National Technical University of Athens
School of Electrical & Computer Engineering

Eir Web Application

Appathon@NTUA 2020: *Applications for people*
Internet Applications

Giannis Fakinos

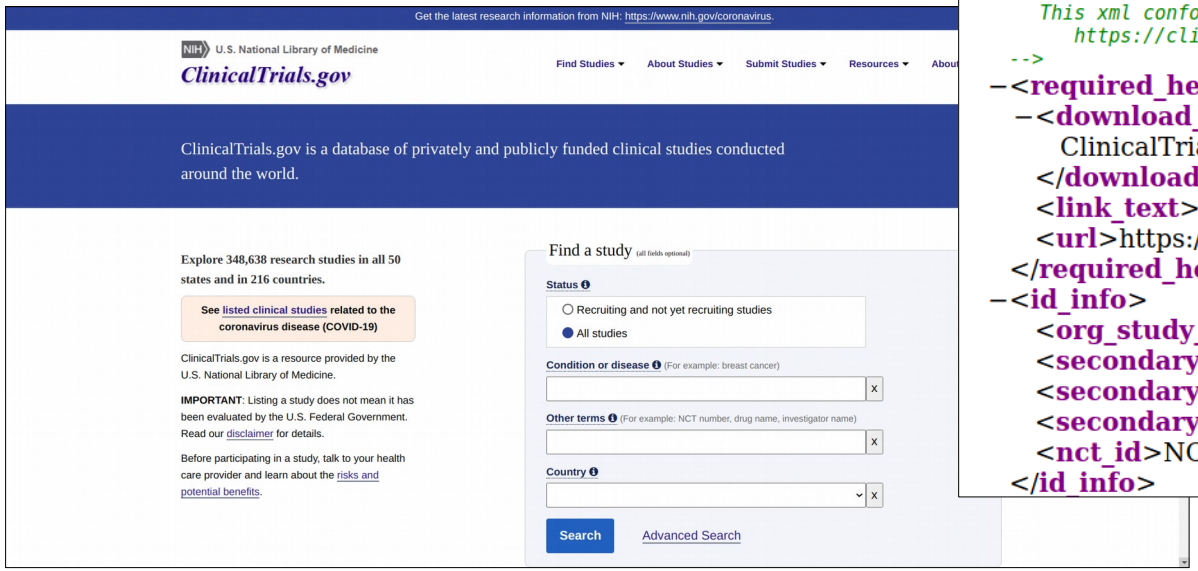
Eir Web Application

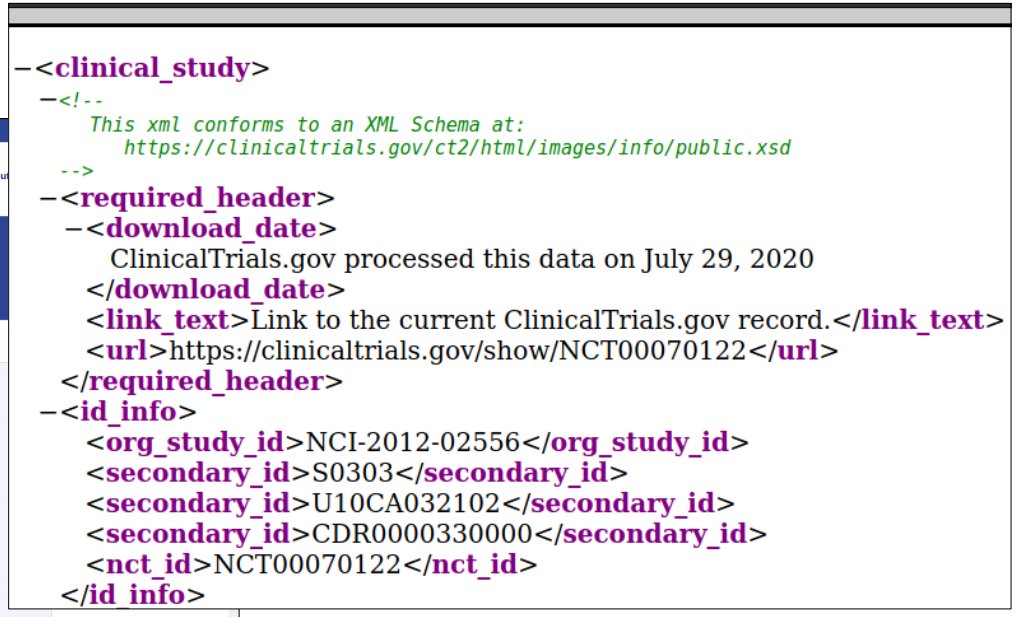
Contents of these slides:

