

# Bioinformatics News – Web Application for Getting Newest Bioinformatics Research

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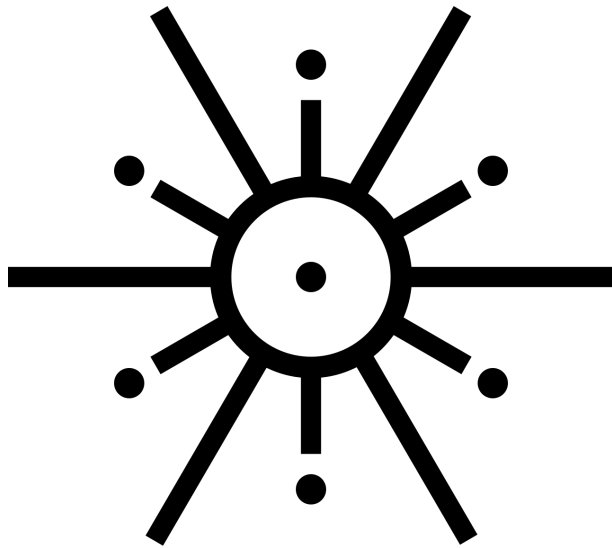
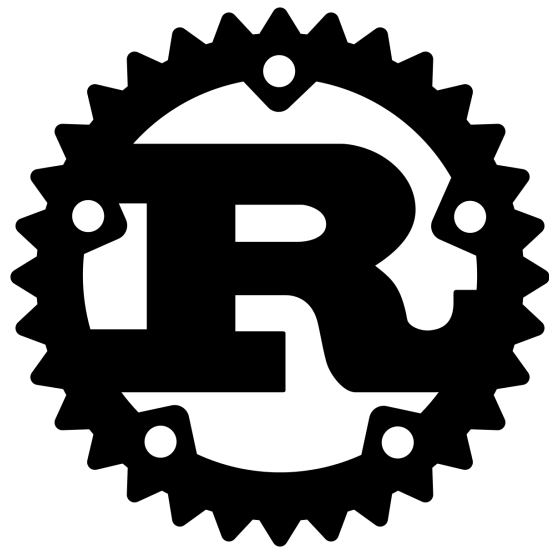
Faculty of Mathematics, Informatics and Mechanics  
University of Warsaw

Architecture of Large Bioinformatic Projects

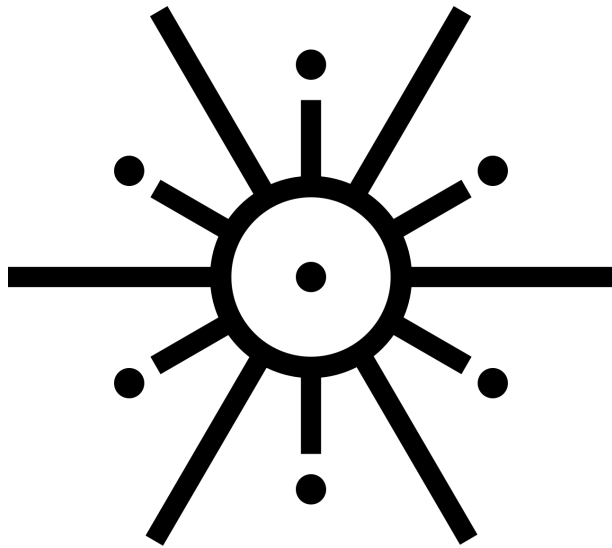
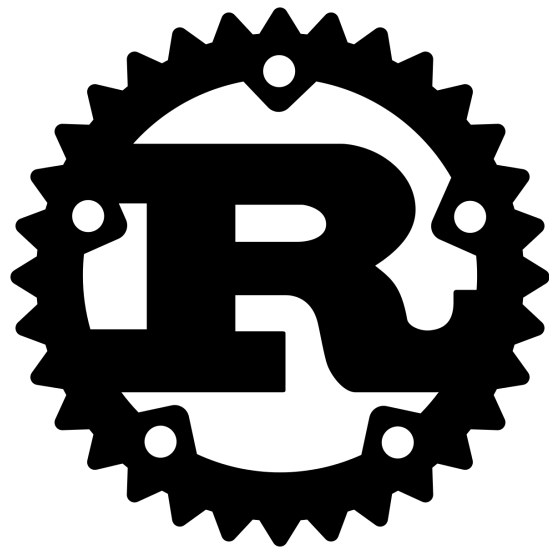
# Project Goals

