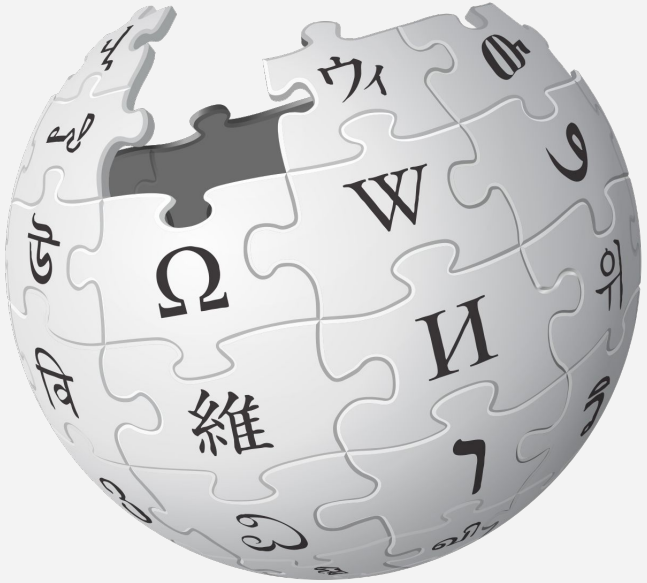
Wiki Addition Viewer: An extension to add insights to your Wikipedia experience

Shirin, PJ, Luisa, Etienne, Duc

2022-2023 Comps

Advisor: Sneha Narayan



01 Project Overview and Motivation

Introduction to our comps project, use cases, and motivation

02 Use Cases

Going through how our extension can be useful

03 Background

Looking into past examples

04 Architecture

Diagram of our extension's design, Wikipedia APIs

05 Features

Graph, highlighting, text matching

06 User Study

We conducted 2 user studies

07 Live Demo

It works!

08 Future Improvement

Data interpretation, authorship, talk page

09 Conclusion

Performance, acknowledgements, and references

01
Project Overview and Motivation

Carleton College

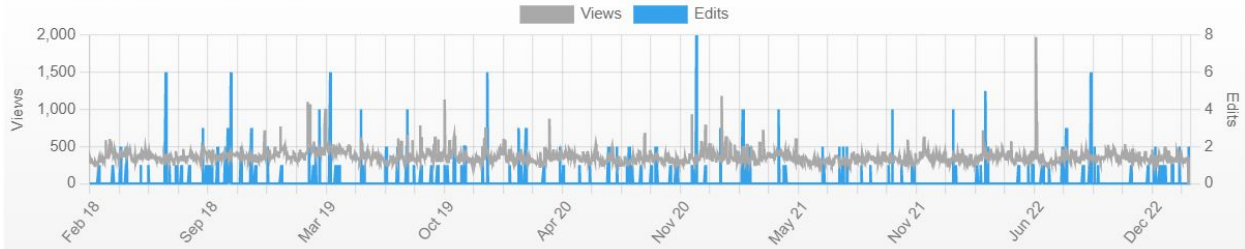
12 languages

Article Talk | Read Edit View history

From Wikipedia, the free encyclopedia

ALL 5Y 3Y 1Y 6M 3M

Coordinates: 44°27′43″N 93°9′13″W



4/27/2018 Highlight Changes

We highlighted **111** changes which represent additions to the page between 4/27/2018 (the closest revision to your chosen time) and the present day. Some of the changes were purely formatting or deletions and, therefore, are not highlighted.

This article is about the college in Minnesota, United States. For the university in Ontario, Canada, see Carleton University.

Carleton College (/ˈkɑːrltɪn/ *KARL-tin*) is a private liberal arts college in Northfield, Minnesota.[7] Founded in 1866, it had 2,105 undergraduate students and 269 faculty members in fall 2016. The 200-acre main campus is between Northfield and the 800-acre Cowling Arboretum, which became part of the campus in the 1920s.[8]

Admissions is highly selective with an acceptance rate of 16.5% in 2022,[9] and Carleton is annually ranked near the top in most rankings of liberal arts schools. Carleton is particularly renowned for its undergraduate teaching, having been ranked #1 in Undergraduate Teaching by U.S. News & World Report for over a decade.[10]

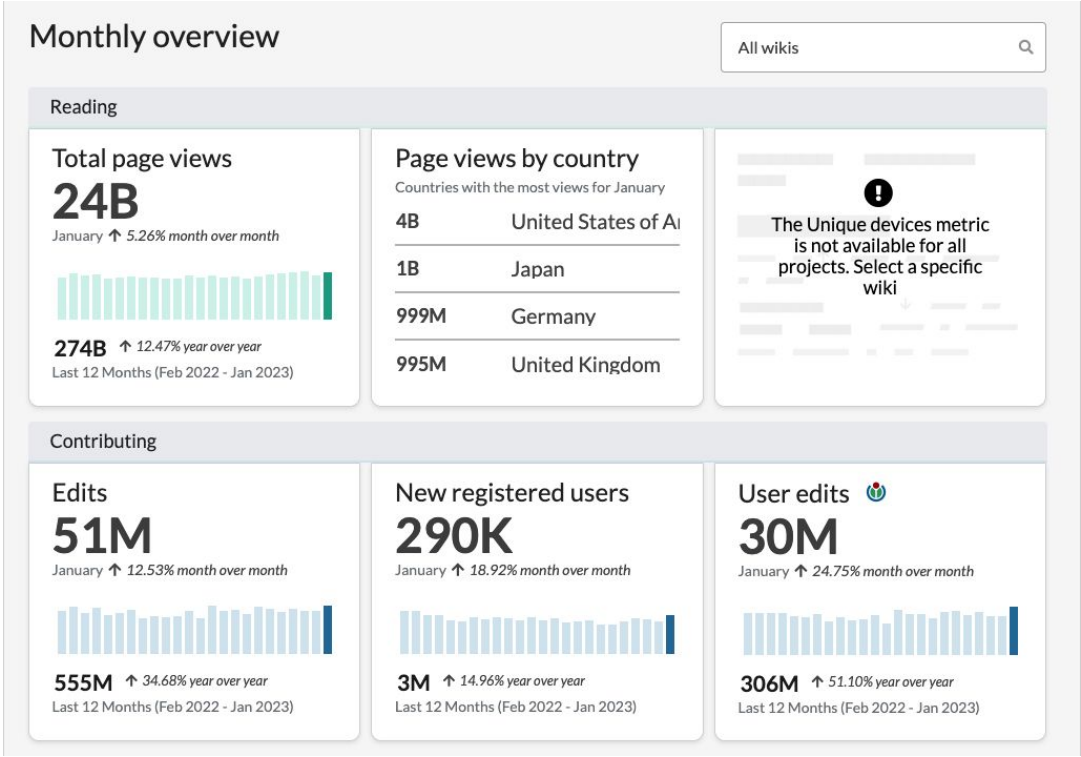
Students can choose courses from 33 major programs and 31 minor programs and have the option to design their own major. Carleton's varsity sports compete at the NCAA Division III level in the Minnesota

Carleton College

Latin: *Collegium Carleton*

Former names Northfield College (1866–1871)

Why Choose Wikipedia?

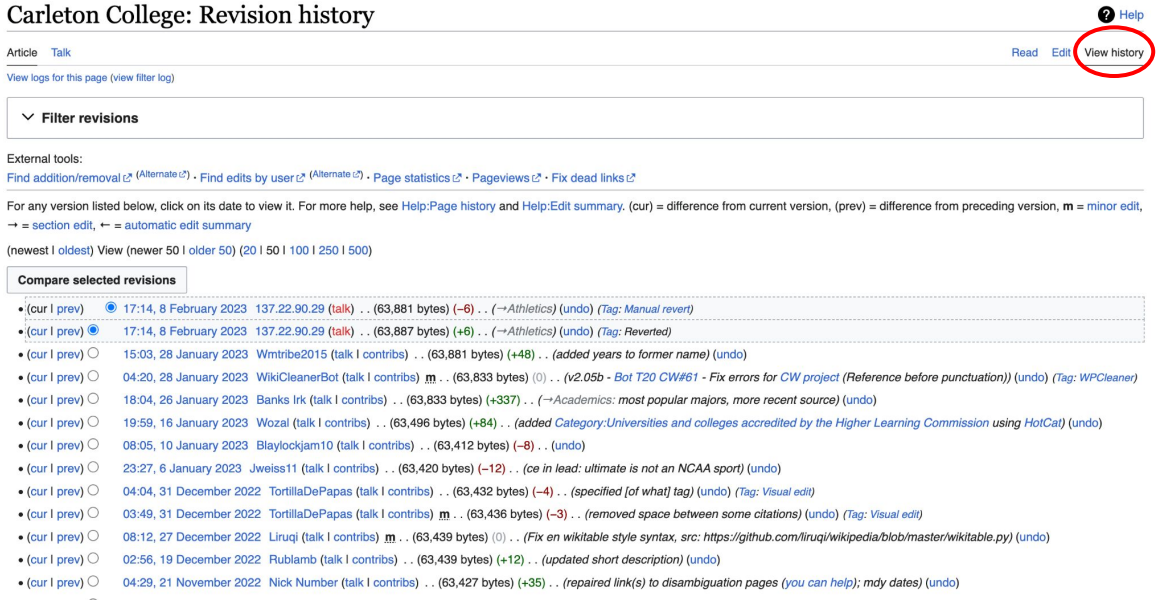


From Wikimedia Statistics

History Page

Problem:

- Not visible to readers
- Not intuitive (very hard to make sense of the revisions)



Carleton College: Revision history

Help

Article Talk Read Edit View history

View logs for this page (view filter log)

Filter revisions

External tools:

Find addition/removal (Alternate) · Find edits by user (Alternate) · Page statistics · Pageviews · Fix dead links

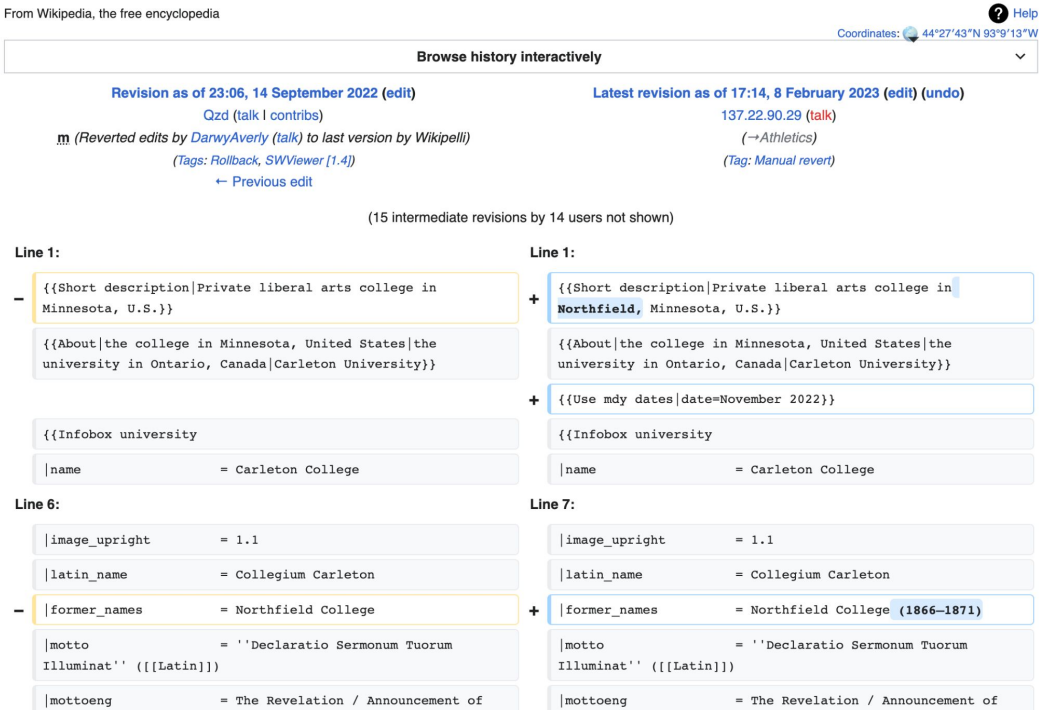
For any version listed below, click on its date to view it. For more help, see Help:Page history and Help:Edit summary. (cur) = difference from current version, (prev) = difference from preceding version, **m** = minor edit, → = section edit, ← = automatic edit summary

(newest | oldest) View (newer 50 | older 50) (20 | 50 | 100 | 250 | 500)

