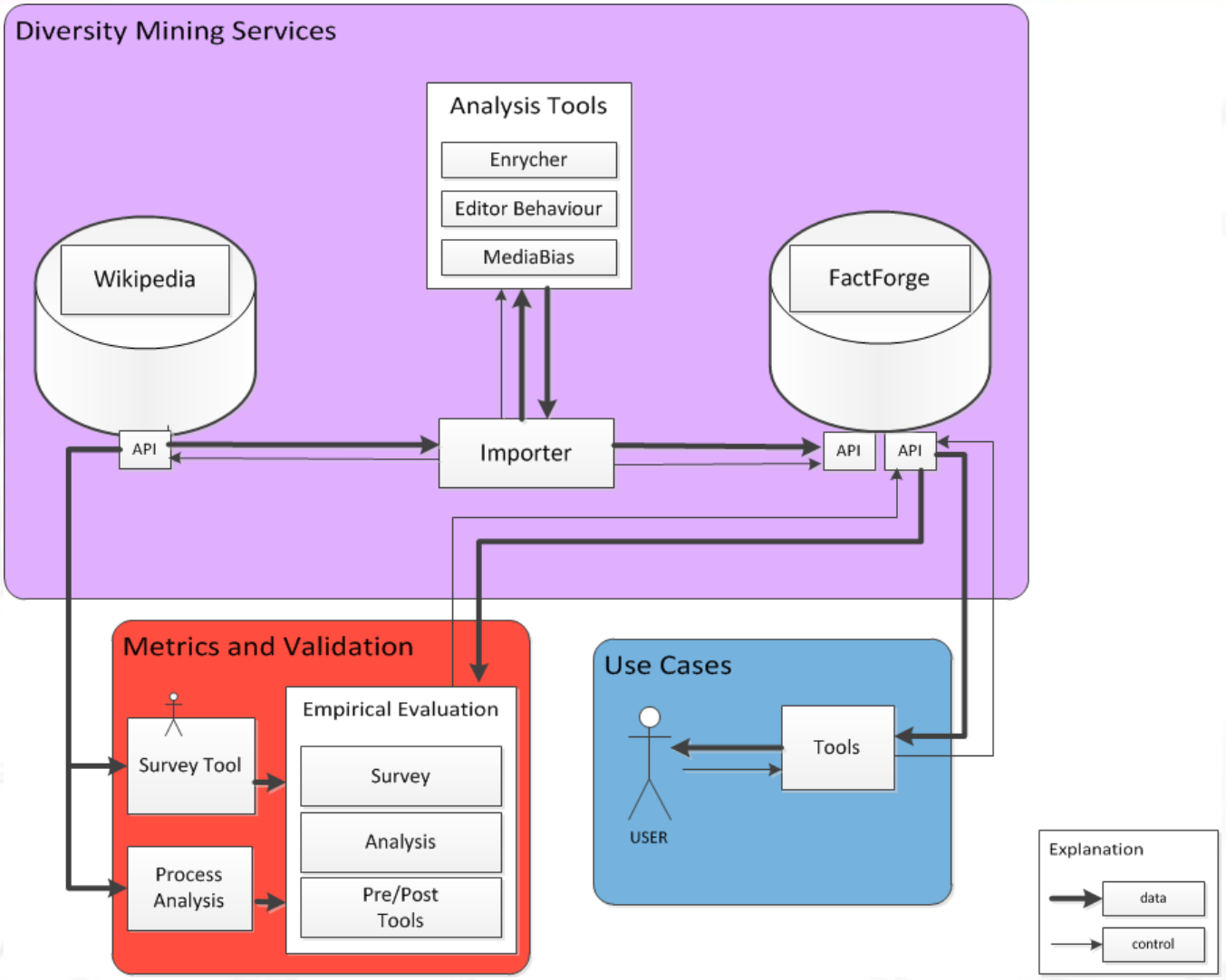


Overview of solutions including reuse of R&D results



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Opinionated Wikipedia Articles