- Provide user-friendly web interface for browsing the newest articles
- Implement some filtering functionalities
- Get data from Springer and Elsevier publishers via their public API

# Technologies



# Technologies



mongoDB®



# Springer API

SPRINGER NATURE

API Portal

ApplicationsStatisticsDocumentation

Messages⚙️ Settings🔗

Search over 14 million articles and chapters

## Welcome to the Springer Nature API portal

SARS-CoV-2 is a new virus responsible for an outbreak of respiratory illness known as COVID-19, which has spread to several countries around the world. As a leading research publisher, Springer Nature is committed to supporting the global response to emerging outbreaks by enabling fast and direct access to the latest available research, evidence, and data. See <https://www.springernature.com/gp/researchers/campaigns/coronavirus> for full details. For API purposes, **we have made additional content free via the OpenAccess API** available here at <https://dev.springernature.com/>. See <https://dev.springernature.com/adding-constraints> for more details on using the OpenAccess API.

Springer Nature is a leading global scientific publisher of books and journals, delivering quality content through innovative information products and services. It publishes close to 500 academic and professional society journals. In the science, technology and medicine (STM) sector, the group publishes about 3,000 journals and 13,000 new books a year, as well as the largest STM eBook Collection worldwide. Springer Nature has operations in about 20 countries in Europe, the USA, and Asia, and more than 10,000 employees.

We have created multiple APIs for developers to access our freely available content for noncommercial use:

**Springer Nature Meta API** - Provides new versioned metadata for 14 million online documents (e.g., journal articles, book chapters, protocols).

- **NEW! JATS** xml formatting has now been added to the list of Meta formats\*.
- \*For more information, please, see RESTful Operations, Adding Constraints

Springer Nature Metadata API - Provides metadata for 14 million online documents for 14 million online documents.

Home

RESTful Operations

Querystring Parameters

Adding Constraints

Example API responses

Live Documentation

Leave us some feedback

TDM/Subscribed Content

Sign up

# Initial prototype

```
1 use axum::{
2     response::{self, IntoResponse},
3     routing,
4 };
5
6 mod springer_data;
7
8 /// Just a quick example main with tokio and axum Router.
9 #[tokio::main]
10 async fn main() {
11     // Get request on /springer endpoint.
12     let app = axum::Router::new().route("/springer", routing::get(springer));
13     let addr = std::net::SocketAddr::from([127, 0, 0, 1], 8080);
14     println!("→ Listening on {}", addr);
15     axum::Server::bind(&addr)
16         .serve(app.into_make_service())
17         .await
18         .unwrap();
19 }
20
21 // Test returning response json from Springer API.
22 async fn springer() → response::Response {
23     match springer_data::load_data().await {
24         Ok(json) ⇒ response::Json::from(json).into_response(),
25         Err(_) ⇒ axum::http::StatusCode::INTERNAL_SERVER_ERROR.into_response(),
26     }
27 }
28 }
```

# Initial prototype

```
// Function used to return parsed url object.
fn bioinformatics_articles(start: usize, records: usize) → request::Url {
    let url = format!("https://api.springernature.com/meta/v2/json?api_key={API_KEY}&q=subj
    request::Url::parse(&url).unwrap()
}

// Function for making the actual request. Async for the future when we will be
// possibly making much more requests
async fn request(client: &request::Client) → Result<request::Response, request::Error> {
    client.get(bioinformatics_articles(1, 100)).send().await
}

// this function makes requests and returns serialized value.
pub async fn load_data() → Result<serde_json::Value, request::Error> {
    let client = request::Client::new();
    let res = request(&client).await?;
    let body = res.text().await?;
    Ok(serde_json::from_str(&body).unwrap())
}
```