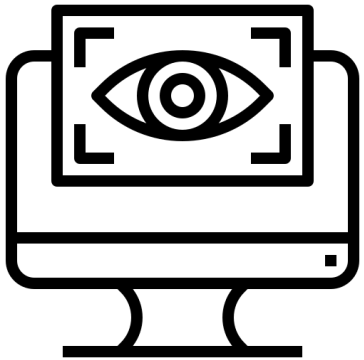
Compare selected revisions

- (cur | prev) 17:14, 8 February 2023 137.22.90.29 (talk) . . (63,881 bytes) (–6) . . *(→Athletics)* (undo) *(Tag: Manual revert)*
- (cur | prev) 17:14, 8 February 2023 137.22.90.29 (talk) . . (63,887 bytes) (+6) . . *(→Athletics)* (undo) *(Tag: Reverted)*
- (cur | prev) 15:03, 28 January 2023 Wmtribe2015 (talk | contribs) . . (63,881 bytes) (+48) . . *(added years to former name)* (undo)
- (cur | prev) 04:20, 28 January 2023 WikiCleanerBot (talk | contribs) **m** . . (63,833 bytes) (0) . . *(v2.05b - Bot T20 CW#61 - Fix errors for CW project (Reference before punctuation))* (undo) *(Tag: WPCleaner)*
- (cur | prev) 18:04, 26 January 2023 Banks Irk (talk | contribs) . . (63,833 bytes) (+337) . . *(→Academics: most popular majors, more recent source)* (undo)
- (cur | prev) 19:59, 16 January 2023 Wozal (talk | contribs) . . (63,496 bytes) (+84) . . *(added Category:Universities and colleges accredited by the Higher Learning Commission using HotCat)* (undo)
- (cur | prev) 08:05, 10 January 2023 Blaylockjam10 (talk | contribs) . . (63,412 bytes) (–8) . . (undo)
- (cur | prev) 23:27, 6 January 2023 Jweiss11 (talk | contribs) . . (63,420 bytes) (–12) . . *(ce in lead: ultimate is not an NCAA sport)* (undo)
- (cur | prev) 04:04, 31 December 2022 TortillaDePapas (talk | contribs) . . (63,432 bytes) (–4) . . *(specified [of what] tag)* (undo) *(Tag: Visual edit)*
- (cur | prev) 03:49, 31 December 2022 TortillaDePapas (talk | contribs) **m** . . (63,436 bytes) (–3) . . *(removed space between some citations)* (undo) *(Tag: Visual edit)*
- (cur | prev) 08:12, 27 December 2022 Liruqi (talk | contribs) **m** . . (63,439 bytes) (0) . . *(Fix en wikitable style syntax, src: https://github.com/liruqi/wikipedia/blob/master/wikitable.py)* (undo)
- (cur | prev) 02:56, 19 December 2022 Rublamb (talk | contribs) . . (63,439 bytes) (+12) . . *(updated short description)* (undo)
- (cur | prev) 04:29, 21 November 2022 Nick Number (talk | contribs) . . (63,427 bytes) (+35) . . *(repaired link(s) to disambiguation pages (you can help); mdy dates)* (undo)

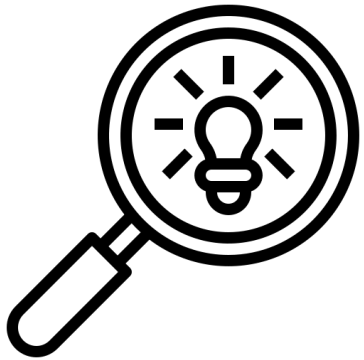
History Page (Compare Revision)



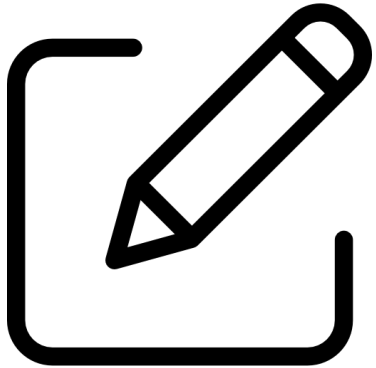
Goals of Our Extension



Visualize



Explore



Interact

02

Use Cases

New Changes

Directs attention to new changes on the page from highlights:

Users can identify any new changes made on the page.

Personal life [edit]

She has close friendships with Jordyn Woods, Normani, Winnie Harlow, and Ryan Destiny, according to *Essence*.[27]

Relationships [edit]

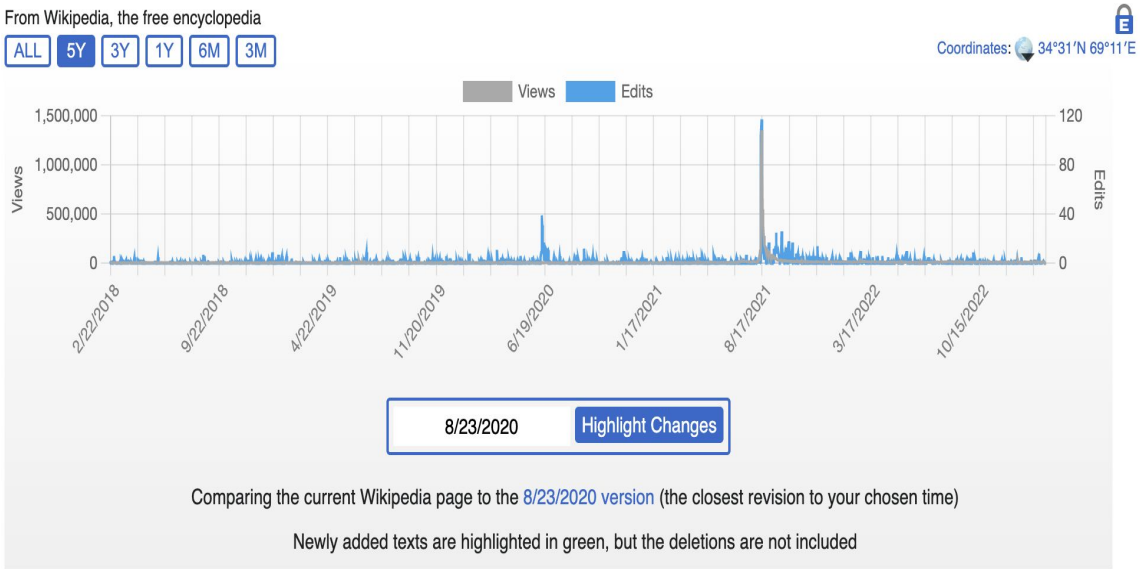
In January 2016, she began dating Dutch yute Memphis Depay. They were engaged in June 2017[28] and separated by 2018.[29]

Following the end of her engagement to Depay, Harvey was briefly linked to British racing driver Lewis Hamilton and R&B singer Trey Songz. She was later linked with the rapper Future; the pair confirmed their relationship in January 2020, and broke up in August of that year.[30] Future later took aim at Harvey on his featured verse on the song "Maybach" by 42 Dugg, with the lyrics "Magic City, I'm the owner. Tell Steve Harvey, I don't want her".[31]

In November 2020, Harvey began dating actor Michael B. Jordan.[32] In December 2021, Jordan declared in an interview with *The Hollywood Reporter*, that he "finally found what love was" with Harvey.[33] In June 2022, it was reported that the couple had ended their relationship.[34]

Harvey confirmed that she is dating actor Damson Idris, in January 2023.[35]

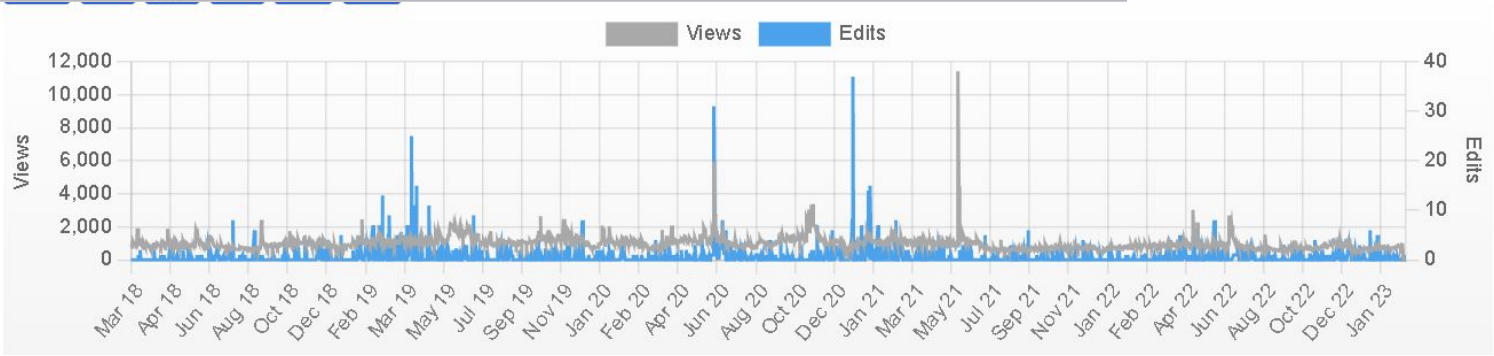
Make Connections between Peaks on Graph and Current Affairs



This is the Wikipedia page for Afghanistan. Here, we can see that on 17th August, 2021, the page received an unprecedented amount of views and edits.

Updating on current affairs

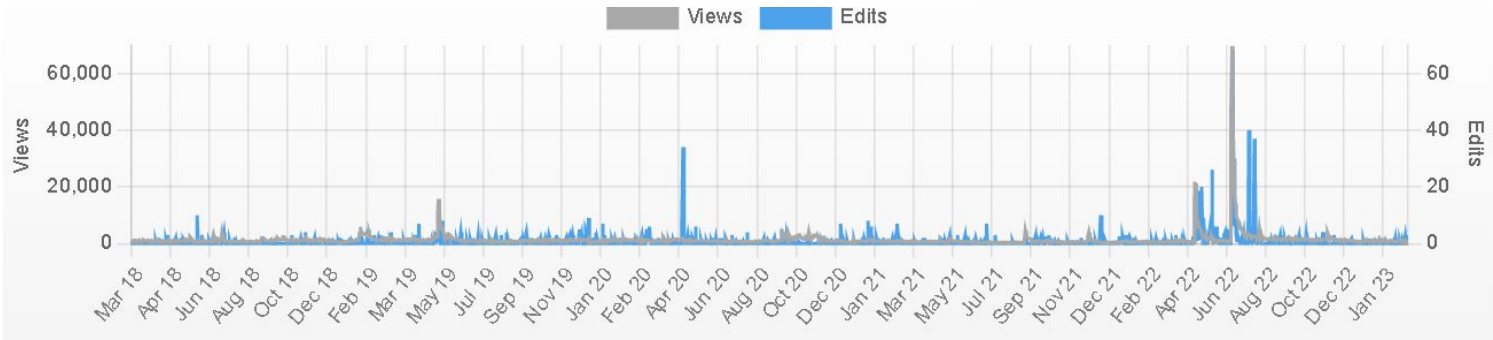
LGBT rights in the United States



On January 25, 2021, the new Biden Administration revoked Trump's ban through an executive order, reverting the policy regarding Transgender people and military service to what it was in 2016 under the Obama Administration. Transgender personnel are now allowed to serve in the military under varying conditions and requirements. On April 30, 2021, the United States Department of Defense enacted a new policy calling for better medical access and gender marker assistance to transgender people serving in the United States Military.[88][89]

Updating on current affairs

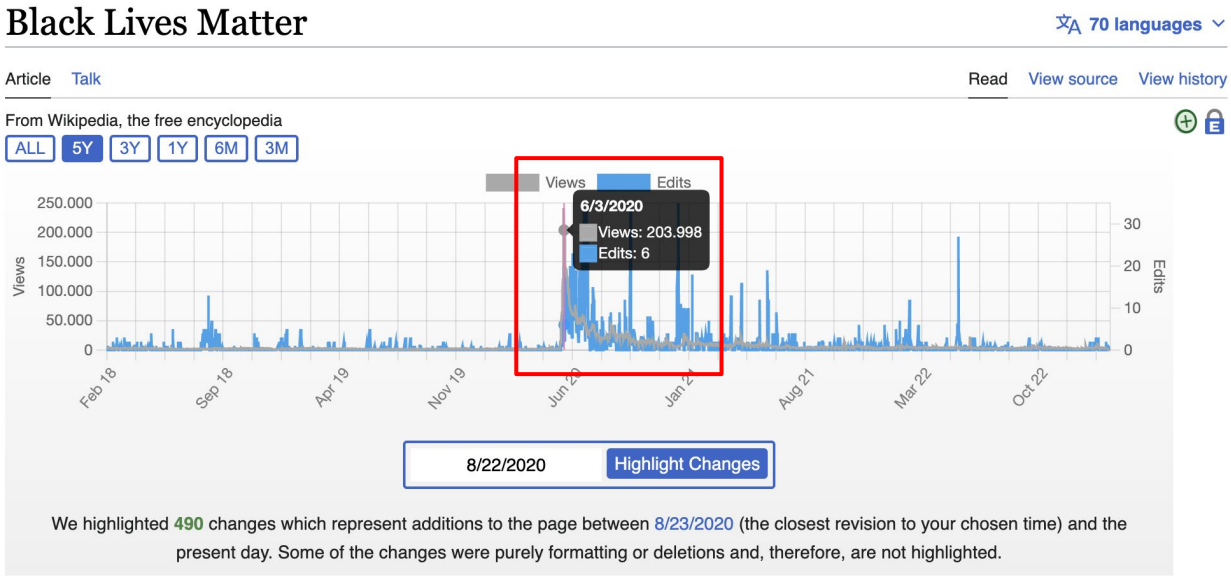
Abortion in the United States



On January 28th, 2023, the Minnesota state Senate passed a bill guaranteeing women's rights to abortion and other reproductive medicine which was signed into law on January 31st. The bill prohibits state and local governments from attempting to restrict access to sterilization or prenatal care, while also requiring contraceptive cost compensation.[202][203]

