Naim Sadeghian
nsadeghi

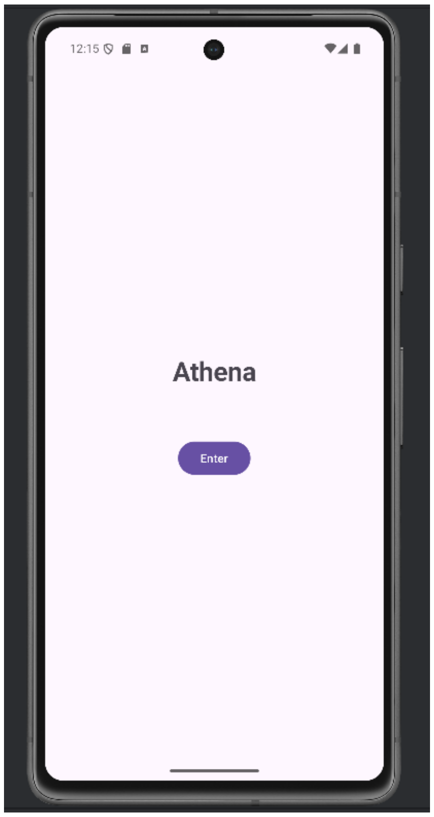
INTRODUCTION

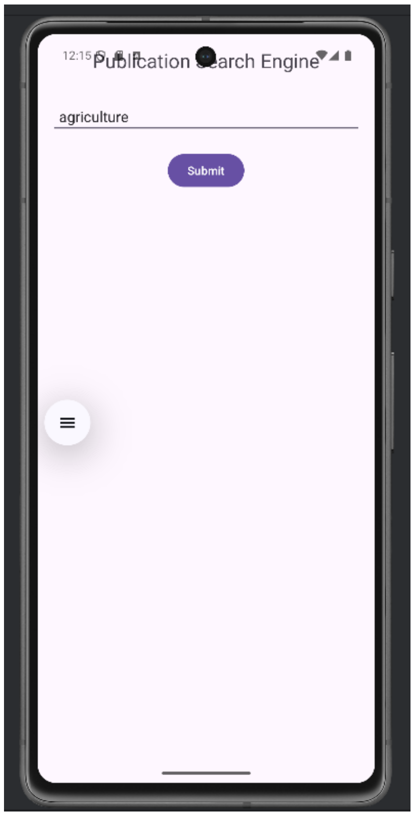
My application assists with searching for scientific publications using a key word. The application brings the first publication found by the openAlex API. The user can see other information like the type of publication (book chapter, journal article, review…), if it is open access (is_oa) , the year if was published, the abstract and the DOI link.

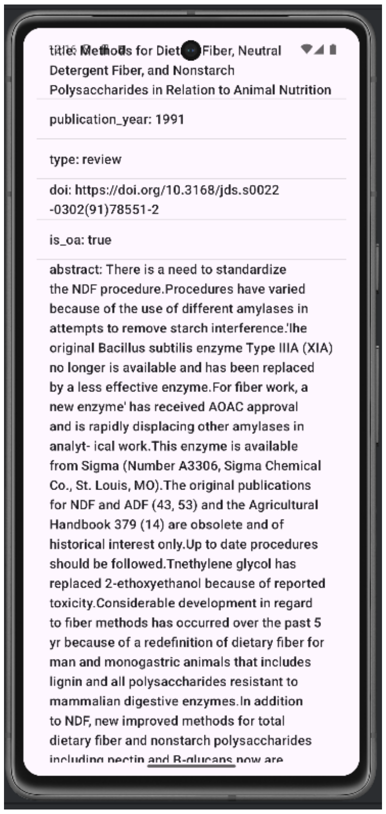
1. Implement a native Android application

a. Has at least three different kinds of Views in your Layout (TextView, EditText, ImageView, or anything that extends android.view.View).