- Dataset & Initiatives
- Application Structure & Technologies used
- Brief description of code & its components
- Working Examples

Dataset

Clinical Studies of this application are available from https://clinicaltrials.gov/ in xml format.





- 347,165 Studies were imported and used for this Web app, that was published on July 29, 2020

Dataset

- Goal: Use of these data for extracting further information, not obvious at first sight

- Interesting Attributes for further investigation and simple processing:

1. e*nrollment type: 'Actual'*. [Relevant to the actual number of volunteers participating in each clinical study]

2. e*nrollment type: 'Anticipated'*. [Anticipated number of participants/volunteers in each study]

3. *study_first_submitted & last_update_submitted* [Dates indicating when each study first submitted and when last updated]

- Last two attributes could be used for computing the average time for requitment by a simple subtrackion.

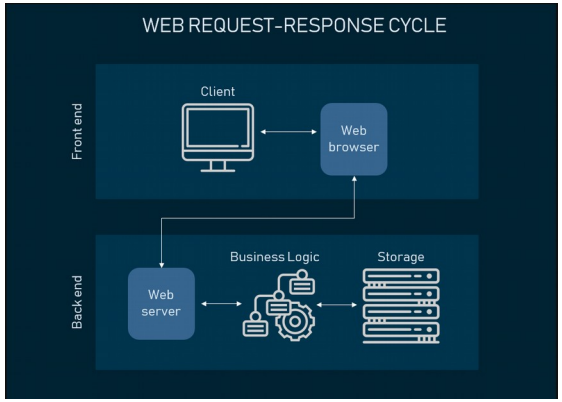
Application Structure

Front-end Server handling:

- User Interface and client requests by a simple browser
- Presentation of the extracted data and information in user friendly environment

Back-end Rest Service:

- Processing data and basics queries about them
- No concern about their presentation to the end-user

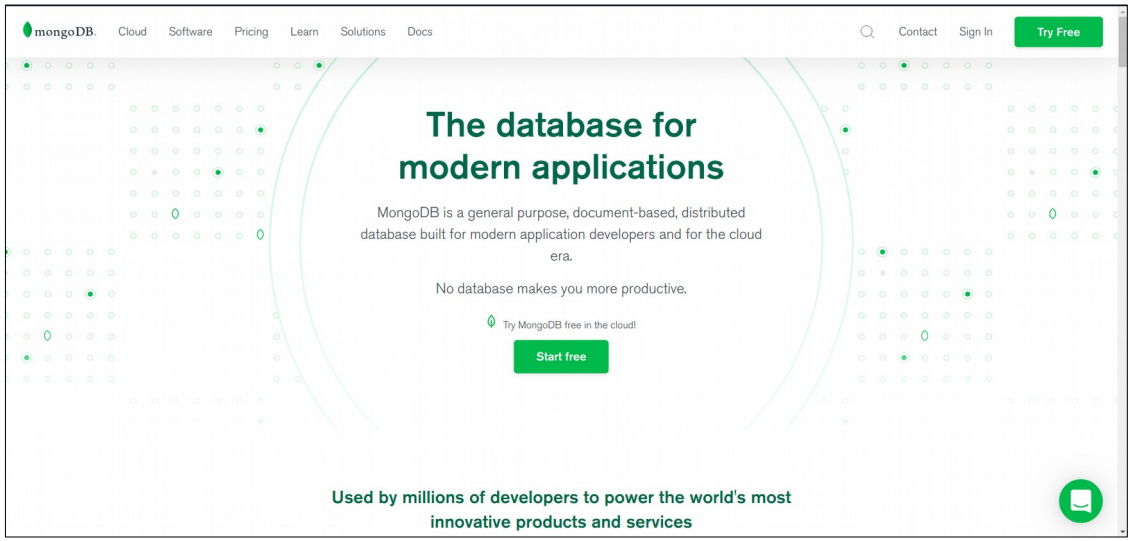


Source of image (Last seen August 12, 2020): https://www.altexsoft.com/blog/front-end-development-technologies-concepts/