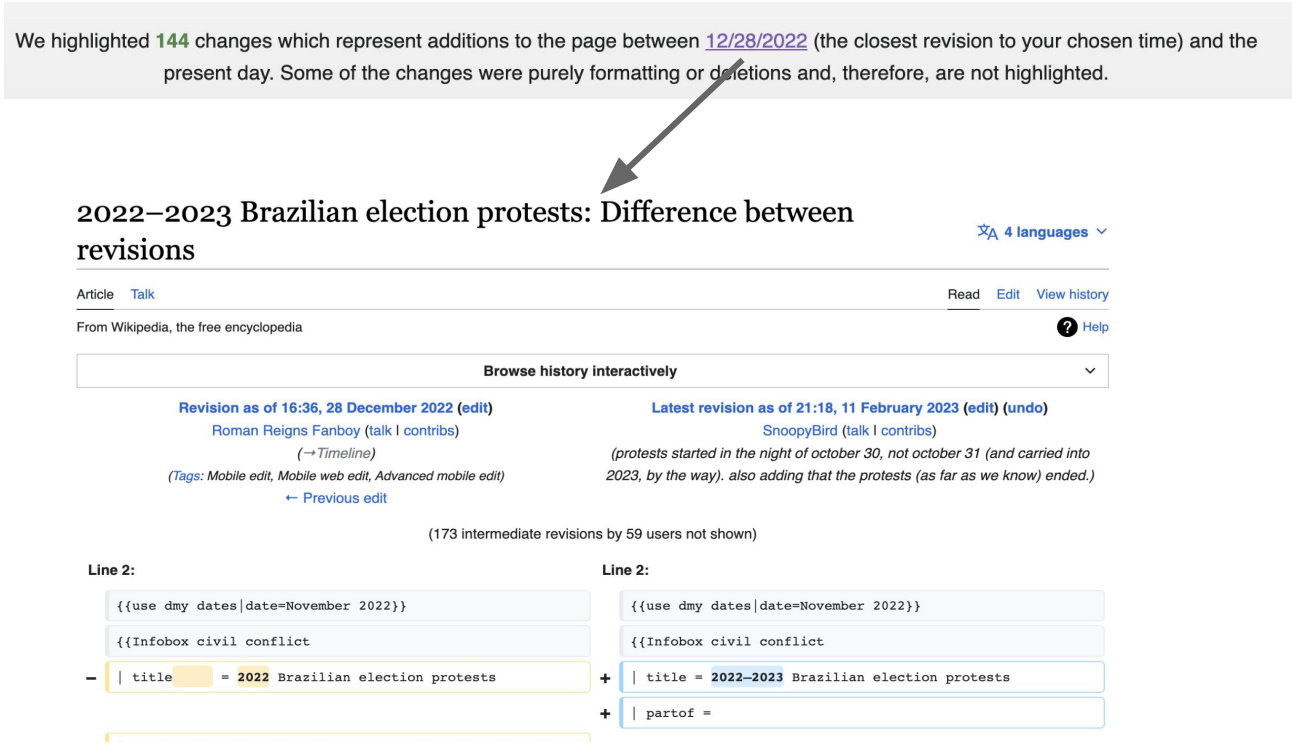
View and Edit History

Shows insight on edit and view history on the graph



Compare Differences Between Revisions

Provides a more interactive way to get to compare differences between revision page



03

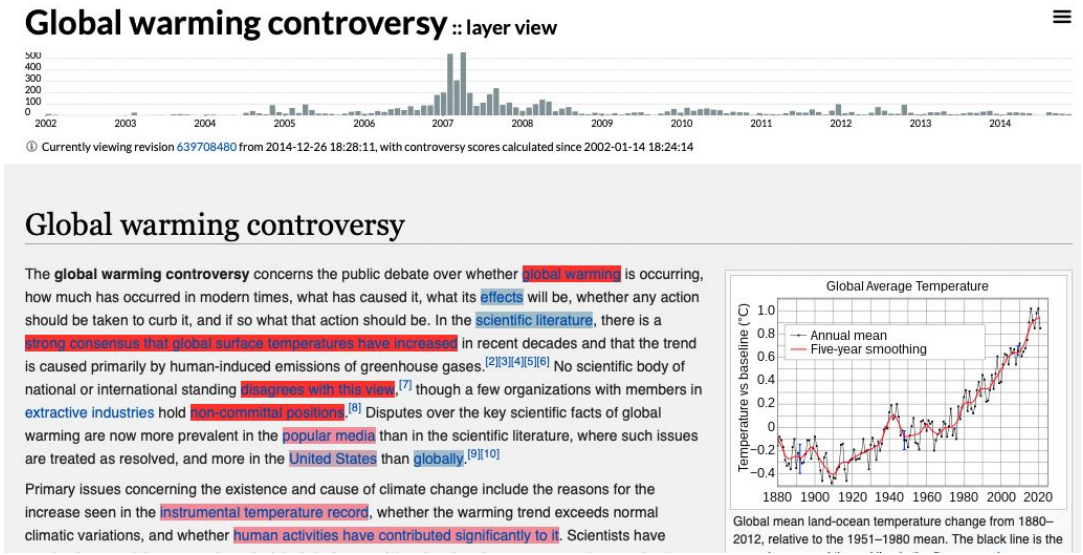
Background

Wiki History Flow

- Visualizes edit history from a given wikipedia article
- No strong connection to the text on the page

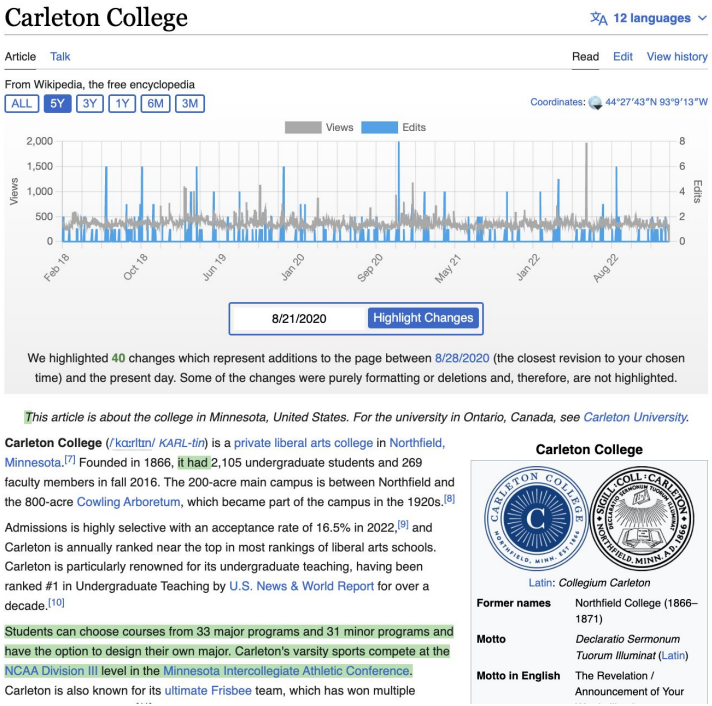
Contropedia

- Highlights links based on controversy metrics
- Has non-interactive time histories of edit history
- Only highlight links
- In a sandbox with example articles



Our Extension

- Shows an interactive time series for views and edits
- Highlights text that has been added between current and a given time
- Links people to the revision comparison page
- Works on any English Wikipedia page in real time



04

Architecture

Browser Extension

General idea

- Background scripts - persisting scripts (server)
- Content scripts - javascript inserted into the current webpage
- Popup - Toolbar button page
- Options page
- Web accessible resources - files your extension can access like images and videos

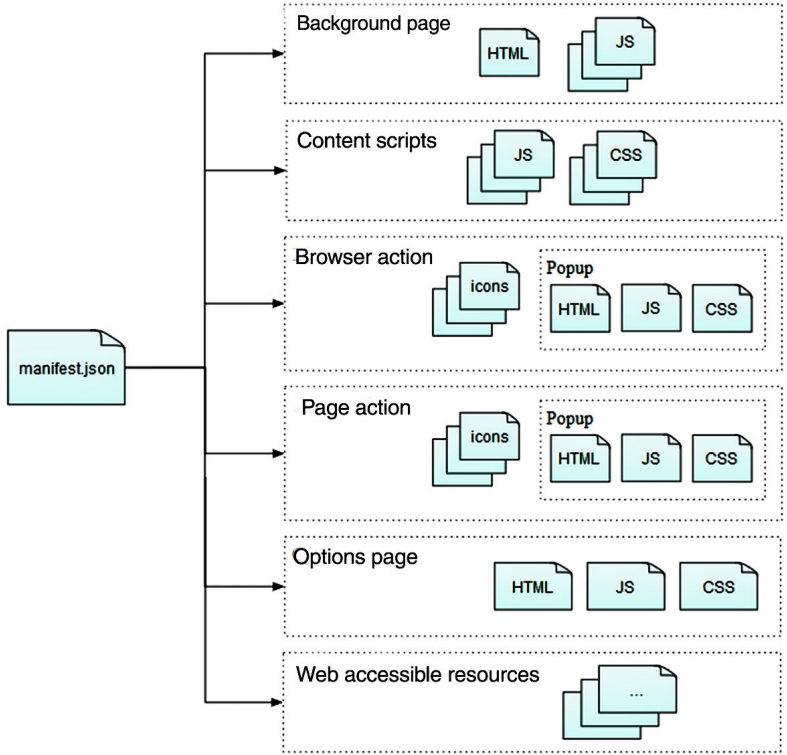


Diagram - On Page Load

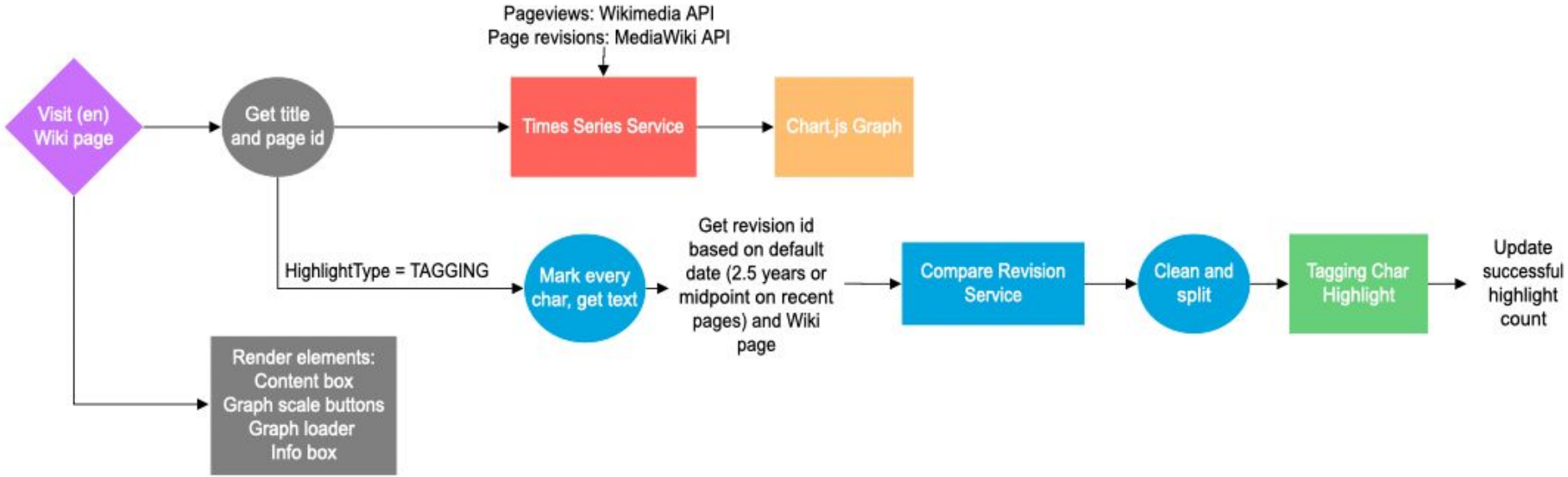
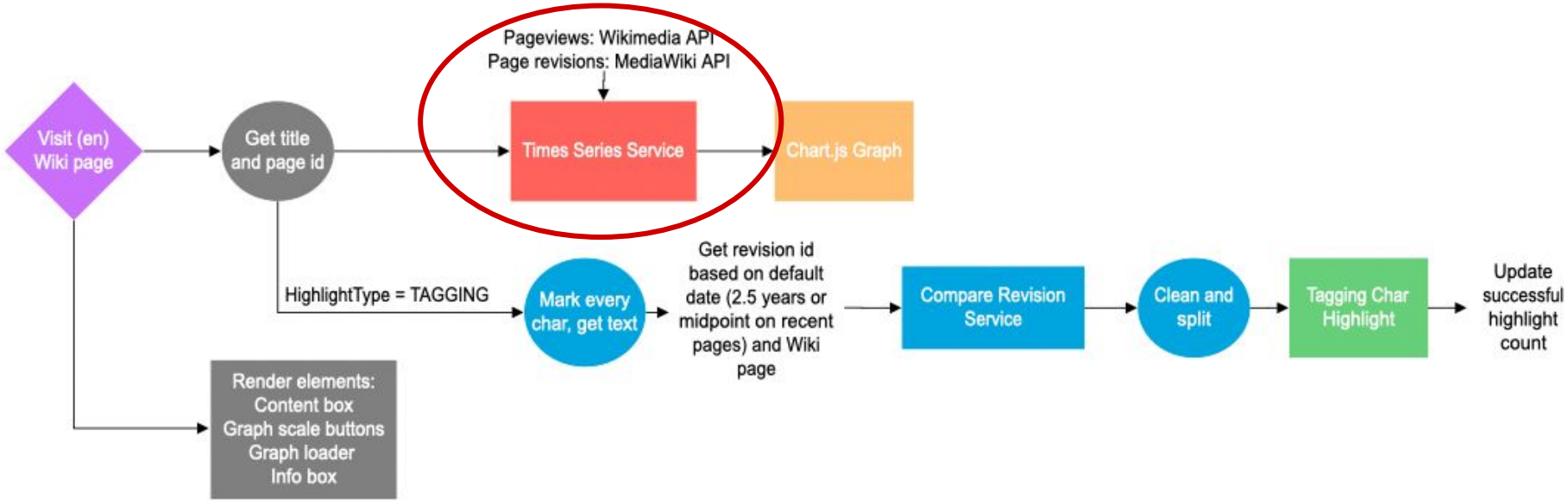
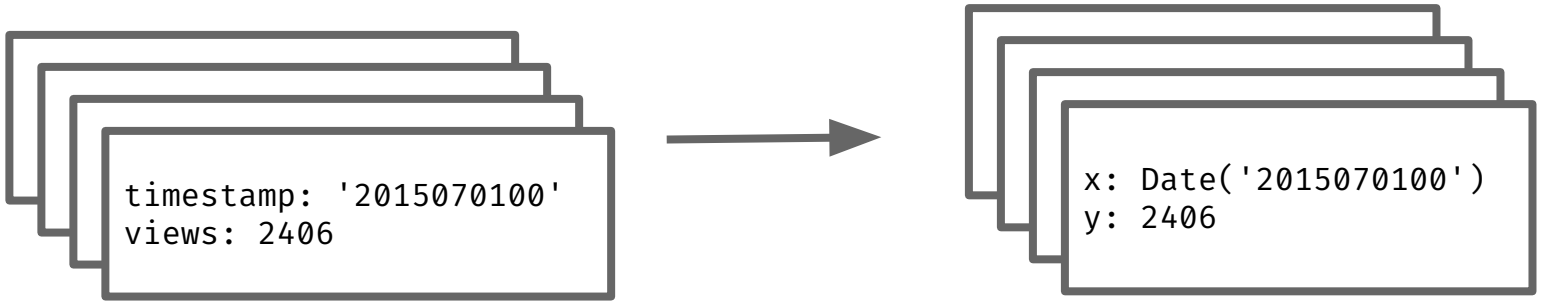