JSI

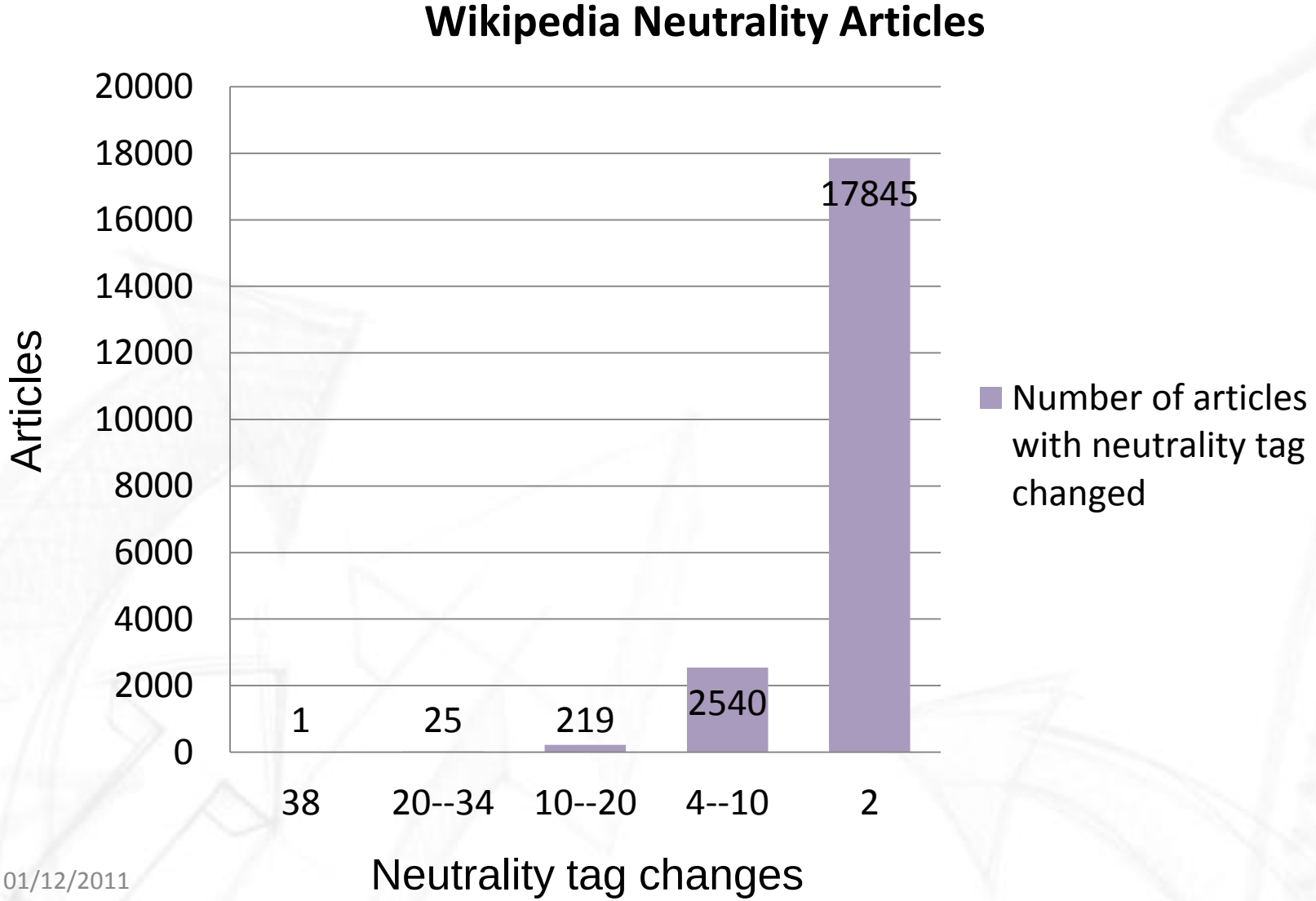
Opinionated Wikipedia articles

- Analyzing opinionated Wikipedia articles
  - With the neutrality template set
  - 2 versions of the article (old and new in the dataset)
  - Condition: neutrality template not reset for 7 days after deletion
  - ~ 2GB xml file with opinionated / non-opinionated articles