Here are the 3 views: one is for the main menu, one is for the search and the last is for the results.
Activity_landing, activity_result, activity_main






title: Methods for Dietary Fiber, Neutral Detergent Fiber, and Nonstarch Polysaccharides in Relation to Animal Nutrition

publication_year: 1991

type: review

doi: https://doi.org/10.3168/jds.s0022-0302(91)78551-2

is_oa: true

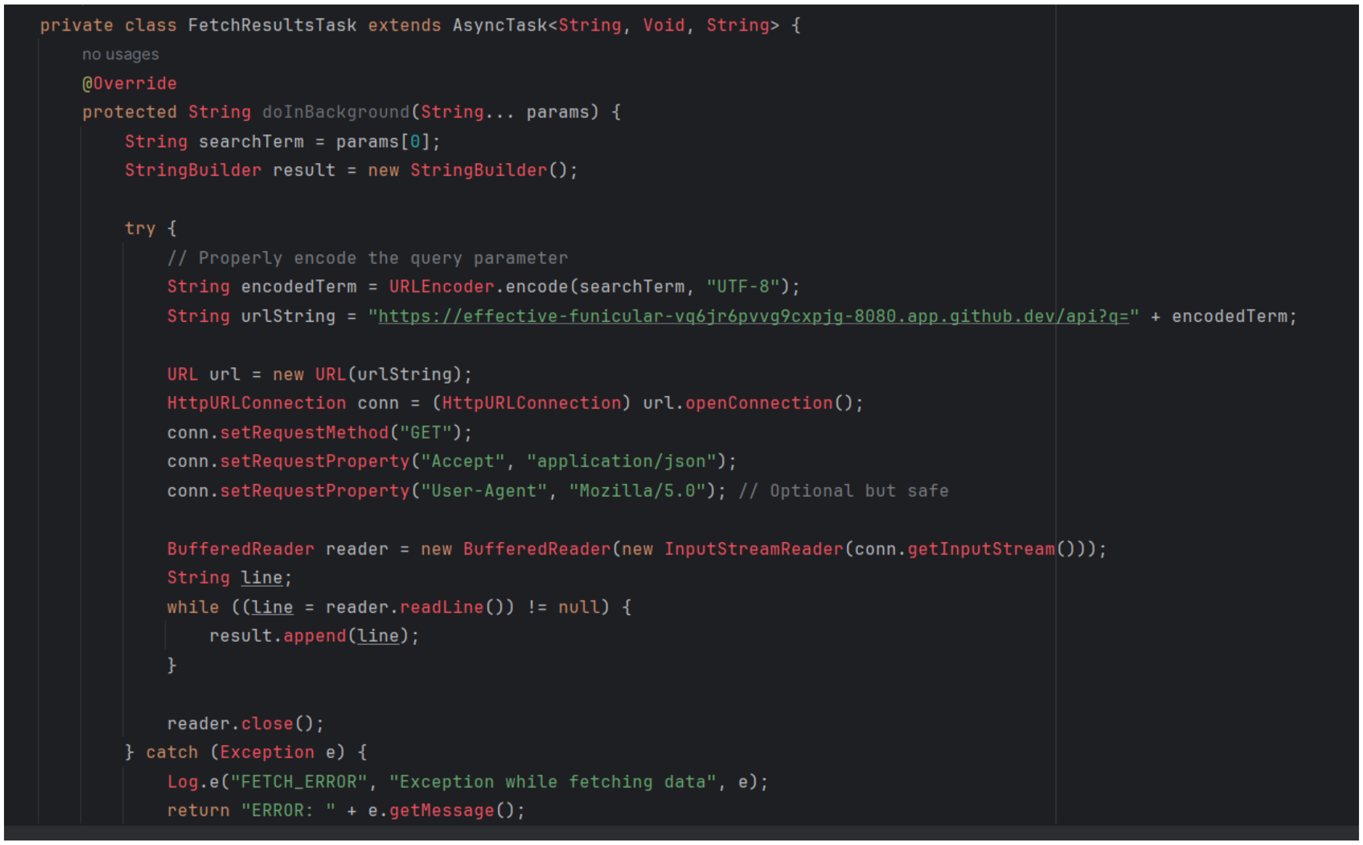
abstract: There is a need to standardize the NDF procedure.Procedures have varied because of the use of different amylases in attempts to remove starch interference.'lhe original Bacillus subtilis enzyme Type IIIA (XIA) no longer is available and has been replaced by a less effective enzyme.For fiber work, a new enzyme' has received AOAC approval and is rapidly displacing other amylases in analyt- ical work.This enzyme is available from Sigma (Number A3306, Sigma Chemical Co., St. Louis, MO).The original publications for NDF and ADF (43, 53) and the Agricultural Handbook 379 (14) are obsolete and of historical interest only.Up to date procedures should be followed.Tnethylene glycol has replaced 2-ethoxyethanol because of reported toxicity.Considerable development in regard to fiber methods has occurred over the past 5 yr because of a redefinition of dietary fiber for man and monogastric animals that includes lignin and all polysaccharides resistant to mammalian digestive enzymes.In addition to NDF, new improved methods for total dietary fiber and nonstarch polysaccharides including pectin and B-glucans now are