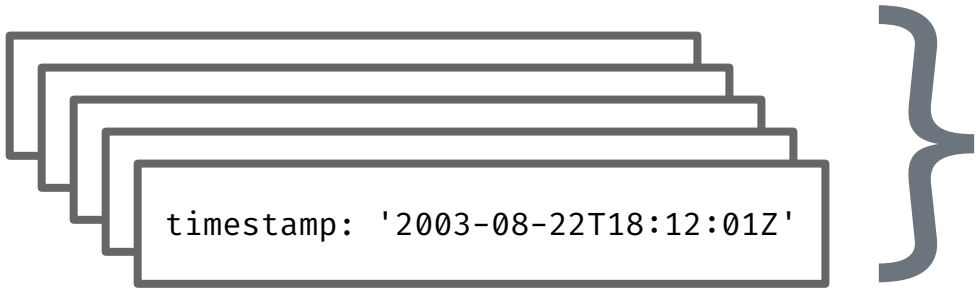
Diagram - On Page Load

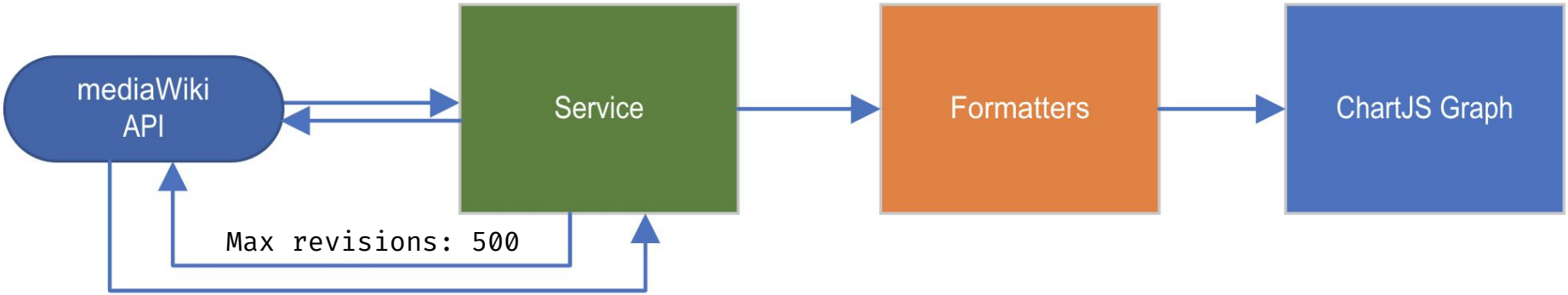


Time Series Service (PageViews)

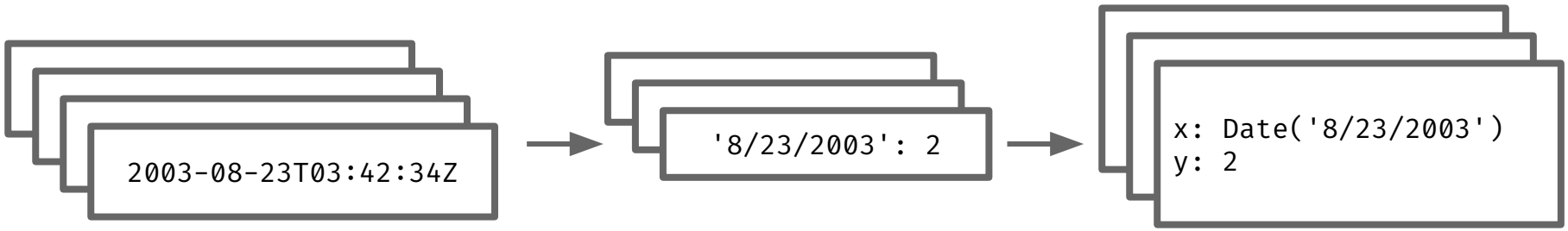


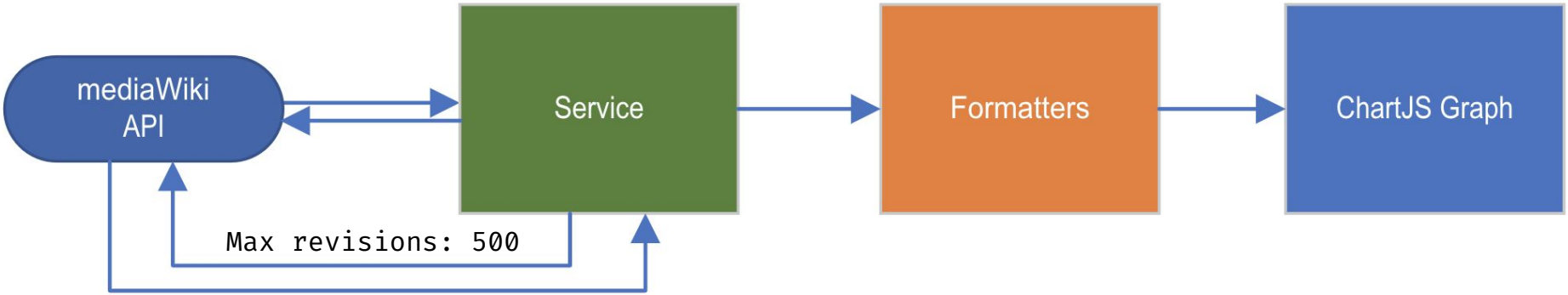
Time Series Service (Revisions)



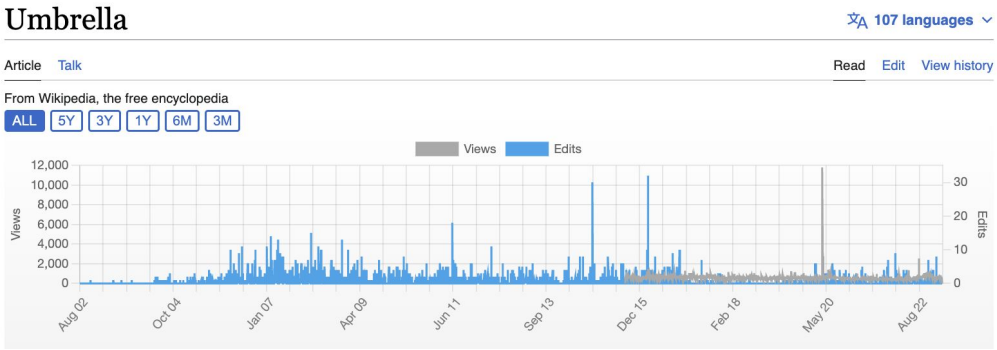


Time Series Service (Revisions)

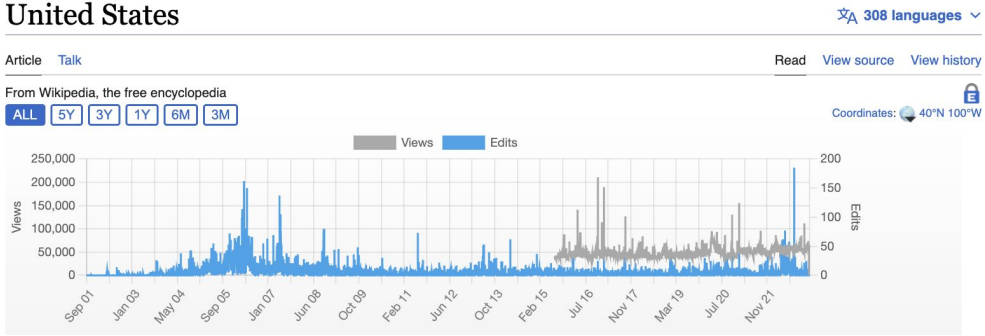




Is the 500-Revision Limit a Big Deal?

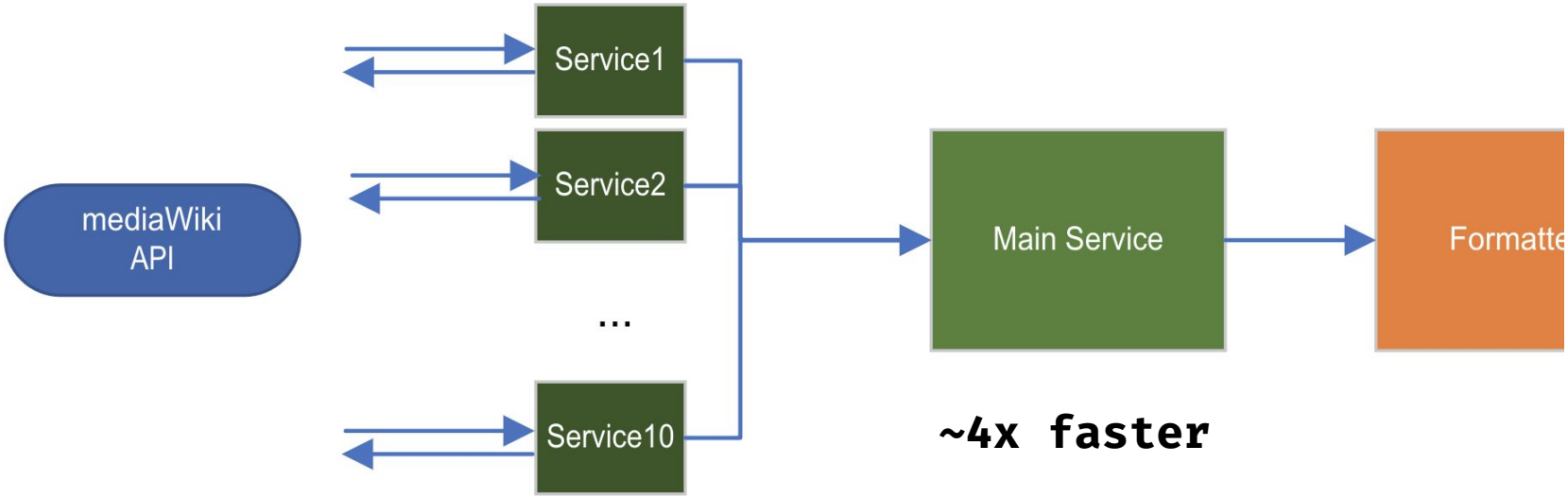


2,914 Revisions
(6 API calls)

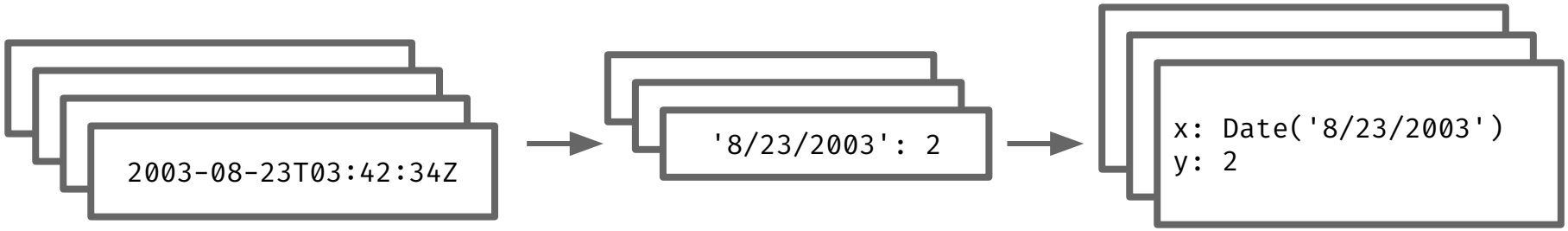


46,533 Revisions
(94 API calls)

Is the 500-Revision Limit a Big Deal?