No Relational database (and its relevant server) storing downloaded documents in a more consistent way

Application Structure: Database

- No-SQL database was created using mongodb as a DBMS

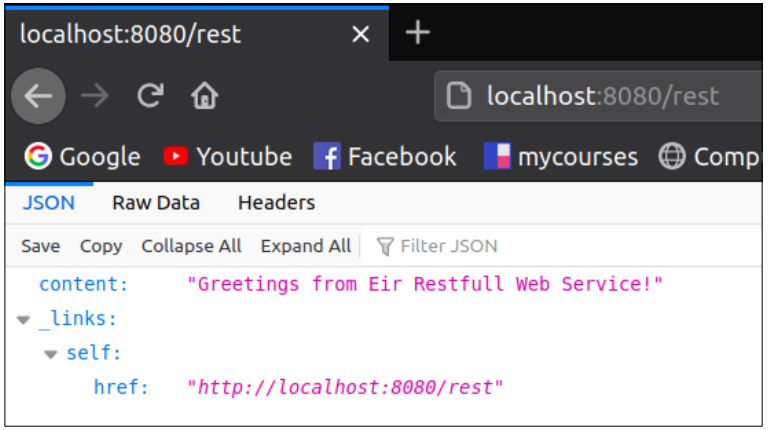



```
> use eir
switched to db eir
> db.clinical_studies.count()
347165
>
```

- XML formated data converted to JSON files using xmljson python Library and Gdata convention (attributes are saved under the field name *type* and actual field values are stored under the field *$t – we later changed it, as mongo doesn't support fields with '$' in them*)

Application Structure: Back-end Rest Service

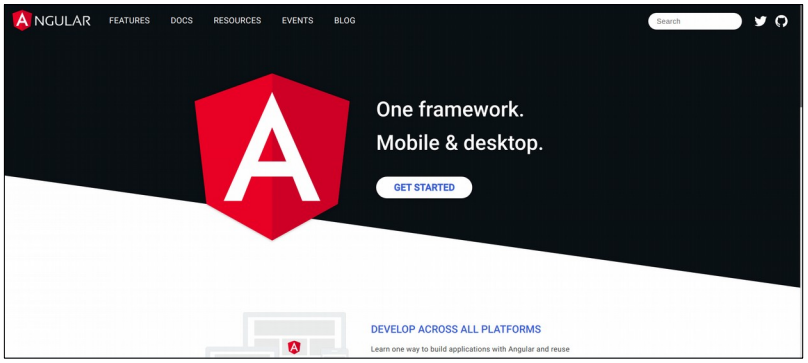
- Written in Java 11 with Spring Boot Framework and Maven as a built automation tool
- Connection with database established with Spring Data MongoDB module
- Service is described as RESTfull (or better as Roy Fielding described R.P.C. - Remote Procedure Call), due to the fact that Spring HATEOAS library is included. It is ensure for each rest reply that includes links to it self and other components.



Application Structure: Front-end Server

Web site providing access to the aforamentioned service is constructed using:

- Angular 9 Framework & Typescript
- HTML 5 & CSS 3
- Npm was used as the package manager for this application
- Angular Material was used for theme purposes



Brief description of code: Back-end

It consists of an entity package, a repository package and a rest package:

- Entity package contains classes concerning data and documents representation of the NO-SQL database (ClinicalStudies, ActualNumberOfVolunteers, AnticipatedNumberOfVolunteers e.t.c.)
- Repository package contains the MyMongoCollectionRepository class, which implements mongo queries to db and the exception package for basic error handling.
- Rest package consists only of the EirRestController which is responsible for handling GET Requests, listening at http://localhost:8080/

- Parameters of each request are url encoded by each client and decoded by service itself. If no proper parameter was parsed, an exception is raised returning an HTTP Response with status code 400.