  - 20,630 opinionated articles
  - 18,719,338 articles in total

  (these counts exclude Wikipedia infrastructure articles)

Opinionated Wikipedia articles



Top 20 Articles Based on the Neutrality Tag Change

- September 11 attacks - 38
- George W. Bush - 34
- Intelligent design - 32
- Global warming - 32
- Race and intelligence - 28
- Circumcision - 28
- Armenian Genocide – 28
- Macedonians (ethnic group) - 26
- Iraq War - 26
- The Holocaust - 24
- Muhammad - 24
- Jesus - 24
- Israel - 24
- Arab Israeli conflict - 24
- Zionism - 22
- Srebrenica massacre - 22
- Islamophobia - 22
- Homeopathy - 22
- Holocaust denial - 22
- Evolution - 22

Opinionated Wikipedia articles

Learning opinionated Wikipedia articles

Wikipedia Opinionated Dataset

enrycher
WHAT ARE YOU WRITING ABOUT?

Opinionated Topics (DMOZ)

Article Reference Changes

Entities

Links to Other Articles

Part of Speech Tags

…

Learning Features

Learning opinionated Wikipedia articles

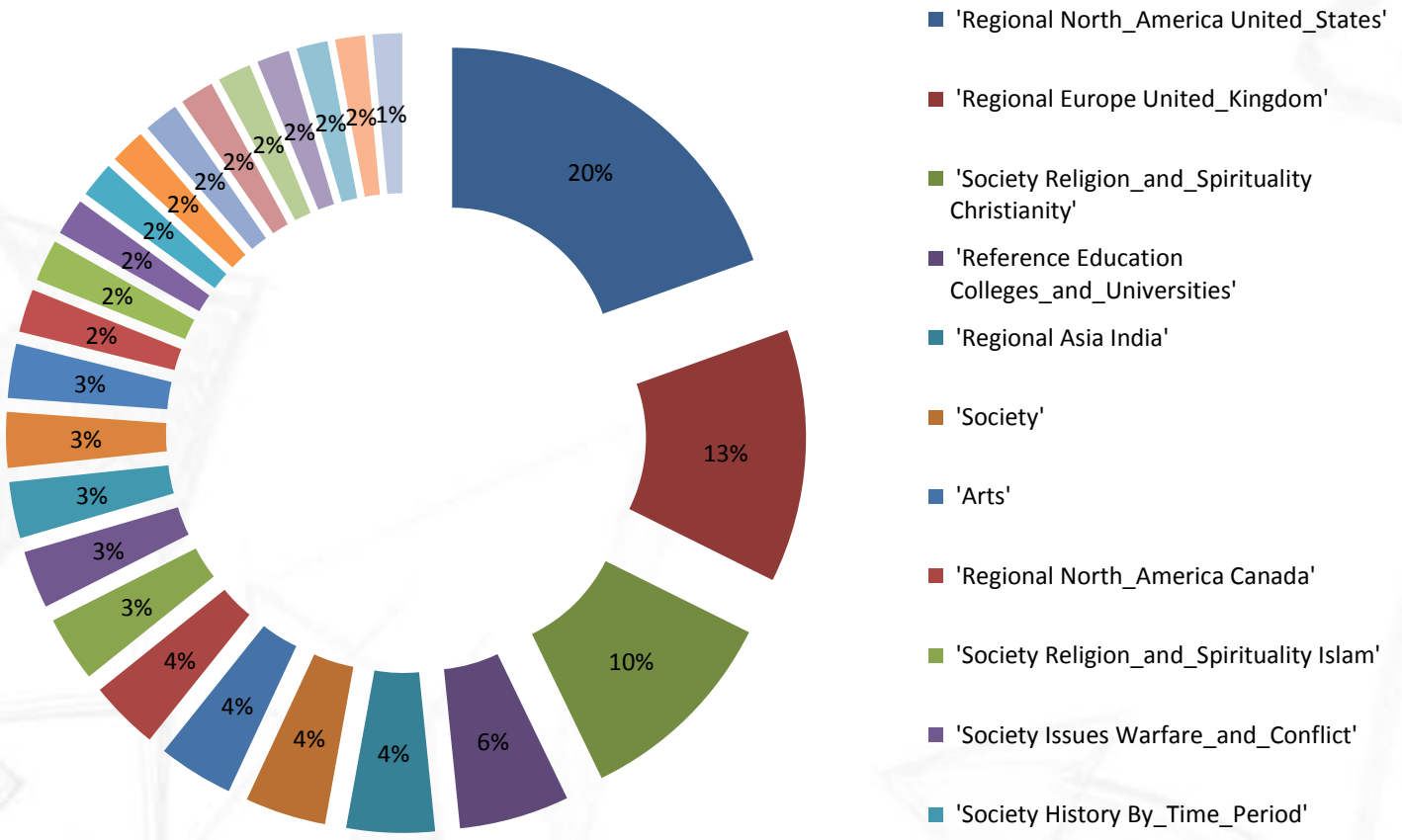
Wikipedia Opinionated Dataset

enrycher
WHAT ARE YOU WRITING ABOUT?

Opinionated Topics (DMOZ)

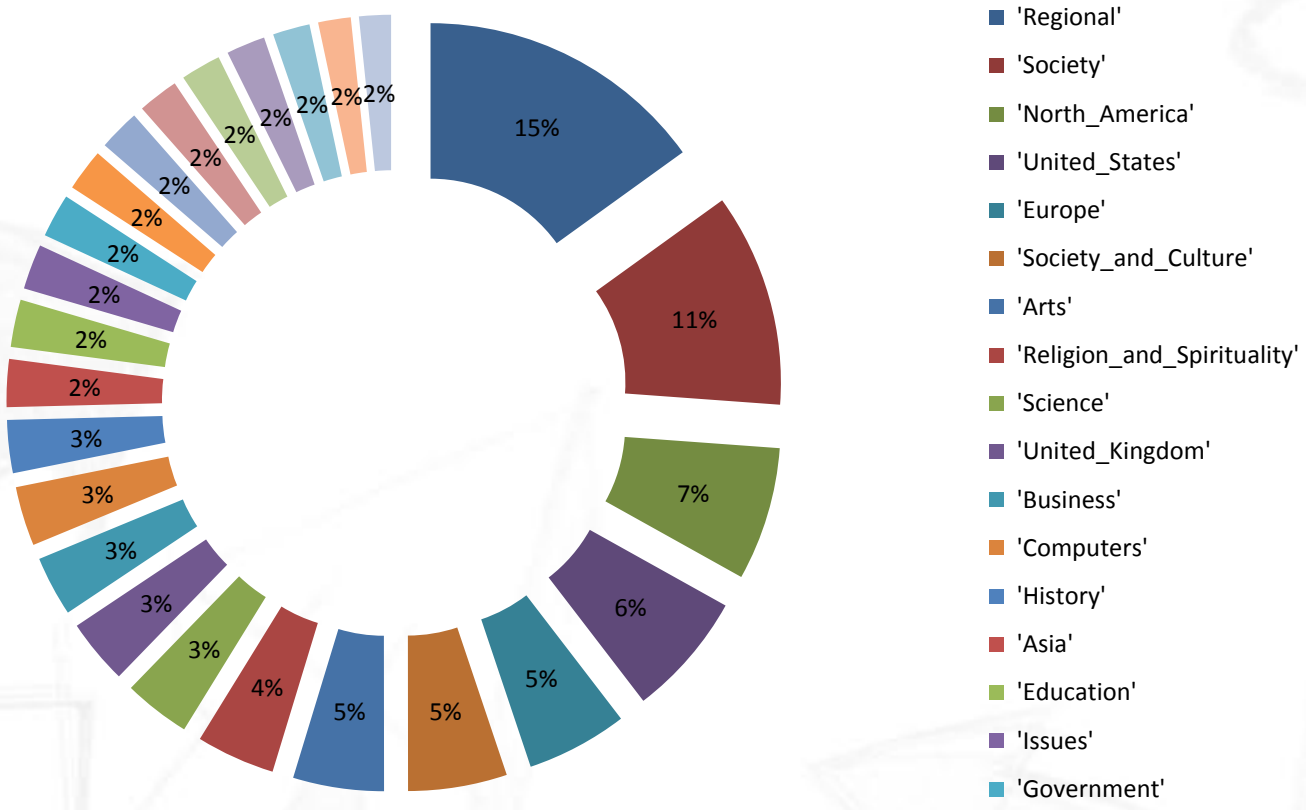
- ~ 10,000 opinionated articles
- Applied Enrycher services:
  - POS tagging
  - DMOZ
    - Topics
    - Keywords