Time Series Service (Revisions)



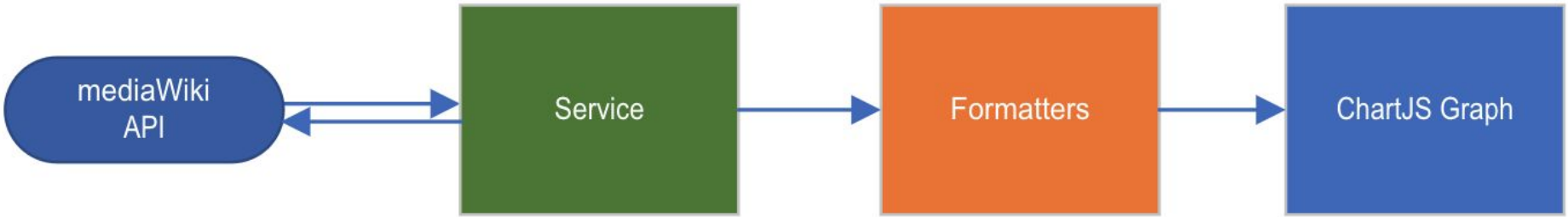
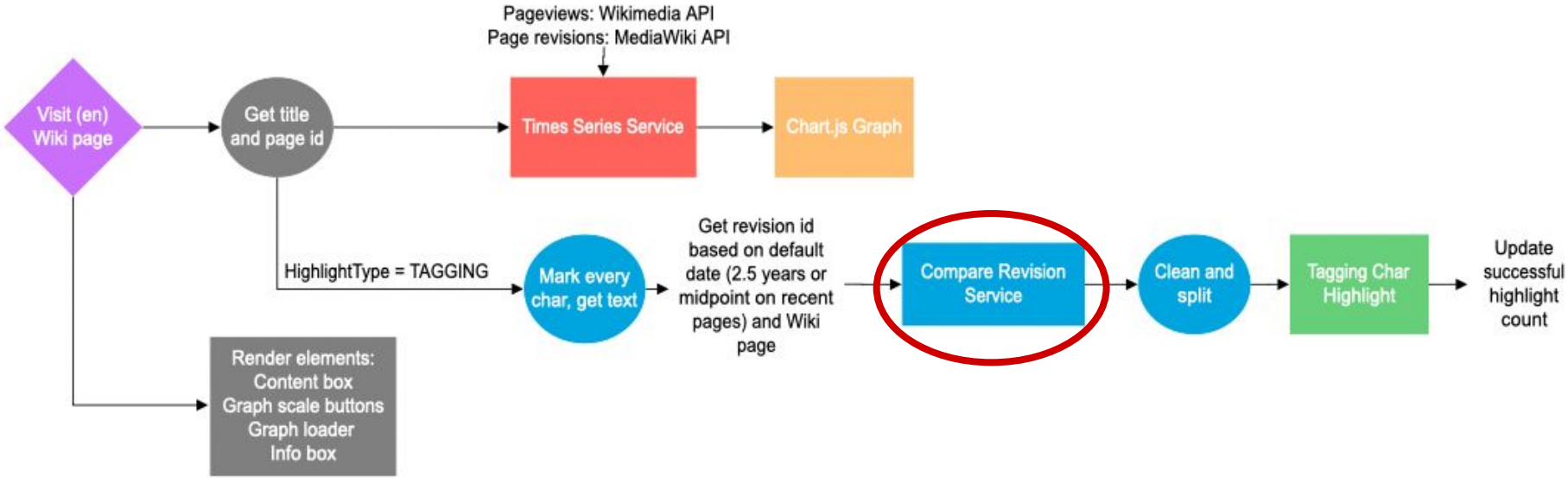
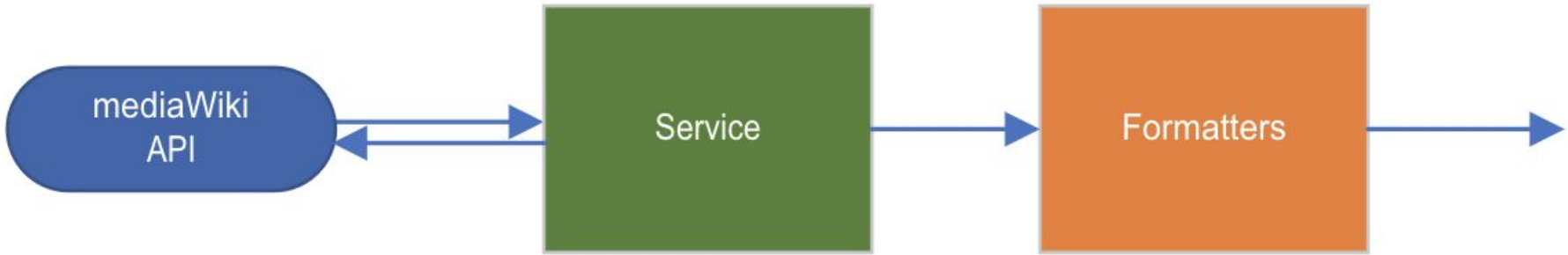


Diagram - On page load



Compare Revision Service



A Brief Background

Wikitext

```
'''Carleton College''' ({{IPAc-en|'|k|ɑːr|l|t|ɪ|n}} {{Respell|KARL|tin}}) is a [[Private college|private]] [[Liberal arts colleges in the United States|liberal arts college]] in [[Northfield, Minnesota]].<ref name=about> {{cite web|title = About Carleton |url = https://apps.carleton.edu/about/ |publisher=Carleton College |access-date = October 31, 2017}}</ref> Founded in 1866, it had 2,105 undergraduate students and 269 faculty members in fall 2016. The 200-acre main campus is between Northfield
```

(What API Returns)

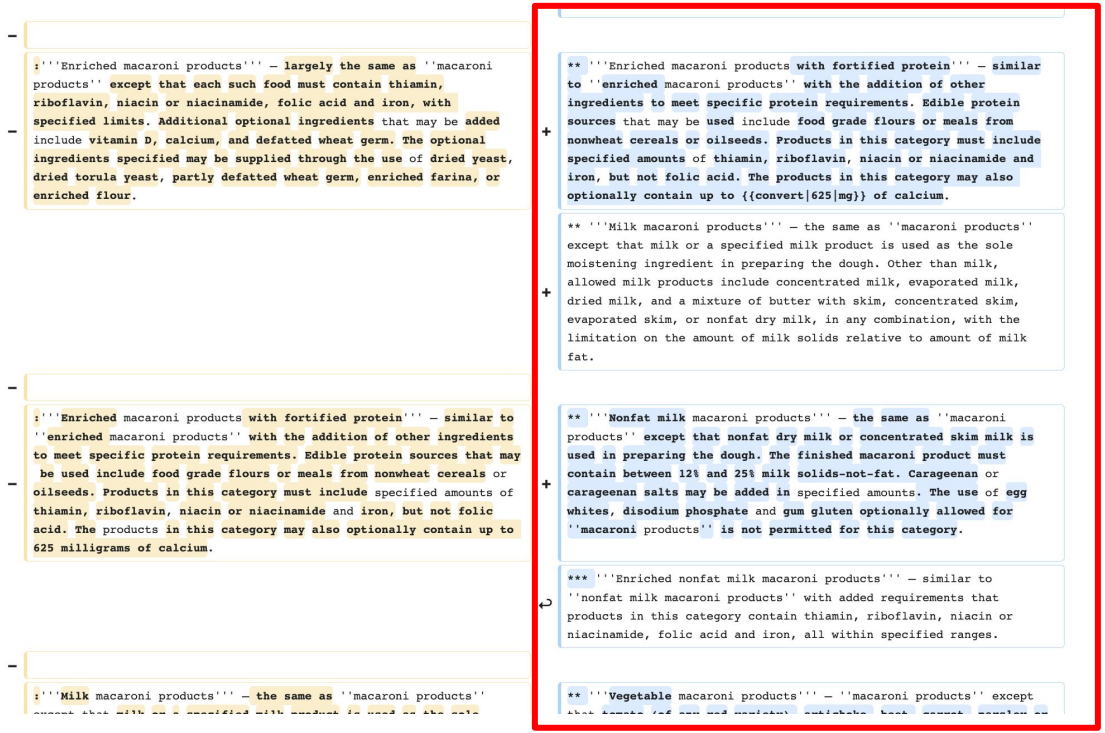
HTML

```
▼<p>
  <b>Carleton College</b>
  " ("
 ▼<span class="rt-commentedText nowrap">
  ▼<span class="IPA nopopups noexcerpt" lang="en-fonipa">
   ▼<a href="/wiki/Help:IPA/English" title="Help:IPA/English">
     "/"
    ▼<span style="border-bottom:1px dotted">
       <span title="/'/: primary stress follows">'
       </span>
       <span title="'k' in 'kind'">k</span>
       <span title="/ɑːr/: 'ar' in 'far'">ɑːr</span>
       <span title="'l' in 'lie'">l</span>
       <span title="'t' in 'tie'">t</span>
       <span title="/ɪ/: 'i' in 'kit'">ɪ</span>
       <span title="'n' in 'nigh'">n</span>
     </span>
     "/"
   </a>
  </span>
 </span>
```

Displayed

Carleton College (/ˈkɑːrltɪn/ *KARL-tin*) is a private liberal arts college in Northfield, Minnesota.[7] Founded in 1866, it had 2,105 undergraduate students and 269 faculty

Compare Revision Service (Wikitext)



What we are trying to fetch

Compare Revision Service

Line 1:

− {{**short** description|**Cured** dried beef **seasoned** **with** **a** **spice** **paste**}}

[[File:Basturma or Pastroma from Armenia 2.JPG|thumb|right|Pastirma]]

'''Pastırma''' or '''basturma''',<ref name="RayDidier2014">{{cite book|author1=Ramesh C. Ray|author2=Montet Didier|title=Microorganisms and Fermentation of Traditional Foods|url=https://books.google.com/books?

Line 1:

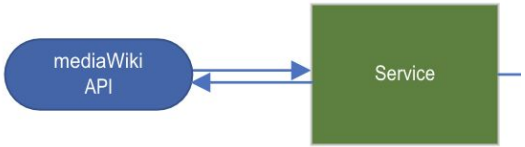
+ {{**Short** description|**Spiced** dried beef **from** **the** **Middle** **East**}}

[[File:Basturma or Pastroma from Armenia 2.JPG|thumb|right|Pastirma]]

+

context-before: “{{”
highlight: “**Short**”
context-after: “description|”

context-before: “description|”
highlight: “**Spiced**”
context-after: “dried beef”



context-before: “dried beef”
highlight: “**from the Middle East**”
context-after: “}}”