Brief description of code: Front-end

A component oriented solution was chosen:

- Dataservice service-component is responsible for consuming back-end REST service and offering a simple interface for all the other components for each other component.
- Home component rendering home page
- Stats component offering a basic page for all the known utilities of Web App

- Each component includes a .css and an html file for its appearance and a .ts file for its functionality
- All calls to back-end service are done asynchronously, offering a more responsive, non-blockin ui

Working Examples

- Running all servers in the same machine under a linux distro:

  ng serve

  ./mvnw spring-boot:run

```
[redacted]:front-end$ ng serve

chunk {main} main.js, main.js.map (main) 58 kB [initial] [rendered]
chunk {polyfills} polyfills.js, polyfills.js.map (polyfills) 141 kB [initial] [rendered]
chunk {runtime} runtime.js, runtime.js.map (runtime) 6.15 kB [entry] [rendered]
chunk {styles} styles.js, styles.js.map (styles) 330 kB [initial] [rendered]
chunk {vendor} vendor.js, vendor.js.map (vendor) 4.42 MB [initial] [rendered]
Date: [redacted] - Time: 21084ms
** Angular Live Development Server is listening on localhost:4200, open your browser on http://localhost:4200/ **
: Compiled successfully.
```

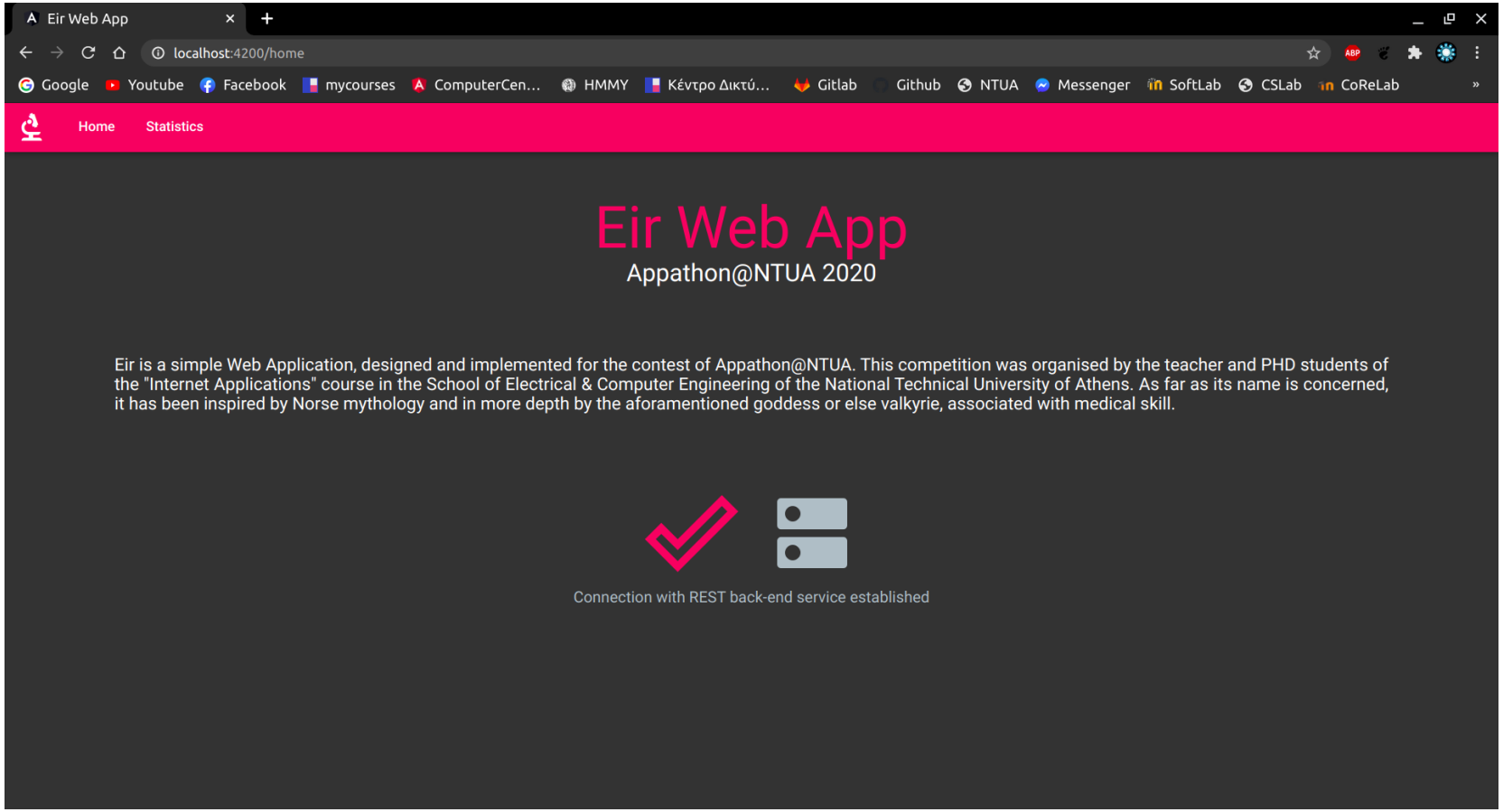
```
  .   ____          _            __ _ _
 /\\ / ___'_ __ _ _(_)_ __  __ _ \ \ \ \
( ( )\___ | '_ | '_| | '_ \/ _` | \ \ \ \
 \\/  ___)| |_)| | | | | || (_| |  ) ) ) )
  '  |____| .__|_| |_|_| |_\__, | / / / /
 =========|_|==============|___/=/_/_/_/
 :: Spring Boot ::        (v2.3.2.RELEASE)

2020-08-12 22:50:48.306  INFO 17036 --- [           main] g.n.e.internetappli.eir.EirApplication   : Starting EirApplication on [redacted] wit
h PID 17036 ([redacted]/Eir-Appathon-NTUA/back-end/target/classes started b
y john in [redacted]/Eir-Appathon-NTUA/back-end)
2020-08-12 22:50:48.308  INFO 17036 --- [           main] g.n.e.internetappli.eir.EirApplication   : No active profile set, falling back
 to default profiles: default
2020-08-12 22:50:48.860  INFO 17036 --- [           main] .s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data MongoDB r