Opinionated topics



* Keywords for which the number of article changes is greater than 500

Opinionated keywords



* Keywords for which the number of article changes is greater than 500

Examples of changes within a topic

- **keyword-based changes**:
  - article - Megleno-Romanians
  - topics - Regional, Europe, Romania, Society_and_Culture, Organizations
  - […] Vlahi is a **disputed** exonym […]
- **reference additions**:
  - article - Soviet occupation of Romania
  - topics - Regional, Europe, Romania
  - […] Sergiu Verona, "Military Occupation and Diplomacy: Soviet Troops in Romania, 1944-1958", Duke University Press […]

Learning opinionated Wikipedia articles

- Next steps in learning opinionated articles:
  - extract the remaining learning features – entities, article references, article links, etc.
- Dealing with scale:
  - process whole Wikipedia articles
    - ~ 30 TB of data
  - extract Wikipedia social network
  - obtain a Wikipedia static and dynamic profile for each contributor/community

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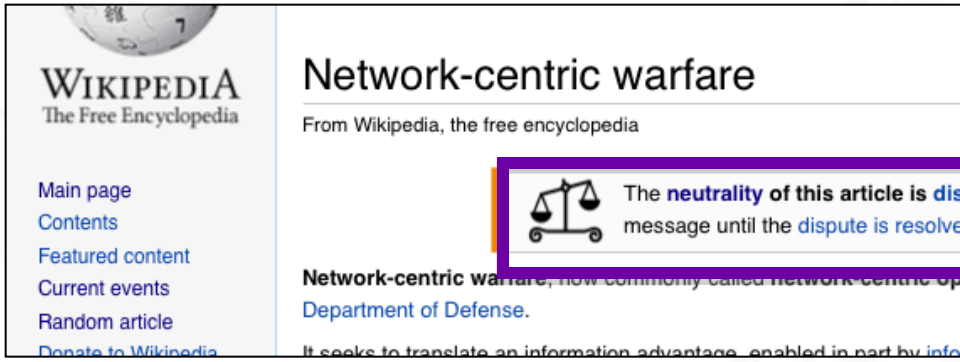
Detecting bias-inducing editor behavior to generate warnings

KIT

Bias detection via editing behavior in Wikipedia

- Relevant use case:
  - UC1: Displaying warnings when detecting patterns of bias
- Intention:
  - Help in understanding and curing behavioral causes for bias



- Needed:
  - Understanding and prediction of socio-technical mechanisms leading to biases

Bias warning examples

Examples for behavioural-pattern-based warnings presented to users:

•*Concentration:* **98%** of the article were written by **3%** of the active editors in the article. The resulting concentration coefficient is of **9 of 10**. Usual coefficient for similar articles is **5 of 10**. Find out what that means and what you can do to help.

•*Homogeneity:* We detected a **very fractioned** editor structure with **80% of non-vandal edits being reverts** and **3 major editor camps**. Click here for explanation and visualization. Find out what that means and what you can do to help.