b. Requires input from the user

Input from user is taken in the search bar component

c. Makes an HTTP request (using an appropriate HTTP method) to your web service. Note that this request *must* be done using a background thread (see Lab 8's use of BackgroundTask)

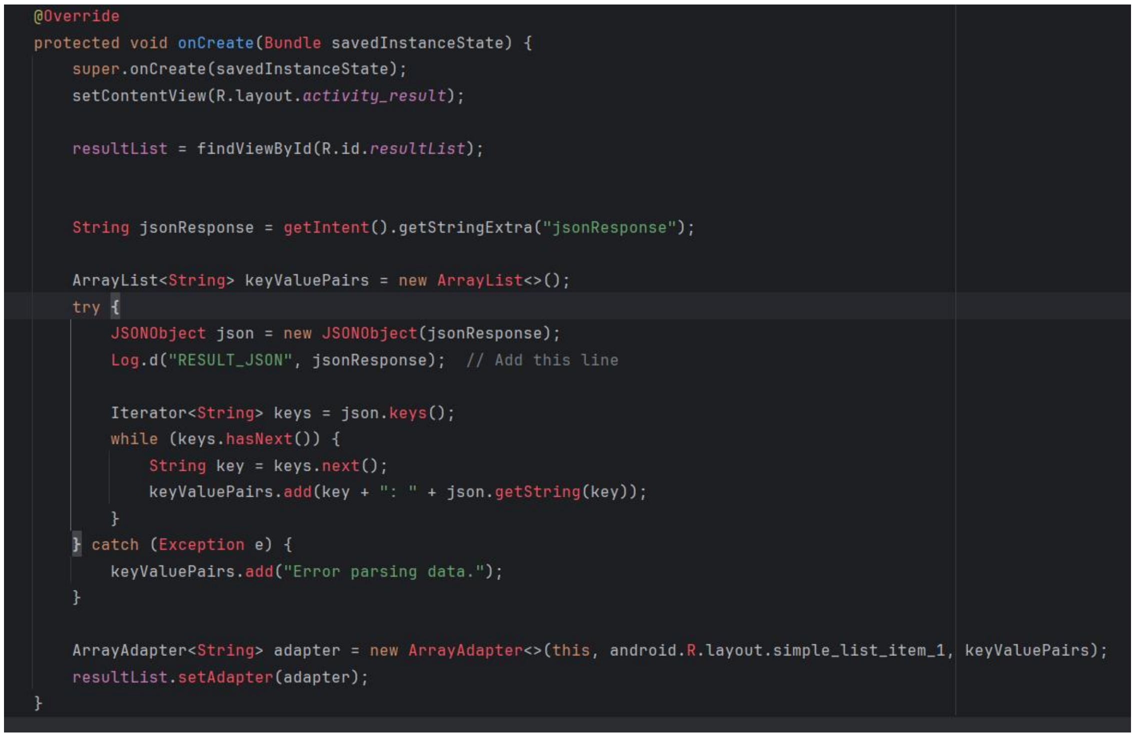
HTTP request is done extending the AsyncTask class, which performs actions in a background thread.



```java
private class FetchResultsTask extends AsyncTask<String, Void, String> {
    no usages
    @Override
    protected String doInBackground(String... params) {
        String searchTerm = params[0];
        StringBuilder result = new StringBuilder();

        try {
            // Properly encode the query parameter
            String encodedTerm = URLEncoder.encode(searchTerm, "UTF-8");
            String urlString = "https://effective-funicular-vq6jr6pvvg9cxpjg-8080.app.github.dev/api?q=" + encodedTerm;

            URL url = new URL(urlString);
            HttpURLConnection conn = (HttpURLConnection) url.openConnection();
            conn.setRequestMethod("GET");
            conn.setRequestProperty("Accept", "application/json");
            conn.setRequestProperty("User-Agent", "Mozilla/5.0"); // Optional but safe

            BufferedReader reader = new BufferedReader(new InputStreamReader(conn.getInputStream()));
            String line;
            while ((line = reader.readLine()) != null) {
                result.append(line);
            }

            reader.close();
        } catch (Exception e) {
            Log.e("FETCH_ERROR", "Exception while fetching data", e);
            return "ERROR: " + e.getMessage();
```