epositories in DEFAULT mode.
2020-08-12 22:50:48.922  INFO 17036 --- [           main] .s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository sca
nning in 58ms. Found 1 MongoDB repository interfaces.
2020-08-12 22:50:49.372  INFO 17036 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat initialized with port(s): 80
80 (http)
2020-08-12 22:50:49.395  INFO 17036 --- [           main] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2020-08-12 22:50:49.395  INFO 17036 --- [           main] org.apache.catalina.core.StandardEngine  : Starting Servlet engine: [Apache To
mcat/9.0.37]
2020-08-12 22:50:49.466  INFO 17036 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring embedded WebApp
licationContext
2020-08-12 22:50:49.466  INFO 17036 --- [           main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initial
ization completed in 1116 ms
2020-08-12 22:50:49.625  INFO 17036 --- [           main] org.mongodb.driver.cluster               : Cluster created with settings {host
s=[localhost:27017], mode=SINGLE, requiredClusterType=UNKNOWN, serverSelectionTimeout='30000 ms'}
2020-08-12 22:50:49.670  INFO 17036 --- [localhost:27017] org.mongodb.driver.connection            : Opened connection [connectionId{loc
alValue:1, serverValue:1}] to localhost:27017
2020-08-12 22:50:49.675  INFO 17036 --- [localhost:27017] org.mongodb.driver.cluster               : Monitor thread successfully co
ed to server with description ServerDescription{address=localhost:27017, type=STANDALONE, state=CONNECTED, ok=true
xWireVersion=8, maxDocumentSize=16777216, logicalSessionTimeoutMinutes=30, roundTripTimeNanos=2916578}
2020-08-12 22:50:50.397  INFO 17036 --- [           main] o.s.s.concurrent.ThreadPoolTaskExecutor  : Initializing
cationTaskExecutor'
```

```
[redacted]:~$ sudo systemctl status mongod
● mongod.service - MongoDB Database Server
   Loaded: loaded (/lib/systemd/system/mongod.service; disabled; vendor preset:
   Active: active (running) since [redacted] ago
     Docs: https://docs.mongodb.org/manual
 Main PID: 16577 (mongod)
   CGroup: /system.slice/mongod.service
           └─16577 /usr/bin/mongod --config /etc/mongod.conf
```