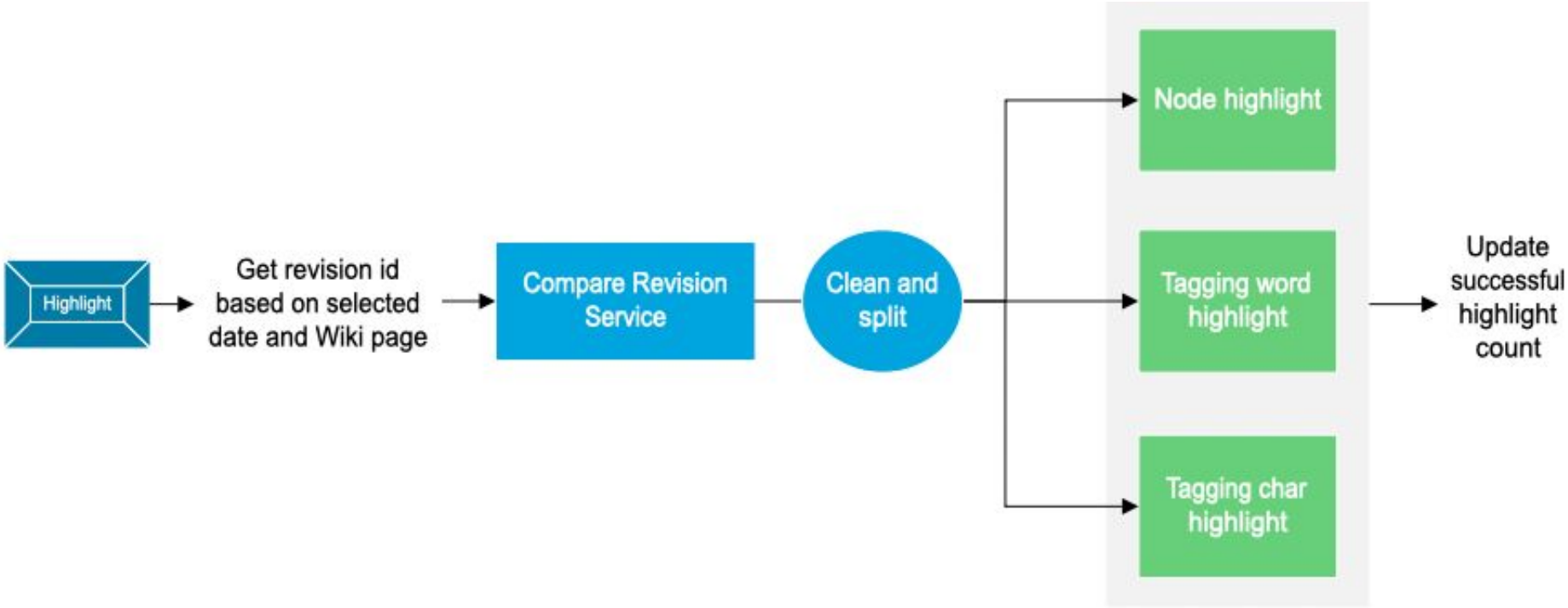
Compare Revision Service

```
<td class=\"diff-addedline
diff-side-added\"><div>{{<ins class=\"diffchange
diffchange-inline\">Short</ins> description|<ins
class=\"diffchange
diffchange-inline\">Spiced</ins> dried beef <ins
class=\"diffchange
diffchange-inline\">from</ins> <ins
class=\"diffchange diffchange-inline\">the</ins>
<ins class=\"diffchange
diffchange-inline\">Middle</ins> <ins
class=\"diffchange
diffchange-inline\">East</ins>}}</div></td>
```

```
Changes:{
        {
                context-before: “{{”
                highlight: “Short”
                context-after: “description|”
        },
        {
                context-before: “description|”
                highlight: “Spiced”
                context-after: “dried beef”
        },
        {
                context-before: “dried beef”
                highlight: “from the Middle East”
                context-after: “}}”
        },

        …
}
```

Diagram - Highlight



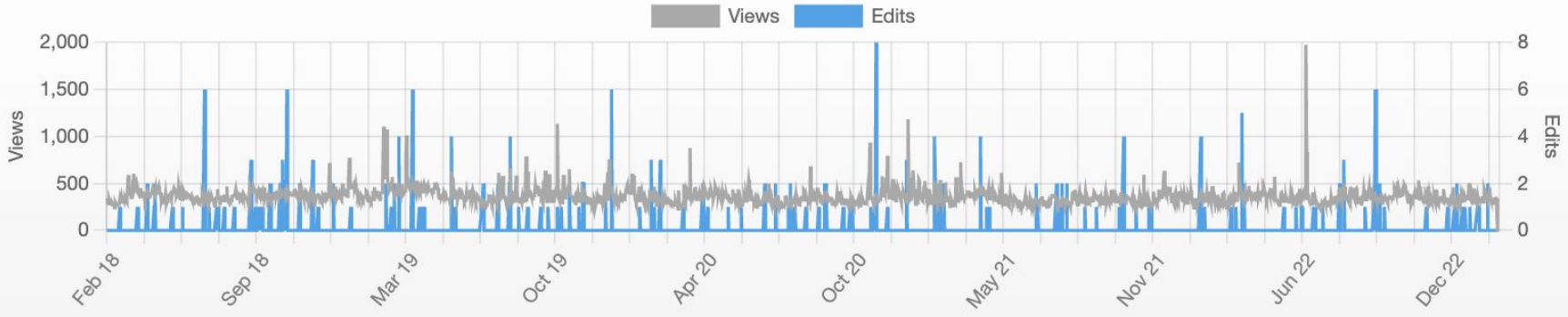
05

Features

Graph

ALL | 5Y | 3Y | 1Y | 6M | 3M

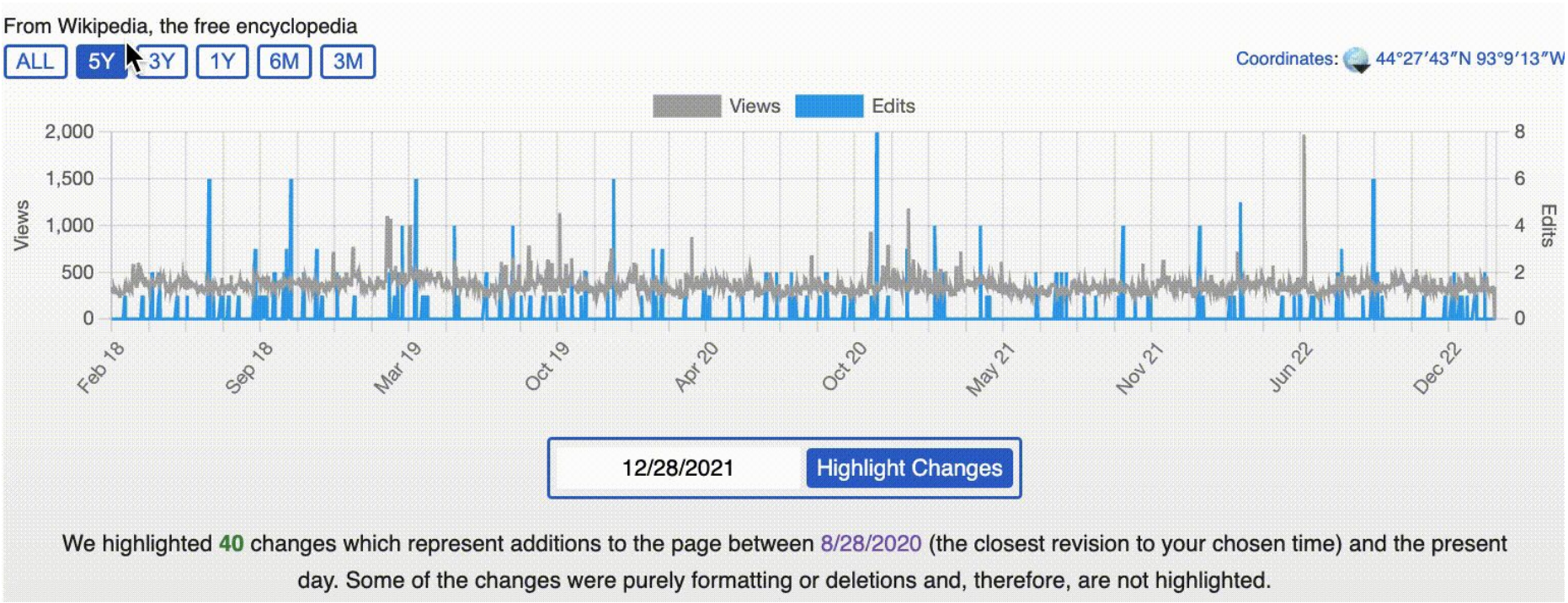
Coordinates: 44°27′43″N 93°9′13″W



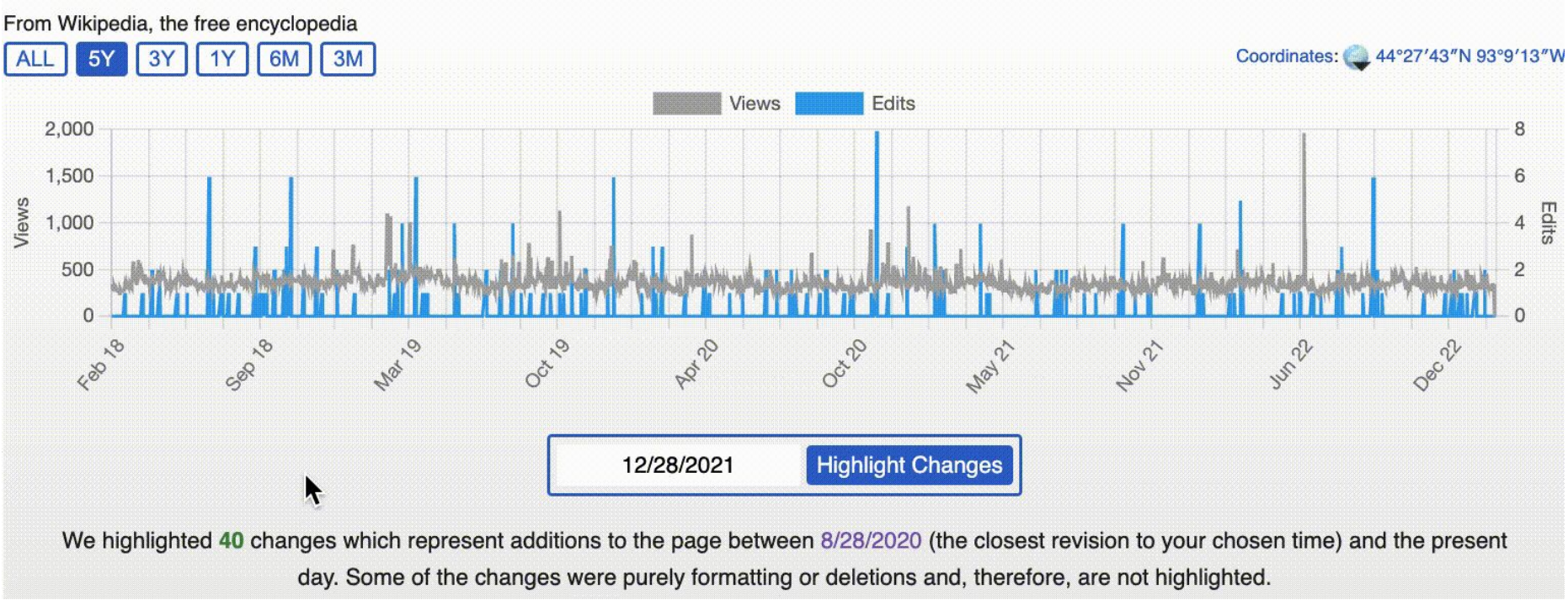
8/24/2020 Highlight Changes

We highlighted **40** changes which represent additions to the page between 8/28/2020 (the closest revision to your chosen time) and the present day. Some of the changes were purely formatting or deletions and, therefore, are not highlighted.

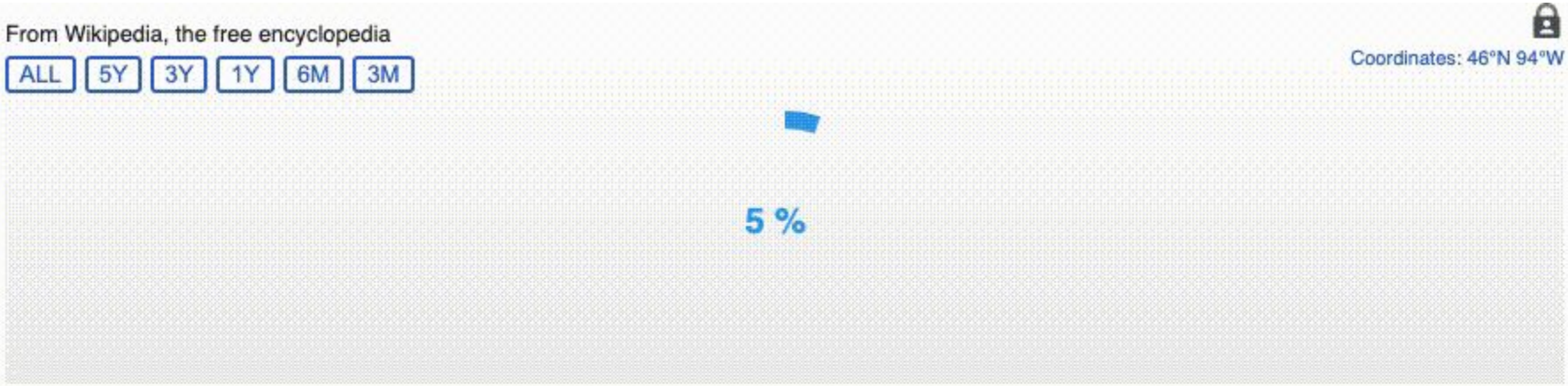
Graph (Scale)


From Wikipedia, the free encyclopedia
ALL
5Y
3Y
1Y
6M
3M
Coordinates: 44°27′43″N 93°9′13″W
Views
Edits
2,000
1,500
1,000
500
0
8
6
4
2
0
Feb 18
Sep 18
Mar 19
Oct 19
Apr 20
Oct 20
May 21
Nov 21
Jun 22
Dec 22
12/28/2021
Highlight Changes
We highlighted 40 changes which represent additions to the page between 8/28/2020 (the closest revision to your chosen time) and the present day. Some of the changes were purely formatting or deletions and, therefore, are not highlighted.