d. Receives and parses an XML or JSON formatted reply from your web service

Here the ResultActivity.java iterates over the JSON object and parses it to print all of the elements



```java
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_result);

    resultList = findViewById(R.id.resultList);


    String jsonResponse = getIntent().getStringExtra("jsonResponse");

    ArrayList<String> keyValuePairs = new ArrayList<>();
    try {
        JSONObject json = new JSONObject(jsonResponse);
        Log.d("RESULT_JSON", jsonResponse);  // Add this line

        Iterator<String> keys = json.keys();
        while (keys.hasNext()) {
            String key = keys.next();
            keyValuePairs.add(key + ": " + json.getString(key));
        }
    } catch (Exception e) {
        keyValuePairs.add("Error parsing data.");
    }

    ArrayAdapter<String> adapter = new ArrayAdapter<>(this, android.R.layout.simple_list_item_1, keyValuePairs);
    resultList.setAdapter(adapter);
}
```

e. Displays new information to the user

The result can be seen in the screenshot at the beginning of the document

f. Is repeatable (I.e. the user can repeatedly reuse the application without restarting it.)

Yes, you only need the press the back button of the phone to go back the search bar and search again.

---

2. Implement a web service

a. Implement a simple (can be a single path) API.

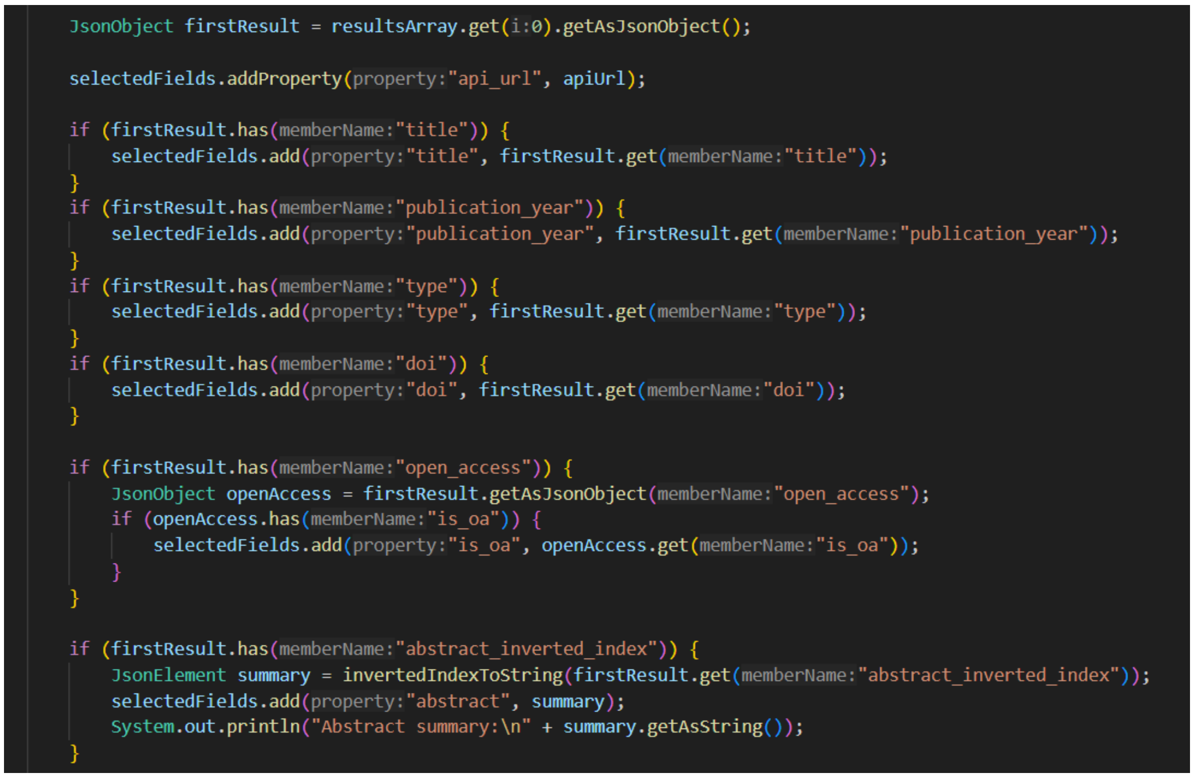
The class APIHandler.java calls the openAlex API and extracts the elements that are needed and passes it to APIServlet.java which is the interface with the user.

b. Receives an HTTP request from the native Android application

The call is shown in the man task method from section 1.c

c. Executes business logic appropriate to your application. This includes fetching XML or JSON information from some 3rd party API and processing the response.