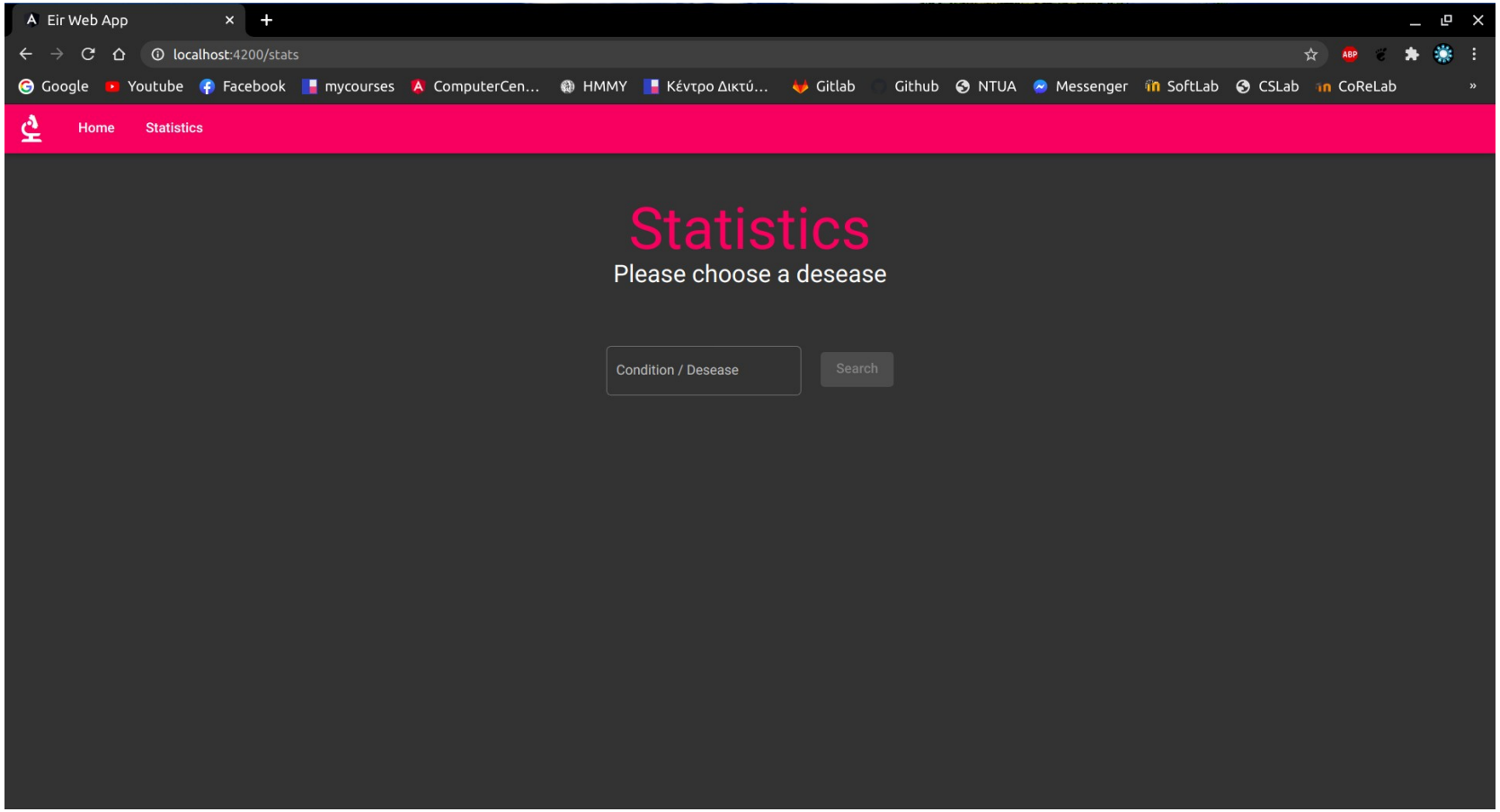
Working Examples

Home Page