Graph (Click on Graph)



Graph (Loading)



This article is about the U.S. state. For the river, see Minnesota River. For other uses, see Minnesota (disambiguation).

tate in the Upper Midwestern region of the
state in area and the 22nd most populous, with
home to western prairies, now given over to
n the southeast, now partially cleared, farmed,
h Woods, used for mining, forestry, and

Minnesota

State

Looks slow because of the conversion to gif format

Highlighting

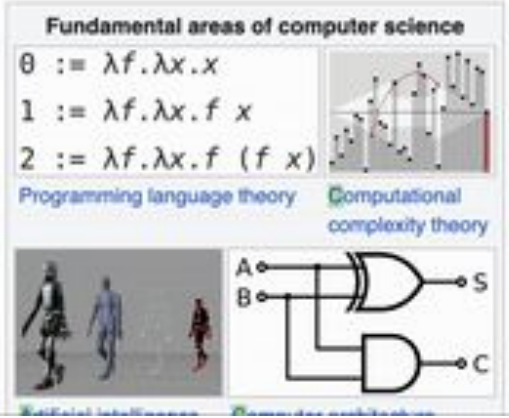
4/10/2022 Highlight Changes

We highlighted 88 changes which represent additions to the page between 4/13/2022 (the closest revision to your chosen time) and the present day. Some of the changes were purely formatting or deletions and, therefore, are not highlighted.

For other uses, see Computer science (disambiguation).

Computer science is the study of computation, automation, and information.[1][2][3] Computer science spans theoretical disciplines (such as algorithms, theory of computation, information theory, and automation) to practical disciplines (including the design and implementation of hardware and software).[4][5][6] Computer science is generally considered an academic discipline and distinct from computer programming.[7]

Algorithms and data structures are central to computer science.[8]
The theory of computation concerns abstract models of computation and general classes of problems that can be solved using them. The fields of cryptography and computer security involve studying the means for secure communication and for preventing security vulnerabilities. Computer graphics and computational geometry address the generation of images. Programming language theory considers different ways to describe computational processes, and database theory concerns the management of



Text matching

API output

Wikitext

```
Hi, we are the [[Wiki]]
Chrome '''Browser'''
extension ''team''!
```

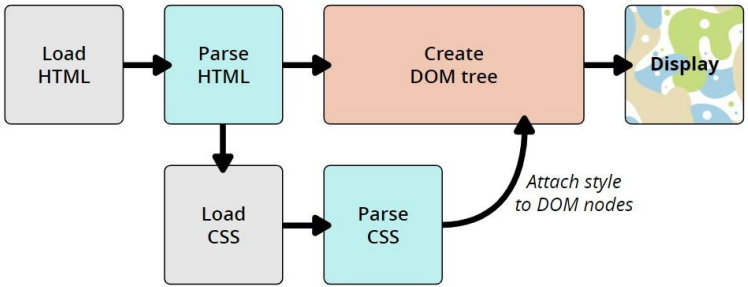
The Wikipedia page

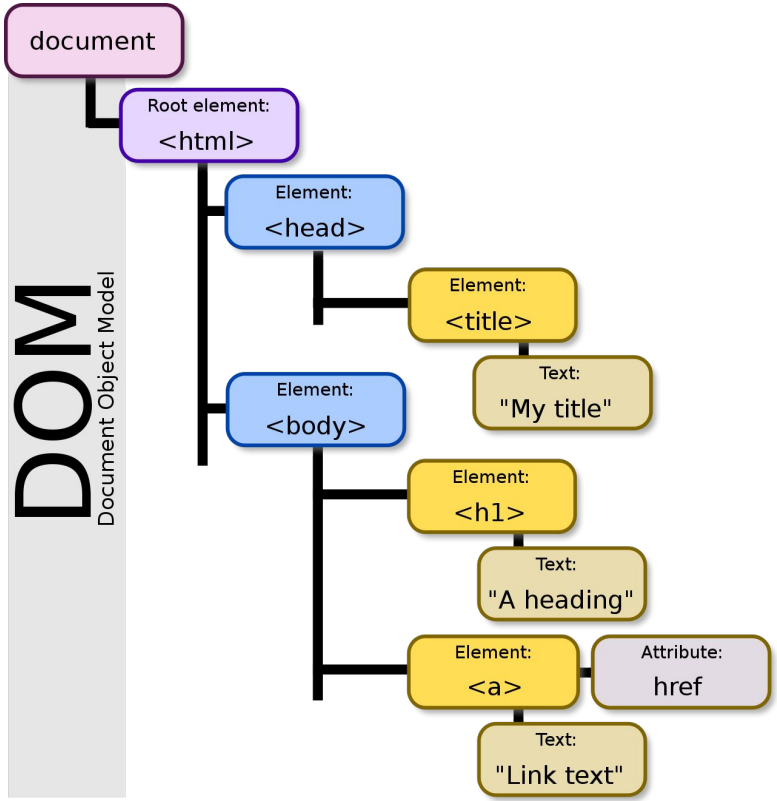
HTML

```
<p>Hi, we are the <a>Wiki</a>
Chrome <b>Browser</b>
extension <i>team</i>!</p>
```

DOM Tree Basics

- The Document Object Model (DOM) is a programming interface for web documents
- Hierarchical structure
- Used to render web pages





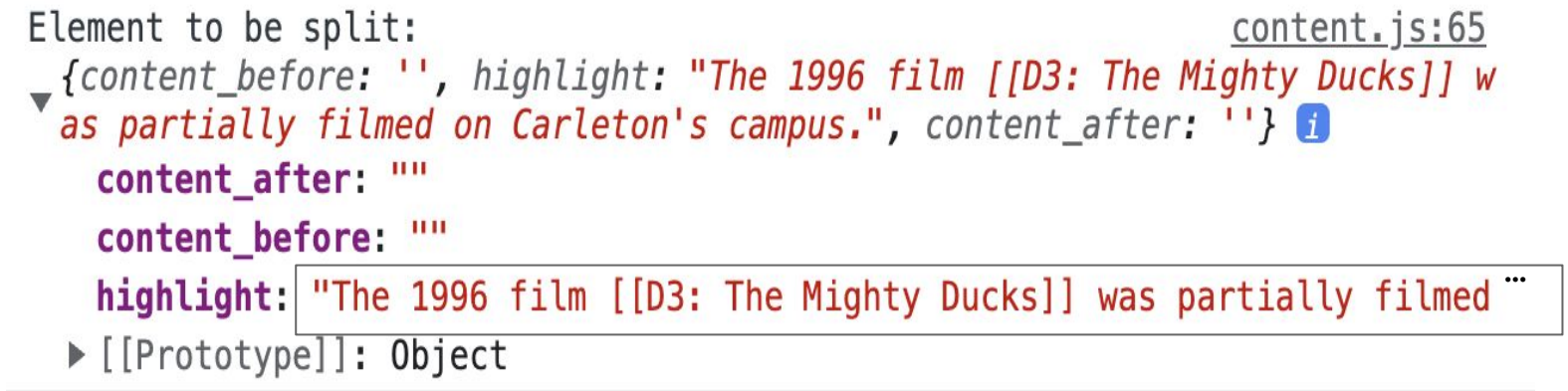
Text Nodes

```
Carleton College
KARL
-tin
) is a
private
liberal arts college
 in
Northfield, Minnesota
 Founded in 1866, it had 2,105 undergraduate students and 269 faculty members in fall 2016. The 200-acre main campus Northfield and the 800-acre
Cowling Arboretum
, which became part of the campus in the 1920s.
```

Carleton College (/ˈkɑːrltɪn/ *KARL-tin*) is a private liberal arts college in Northfield, Minnesota.[7] Founded in 1866, it had 2,105 undergraduate students and 269 faculty members in fall 2016. The 200-acre main campus is between Northfield and the 800-acre Cowling Arboretum, which became part of the campus in the 1920s.[8]

Text matching - links problem

Links were causing us a problem in Node highlighting, as they were in different levels in the tree as the context



Text matching - links solution

```
Split result:
▼ (3) [{…}, {…}, {…}] i
  ▼ 0:
      content_after: "D3: The Mighty Ducks"
      content_before: ""
      highlight: "The 1996 film "
    ▶ [[Prototype]]: Object
  ▼ 1:
      content_after: " was partially filmed on Carleton's campus."
      content_before: "The 1996 film "
      highlight: "D3: The Mighty Ducks"
    ▶ [[Prototype]]: Object
  ▼ 2:
      content_after: ""
      content_before: "D3: The Mighty Ducks"
      highlight: " was partially filmed on Carleton's campus."
```

The educational video game series The Oregon Trail was initially created by three Carleton students.[112]

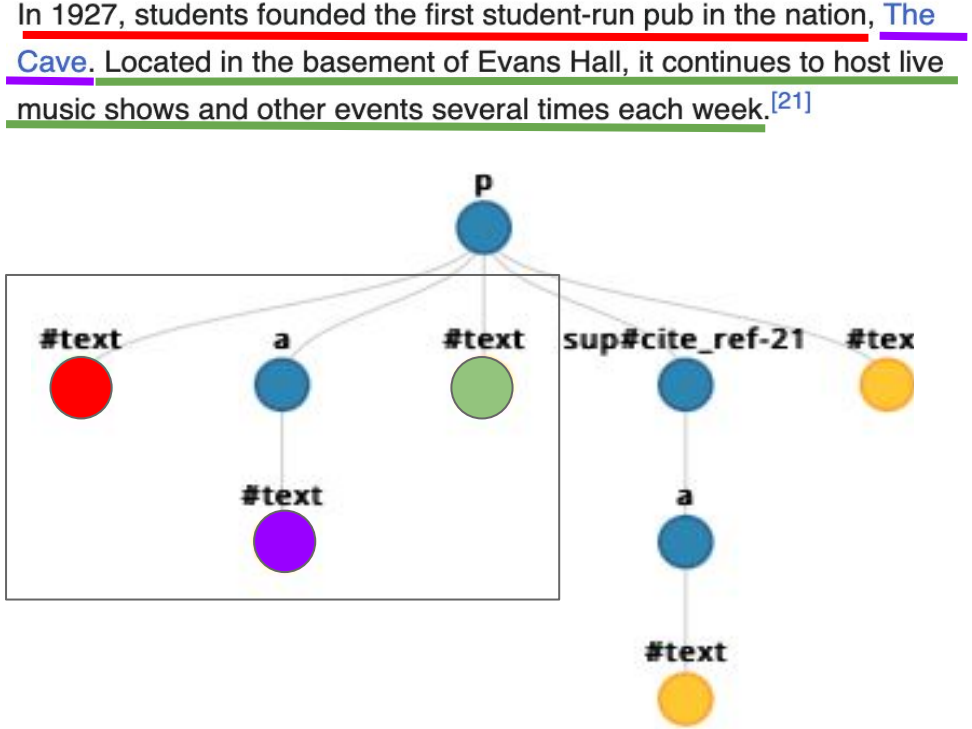
The 1996 film D3: The Mighty Ducks was partially filmed on Carleton's campus.[113]

Node Highlight

General idea

For every context entry, loop over the DOM tree text nodes and replace the matched text with a mark node if:

- Content matches
- Short contents matches
- The parent's next sibling and the parent's previous node include contents



Tagging Highlight

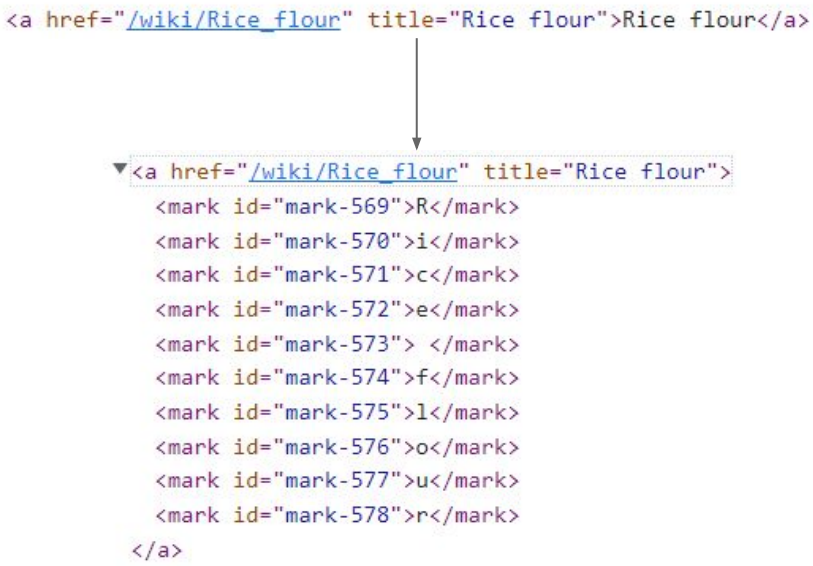
General idea

Once the page loads, we traverse the DOM tree text nodes:

- Append the text to a variable
- Replace each node with a tagged version

At the end:

- We have a variable with all the text of the page
- A way to add CSS styling to any character on the page