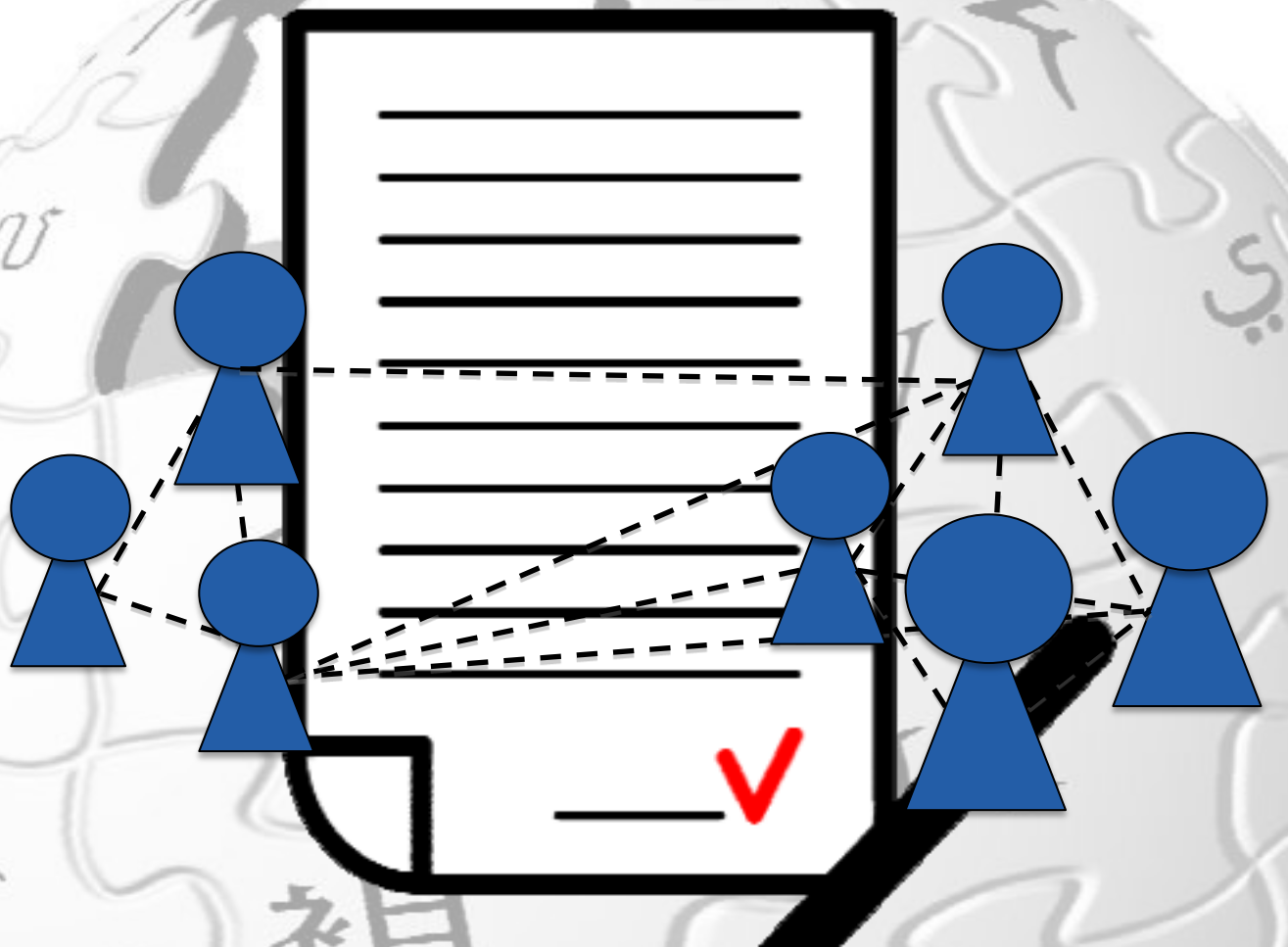
Identify crucial editing patterns

- Research review
  - Identified existing patterns of socio-technical mechanisms potentially influencing bias and diversity
    - Social proof and consolidation
    - Ownership behavior
    - Opinion camps and editor drop-out
    - Lack of boldness and useful conflicts
    - etc.

  → see paper “Towards a diversity-minded Wikipedia” and extended literature survey to be published

Identify crucial editing patterns

Example patterns: Opinion Camp drop-out



Extract useful data to enable modeling

- Define metrics to find patterns in the data typical for the mechanisms
  - For example: A dense core group of editors in an article's social network structure

→How to get the data for using these metrics?