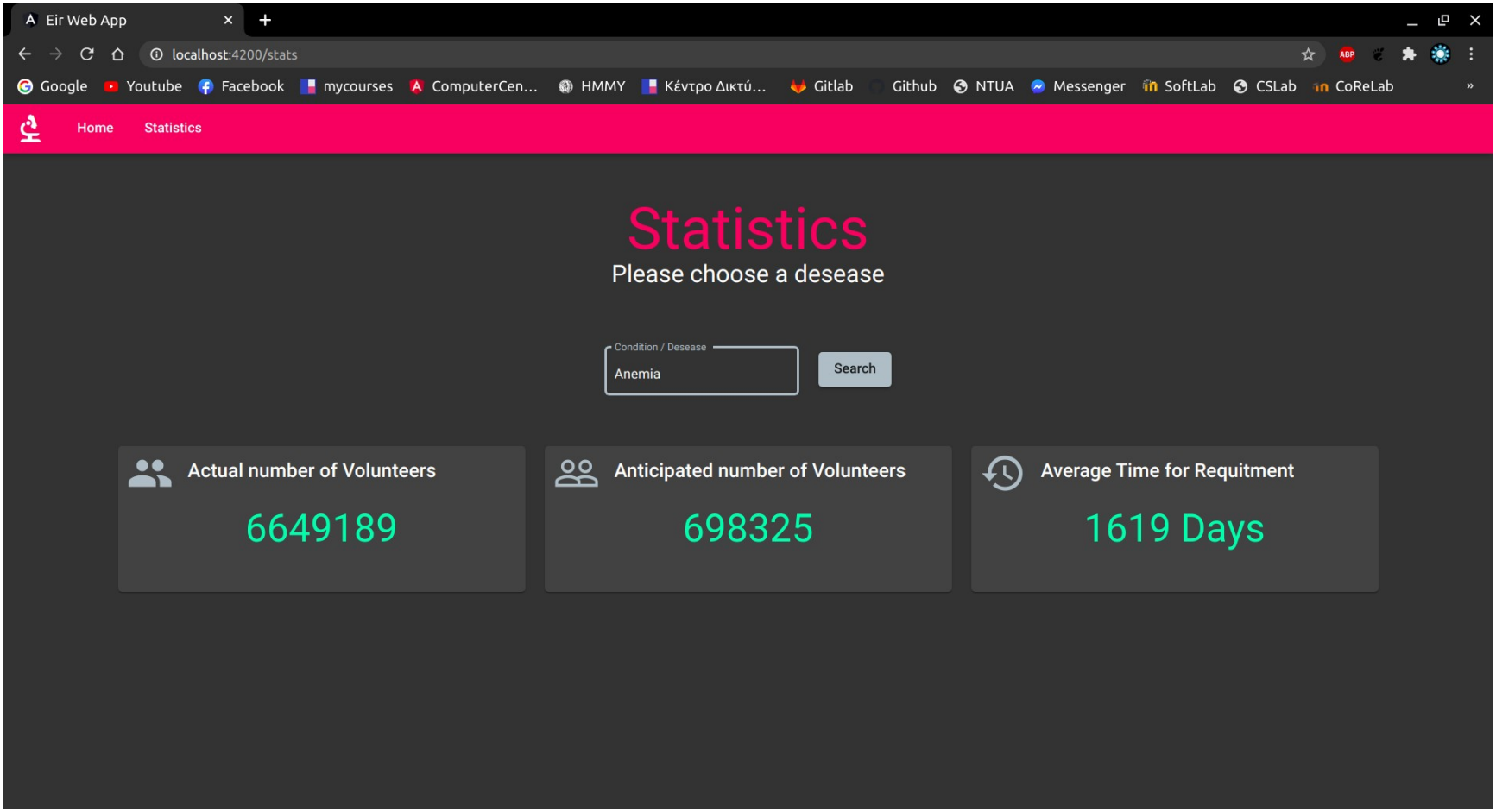
Working Examples

Statistics Page