# Proof of concept

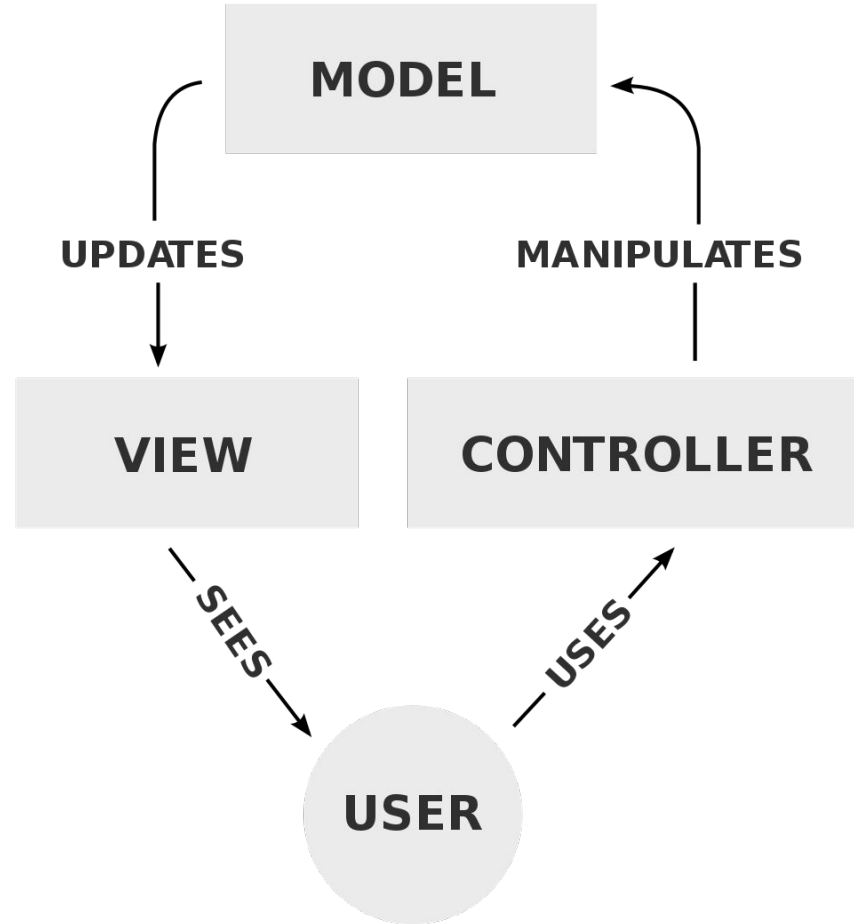
```
(venv) jakub@Vivobook:projekt/bioinf-news% cargo run
Finished dev [unoptimized + debuginfo] target(s) in 0.05s
Running `target/debug/backend`
→ Listening on 127.0.0.1:8080
```

```
▼ title: "NDM-5-carrying Klebsiella pneumoniae S1437 belonging to high-risk clonal complex (CC11) from an urban river in eastern India"
  topicalCollection: ""
▼ url:
  ▼ 0:
    format: "html"
    platform: "web"
    ▼ value: "http://link.springer.com/openurl/fulltext?id=doi:10.1007/s13205-023-03556-5"
  ▼ 1:
    format: "pdf"
    platform: "web"
    ▼ value: "http://link.springer.com/openurl/pdf?id=doi:10.1007/s13205-023-03556-5"
  ▼ 2:
    format: ""
    platform: ""
    value: "http://dx.doi.org/10.1007/s13205-023-03556-5"
  volume: "13"
▼ 1:
▼ abstract: "Background Acoustic telemetry is a commonly used technology to monitor animal occupancy and infer movement in aquatic environments. The information that acoustic telemetry provides is vital for spatial planning and management decisions concerning aquatic and coastal environments by characterizing behaviors and habitats such as spawning aggregations, migrations, corridors, and nurseries, among others. However, performance of acoustic telemetry equipment and resulting detection ranges and efficiencies can vary as a function of environmental conditions, leading to potentially biased interpretations of telemetry data. Here, we characterize variation in detection performance using an acoustic telemetry receiver array deployed in Wellfleet Harbor, Massachusetts, USA from 2015 to 2017. The array was designed to study benthic invertebrate movements and provided an in situ opportunity to identify factors driving variation in detection probability. Results The near-shore location proximate to environmental monitoring allowed for a detailed examination of factors influencing detection efficiency in a range-testing experiment. Detection ranges varied from < 50 to 1,500 m and efficiencies varied from 0 to 100% within