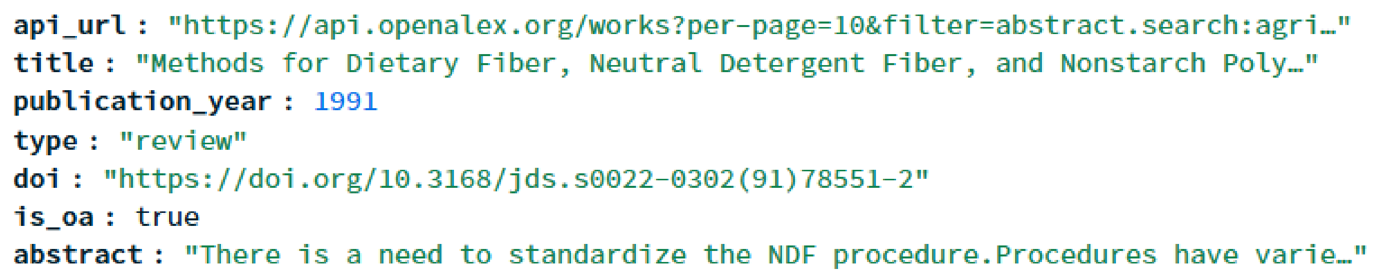
The APIHandler.java extracts the fields that are needed in the business logic and build the publication abstract which comes in an inverted_index data-structure.



```
JsonObject firstResult = resultsArray.get(i:0).getAsJsonObject();

selectedFields.addProperty(property:"api_url", apiUrl);

if (firstResult.has(memberName:"title")) {
    selectedFields.add(property:"title", firstResult.get(memberName:"title"));
}
if (firstResult.has(memberName:"publication_year")) {
    selectedFields.add(property:"publication_year", firstResult.get(memberName:"publication_year"));
}
if (firstResult.has(memberName:"type")) {
    selectedFields.add(property:"type", firstResult.get(memberName:"type"));
}
if (firstResult.has(memberName:"doi")) {
    selectedFields.add(property:"doi", firstResult.get(memberName:"doi"));
}

if (firstResult.has(memberName:"open_access")) {
    JsonObject openAccess = firstResult.getAsJsonObject(memberName:"open_access");
    if (openAccess.has(memberName:"is_oa")) {
        selectedFields.add(property:"is_oa", openAccess.get(memberName:"is_oa"));
    }
}

if (firstResult.has(memberName:"abstract_inverted_index")) {
    JsonElement summary = invertedIndexToString(firstResult.get(memberName:"abstract_inverted_index"));
    selectedFields.add(property:"abstract", summary);
    System.out.println("Abstract summary:\n" + summary.getAsString());
}
```

d. Replies to the Android application with an XML or JSON formatted response. The schema of the response can be of your own design.