Highlighting

Tagging

Pros

- Can access the entire text to use context before and after
- Highlights more

Cons

- Bloats page HTML
- Affects accessibility

Node

Pros

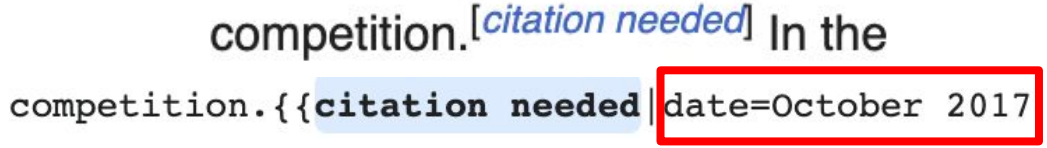
- Simple, no change in Wikipedia's HTML (other than the highlights)

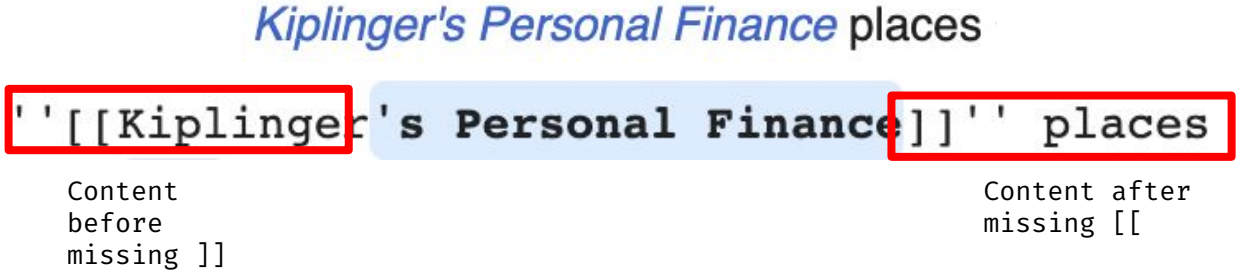
Cons

- Can't highlight when the content is in different nodes in the DOM tree
- Needs multiple DOM tree traversals

Highlight limitations

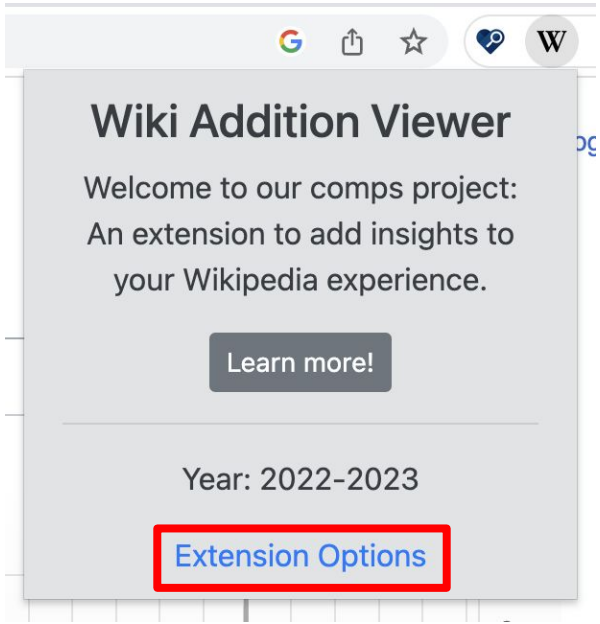
We don’t highlight cases where the content includes internal attributes





We clean and highlight only well-formed elements

Options Page



Options

Highlight Color:

Restore Color

Save

06

User study

Why?

1. Critical to see how users were interacting with our tool
2. To determine whether our tool was intuitive or not
3. Figure out features to improve

How?

1. “Speak as you think” method
2. Carefully designed questions
3. 2 iterations
4. 8 users
5. Interviews lasted 30-45 minutes each

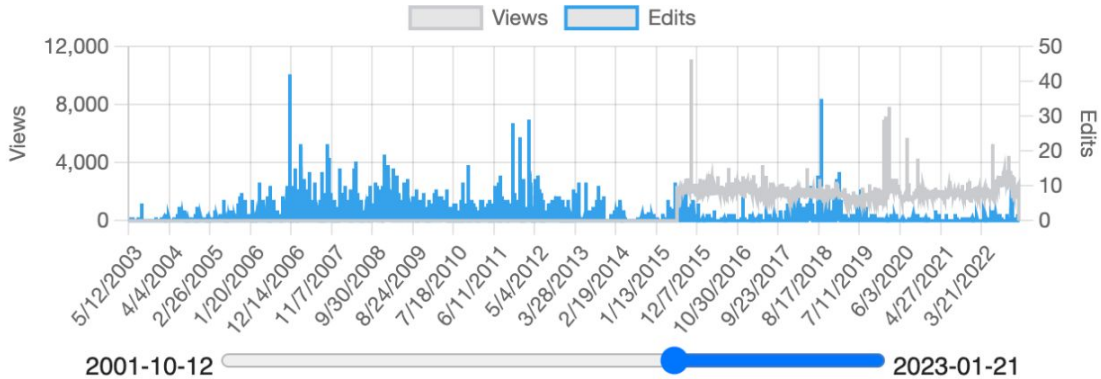
Before User Study 1

Pasta

87 languages

Article Talk Read View source View history

From Wikipedia, the free encyclopedia



06/18/2016 Highlight

Go To Revision Page

Showing highlight for closest revision (**date: 2016-06-18**)

Highlights

This article had 428 terms highlighted. These are the revisions that were made on this particular date.

After User Study 1

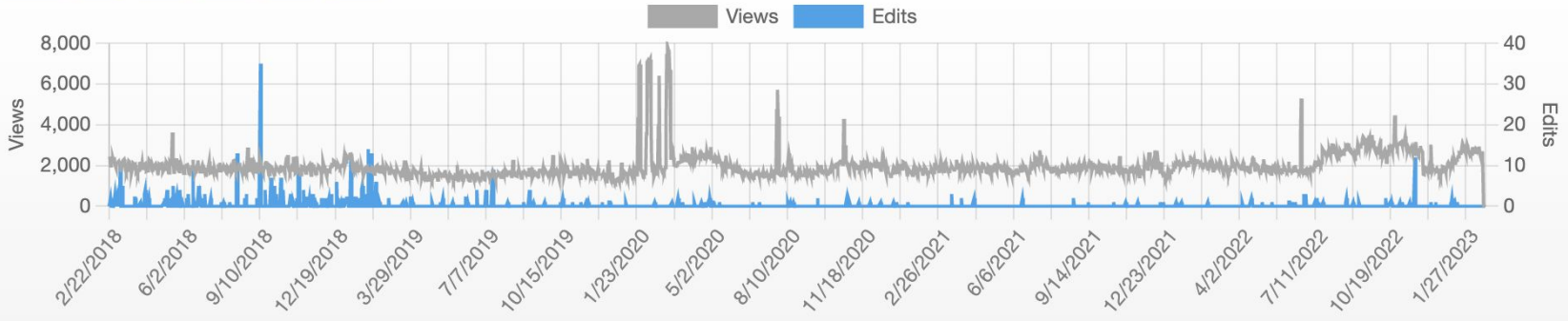
Pasta

87 languages

Article Talk Read View source View history

From Wikipedia, the free encyclopedia

ALL 5Y 3Y 1Y 6M 3M



8/23/2020 Highlight Changes

Comparing the current Wikipedia page to the 9/19/2020 version (the closest revision to your chosen time)

Newly added texts are highlighted in green, but the deletions are not included

Results of User Study 2

P1: “Oh that happened last week! Nice to see it highlighted”

P7: “I want to find out why the views peaked on Christmas”

P3: “I would perhaps use this for researching something currently in the news”

07

Demo

08

Future improvements

- Data Interpretation
- Authorship
- Talk Page Integration

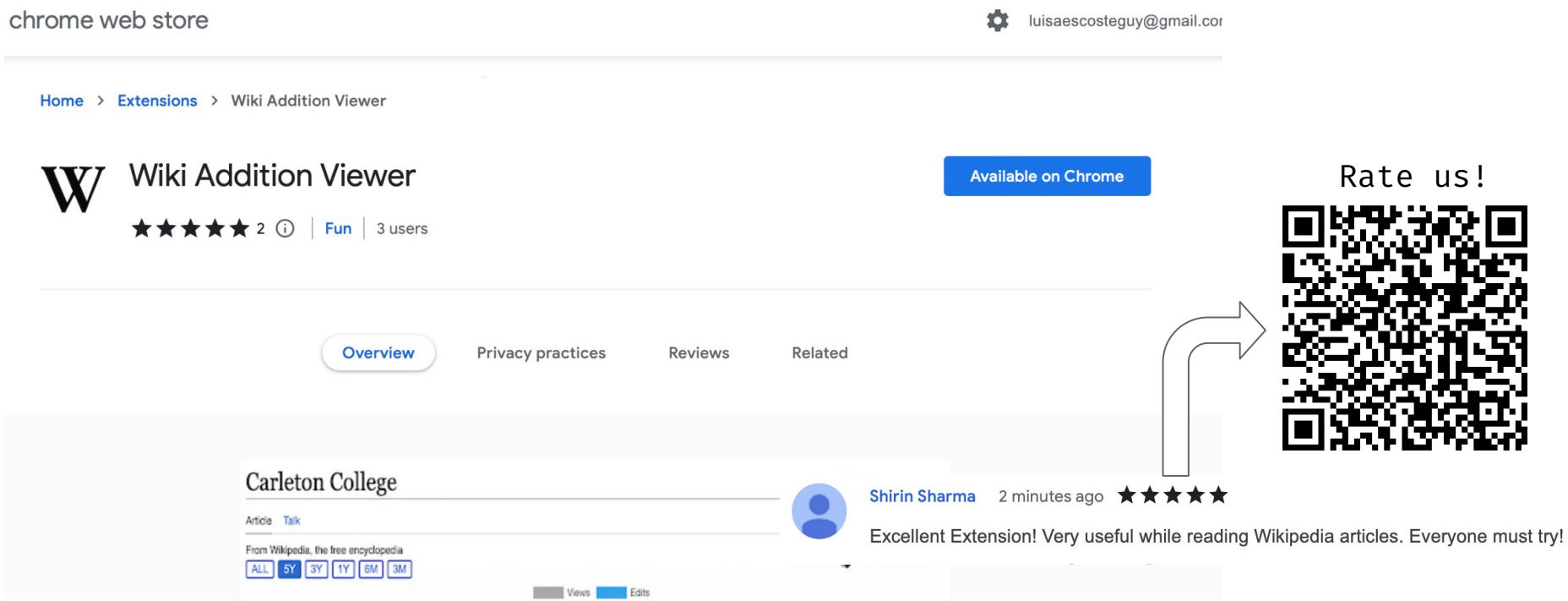
09

Conclusion

Achievements

1. Directly convey information on the history of Wikipedia pages
2. Create connections between the revisions of the page and the current page
3. Easily accessible and convenient to use extension

We published the extension in the Chrome Web Store



Rate us!

Fun Facts

80 PRs Merged

We merged most of our 88 branches

14 Interviews

We conducted 2 user studies, with 8 different subjects

2 Sprints

We separated our dev work in 2 sprints (Fall, Winter)

3 Languages

90% JS, 7% CSS, 3% HTML

71 Tasks

We completed 71 tasks

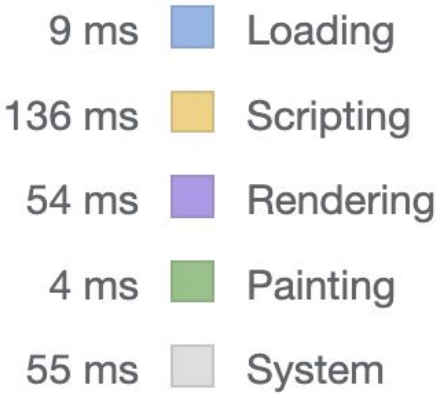
Over 250 PR Comments

We had 43 comments on the most commented PR

Extension Performance

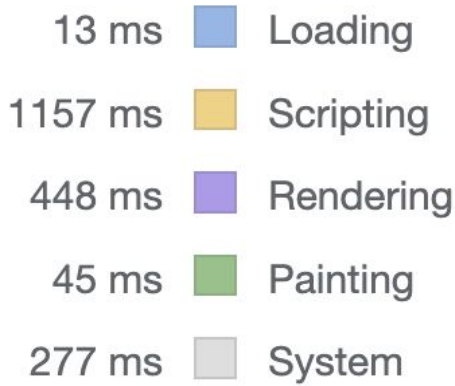
Baseline

Carleton College page with no extension

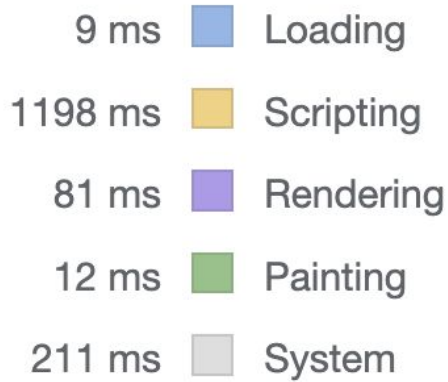


Wiki Addition Viewer

Carleton College page with Tagging



Carleton College page with Node



Acknowledgements

Prof. Sneha Narayan
Prof. Eric Alexander
Prof. Austin Mason
The 8 participants from our user studies

Chrome Web Store

Questions?

Team Website

FLOWCODE PRIVACY.FLOWCODE.COM

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