those detection ranges. Detection efficiency was affected by distance, wind speed and direction, wave height and direction, water temperature, water depth, and water quality. Conclusions Performance of acoustic telemetry systems is strongly contingent on environmental conditions. Our study found that wind, waves, water temperature, water quality, and depth all affected performance to an extent that could seriously compromise a study if these effects were not taken into consideration. Other unmeasured factors may also be important, depending on the characteristics of each site. This information can help guide future telemetry study designs by helping researchers anticipate the density of receivers required to achieve study objectives. Researchers can further refine and document the reliability of their data by incorporating continuously deployed range-testing tags and prior knowledge on varying detection efficiency into movement and occupancy models."
```

```
conferenceInfo: []
contentType: "Article"
copyright: "©2023 The Author(s)"
coverDate: "2023-12"
▼ creators:
  ▼ 0:
    creator: "Long, Michael"
  ▼ 1:
    creator: "Jordaán, Adrian"
  ▼ 2:
    creator: "Castro-Santos, Theodore"
doi: "10.1186/s40317-023-00317-2"
eIssn: "2050-3385"
endingPage: "13"
▼ genre:
  0: "OriginalPaper"
  1: "Research"
identifier: "doi:10.1186/s40317-023-00317-2"
issn: ""
issueType: "Regular"
journalId: "40317"
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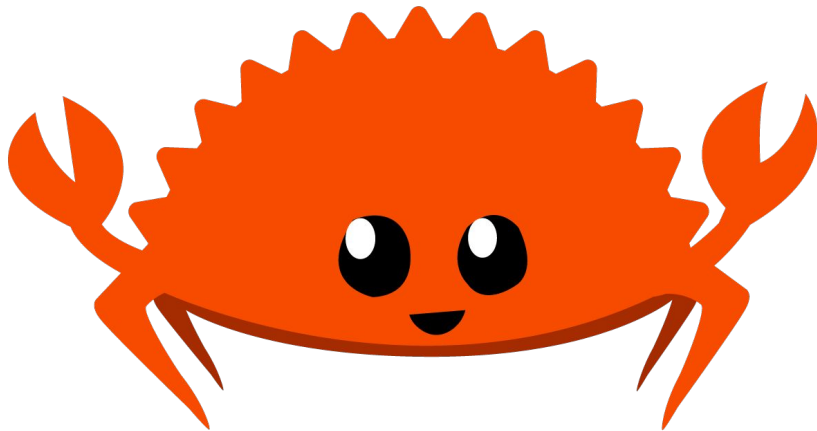


# Design



## Next steps

- Writing a scheduled module for fetching article data from public APIs in constant time intervals
- Setting up the database and the repository model
- Writing business logic for article filtering
- Writing the controller module
- Designing a user-friendly front-end
- Possibly implementing data retrieval from other publishers



# Relevant links

- <https://tokio.rs/>
- <https://docs.rs/axum/latest/axum/>
- <https://www.mongodb.com/>
- <https://react.dev/>
- <https://dev.springernature.com/>