Here is an example of what the Android application will receive

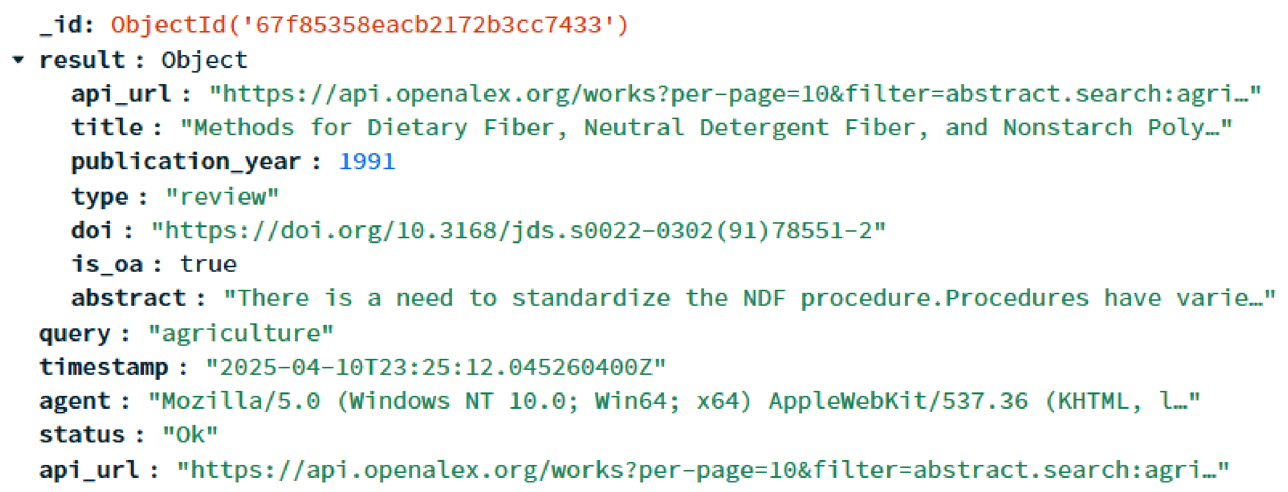


```
api_url : "https://api.openalex.org/works?per-page=10&filter=abstract.search:agri…"
title : "Methods for Dietary Fiber, Neutral Detergent Fiber, and Nonstarch Poly…"
publication_year : 1991
type : "review"
doi : "https://doi.org/10.3168/jds.s0022-0302(91)78551-2"
is_oa : true
abstract : "There is a need to standardize the NDF procedure.Procedures have varie…"
```

4. Log useful information

The application logs 6 things:

- The openAlex API result (only the fields used)
- The user query/search term
- The timestamp
- The user agent/device
- The request status. In case that the API throws an error message
- The API url



```
  _id: ObjectId('67f85358eacb2172b3cc7433')
▾ result : Object
    api_url : "https://api.openalex.org/works?per-page=10&filter=abstract.search:agri…"
    title : "Methods for Dietary Fiber, Neutral Detergent Fiber, and Nonstarch Poly…"
    publication_year : 1991
    type : "review"
    doi : "https://doi.org/10.3168/jds.s0022-0302(91)78551-2"
    is_oa : true
    abstract : "There is a need to standardize the NDF procedure.Procedures have varie…"
  query : "agriculture"
  timestamp : "2025-04-10T23:25:12.045260400Z"
  agent : "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, l…"
  status : "Ok"
  api_url : "https://api.openalex.org/works?per-page=10&filter=abstract.search:agri…"
```

5. Store the log information in a database

The Mongo.java class saves all the logs to the database.

6. Display operations analytics and full logs on a web-based dashboard

a. A unique URL addresses a web interface dashboard for the web service.