Reverts as the basis for accurately modeling user behavior in Wikipedia

- Most telling: editors' actions which are *related* to each other
  - Reverting is undoing; contradicting actions perceived as false
  - Inferences possible without knowing meaning
    - Example:

Edit No.	Content	Added/deleted content
1	"zzz"	
2	"zzz yyy"	+"yyy"
3	"zzz"	-"yyy"

→ Foundation for the search *for* and analysis *of* most of the recurring editing patterns that are typical for biased articles

State-of-the-art revert detection

Simple identity revert method using MD5 hashes

Edit Number	Article content	Words deleted/added (actions taken) by edit	MD5 Hash (simplified)
1	Zero	(ignored for this example)	Hash1

Deficiencies of the state-of-the-art

- Partly reverts exist
- Reverts do not always produce duplicate revisions

Edit Number	Revision content	Words deleted/added (actions taken) by edit	MD5 Hash (simplified)	Detected identic and reverted revisions
1	Zero	(ignored for this example)	Hash1	Like revision 5
2	Zero Apple Banana	+“Apple” +”Banana”	Hash2	Reverted by revision 5
3	Zero Apple Banana Coconut Date	+”Coconut” +”Date”	Hash3	Reverted by revision 5
4	Zero Coconut Date	-“Apple” - “Banana”	Hash4	Reverted by revision 5
5	Zero	-“Coconut” - “Date”	Hash1	Like revision 1 → revert of revisions 2,3,4

An improved revert detection method

- A revert is defined by Wikipedia as an action of an editor "undoing the effects of one or more edits" and "(m)ore broadly, reverting may also refer to any action that in whole or in part reverses the actions of other editors."

- Clear definition, taking into account Wikipedia definition, known intentional behavior & available data:

  An edit A is reverted if all of the actions of that edit are completely undone in one subsequent edit B. Edit B has then reverted edit A.

Improved method - implementation

Edit No.	Revision content	Words deleted/added (actions taken) by edit	MD5 Hash (simplified)
1	Zero	(ignored for this example)	Hash1
2	Zero Apple Banana	+“Apple” +”Banana”	Hash2
3	Zero Apple Banana Coconut Date	+”Coconut” +”Date”	Hash3
4	Zero Coconut Date	-“Apple” - “Banana”	Hash4
5	Zero	-“Coconut” - “Date”	Hash1
6	Zero Fig	+”Fig”	Hash5
7	Zero Grape	+”Grape”	Hash6
8	Zero Huckleberry	-“Fig” -“Grape” +”Huckleberry”	Hash7

Improved method - results

- Survey evaluation: Accuracy is much higher for new method
  - Significantly less false positives
  - Can accurately distinguish between full and partial reverts
- 12% more reverts detected with the new method than with identity reverts
  - Up to 50% more in short articles
- First revert detection evaluated to work according to the Wikipedia definition and to editors' idea of a revert → better reflects actual behavior and relations → key to precisely modeling the social editing dynamics

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Mock-ups – tools for the case study

Tools to support readers/ editors/ administrators:

- Quality overview of Wikipedia articles for **readers**
- Generation of working lists
  - for Wikipedia **editors** concerning problems of the content
  - Wikipedia **administrators** concerning editor behaviour and interaction

Mock-ups (1) - QAO

Wikipedia Quality Assessment

General:

Status: Featured article since 15/05/2010
Number of edits: 3588
Number of unique editors: 245
First edit: 04/03/2006
Recent edit: 14/10/2011, 17:46
Number of references: 27

↕ less...

Further Assessment:

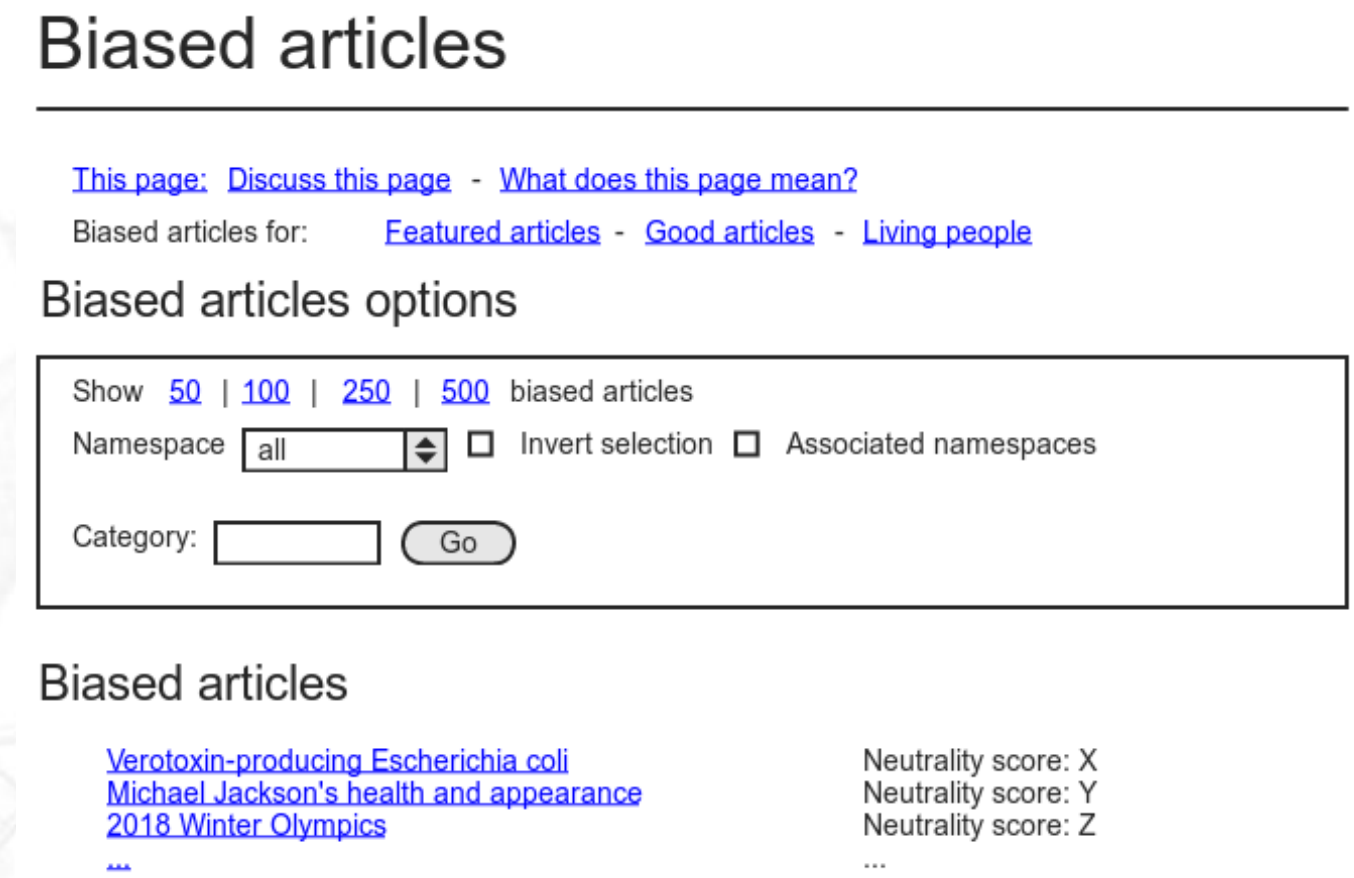
Quality metric I: 0,7
Quality metric II: 5,3
Quality metric III: 4,0
Article feedback score: View page ratings

↕ less...

RENDER Analysis:

Fact coverage: View page ratings
Neutrality: View page ratings
Timeliness: View page ratings

Mock-ups (2) - working lists



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Outlook (1)

- Testing and evaluation of R&D results for Wikipedia
- Development of prototypes for user supporting tools using these results
- Evaluating and testing of these prototypes with Wikipedia users, in the first step of the German community
- Collecting feedback and building up guidelines

Outlook (2)

Roadmap to develop supporting tools for Wikipedia users:

- **M 18** • Development of prototypes
- **M 20** • Testing the prototypes with a small user group like a German WikiProject
- **M 22** • Adjusting and finalising
- **M 24 +** • Apply to other language versions

Questions & comments

Thanks