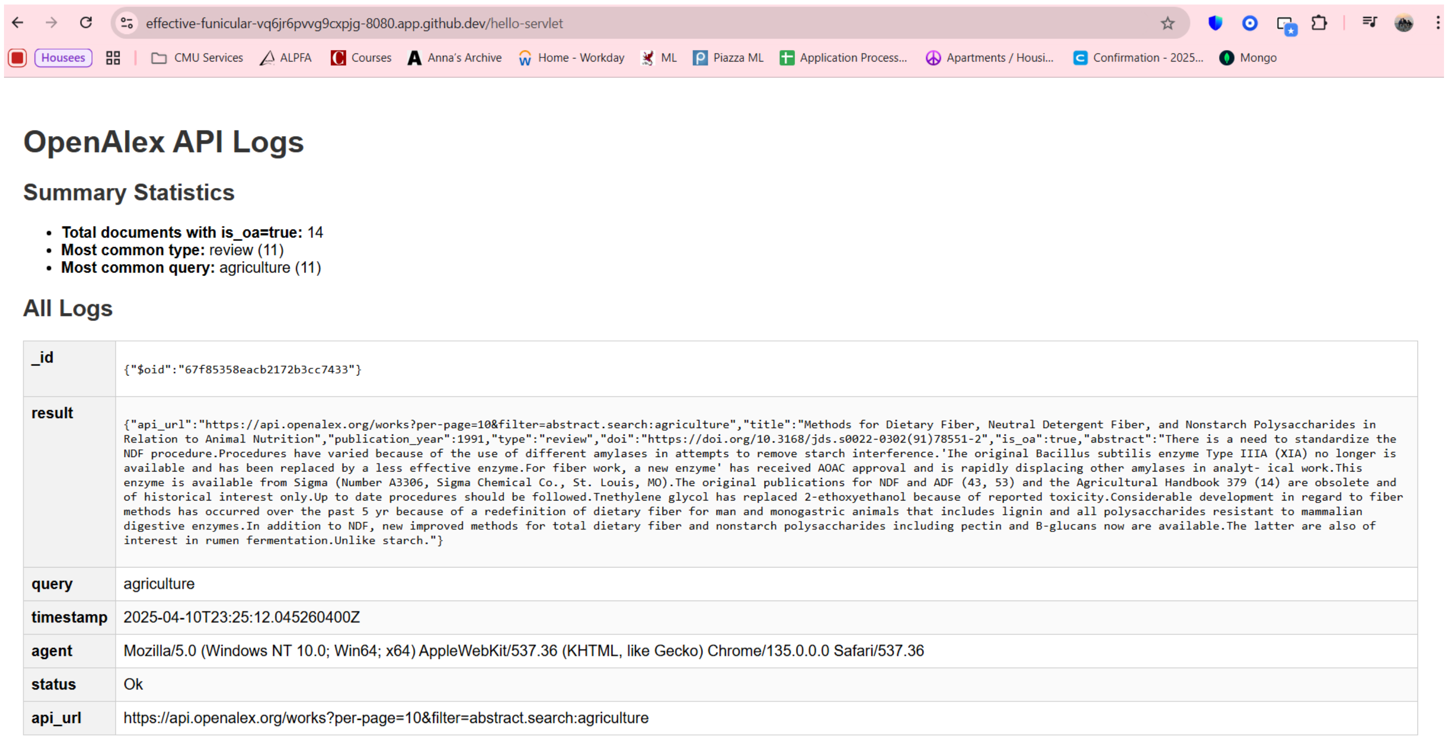
The endpoint /hello-servlet loads the dashboard

b. The dashboard displays at least 3 interesting operations analytics.

The calculated analytics are:

- Total documents that are open access
- The most common publication type
- The most common user query/search term

c. The dashboard displays formatted full logs.



effective-funicular-vq6jr6pvvg9cxpjg-8080.app.github.dev/hello-servlet

OpenAlex API Logs

Summary Statistics

- **Total documents with is_oa=true:** 14
- **Most common type:** review (11)
- **Most common query:** agriculture (11)

All Logs

_id	{"$oid":"67f85358eacb2172b3cc7433"}
result	{"api_url":"https://api.openalex.org/works?per-page=10&filter=abstract.search:agriculture","title":"Methods for Dietary Fiber, Neutral Detergent Fiber, and Nonstarch Polysaccharides in Relation to Animal Nutrition","publication_year":1991,"type":"review","doi":"https://doi.org/10.3168/jds.s0022-0302(91)78551-2","is_oa":true,"abstract":"There is a need to standardize the NDF procedure.Procedures have varied because of the use of different amylases in attempts to remove starch interference.'Ihe original Bacillus subtilis enzyme Type IIIA (XIA) no longer is available and has been replaced by a less effective enzyme.For fiber work, a new enzyme' has received AOAC approval and is rapidly displacing other amylases in analyt- ical work.This enzyme is available from Sigma (Number A3306, Sigma Chemical Co., St. Louis, MO).The original publications for NDF and ADF (43, 53) and the Agricultural Handbook 379 (14) are obsolete and of historical interest only.Up to date procedures should be followed.Tnethylene glycol has replaced 2-ethoxyethanol because of reported toxicity.Considerable development in regard to fiber methods has occurred over the past 5 yr because of a redefinition of dietary fiber for man and monogastric animals that includes lignin and all polysaccharides resistant to mammalian digestive enzymes.In addition to NDF, new improved methods for total dietary fiber and nonstarch polysaccharides including pectin and B-glucans now are available.The latter are also of interest in rumen fermentation.Unlike starch."}
query	agriculture
timestamp	2025-04-10T23:25:12.045260400Z
agent	Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/135.0.0.0 Safari/537.36
status	Ok
api_url	https://api.openalex.org/works?per-page=10&filter=abstract.search:agriculture