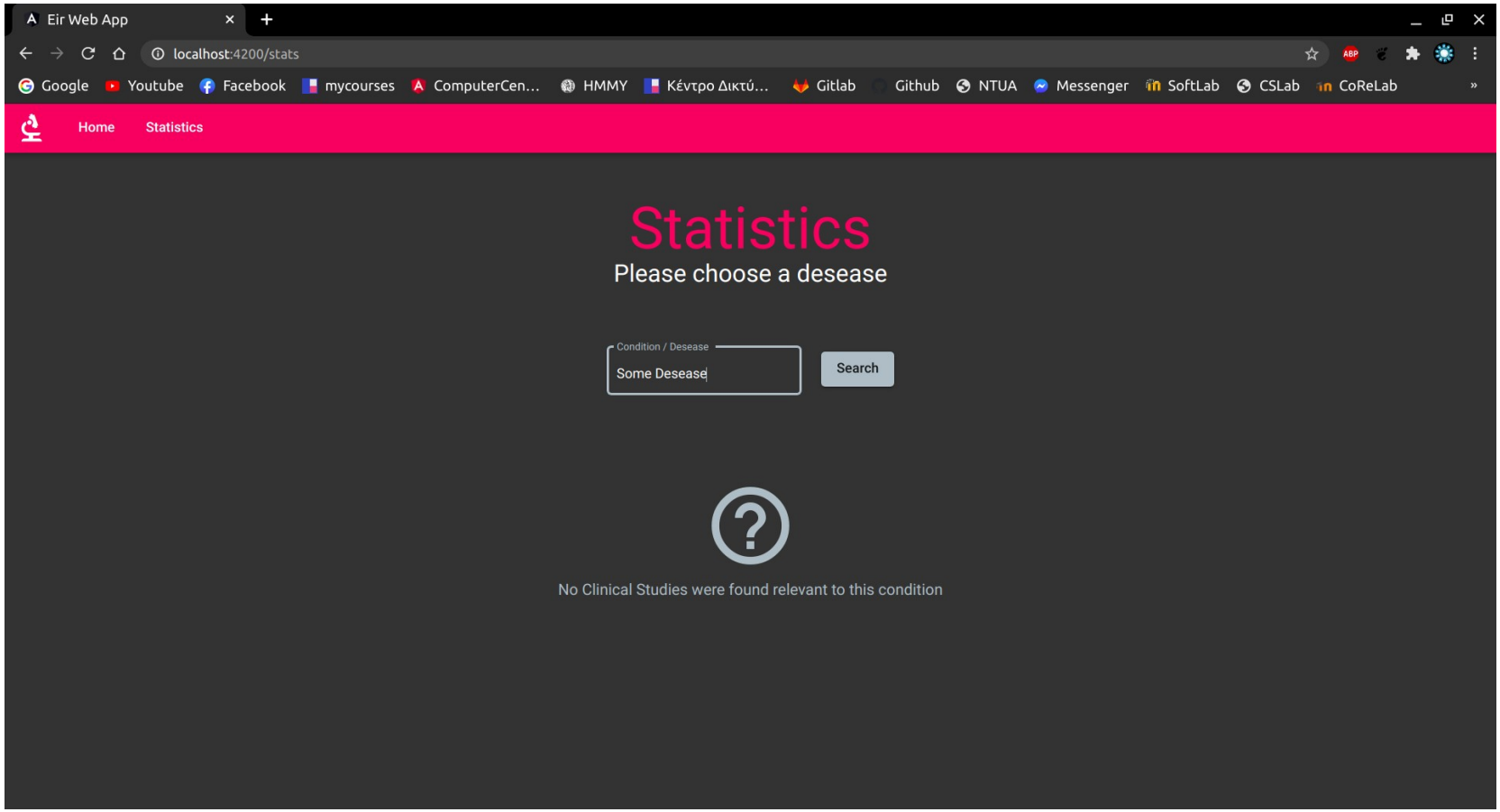
Working Examples

Statistics Page



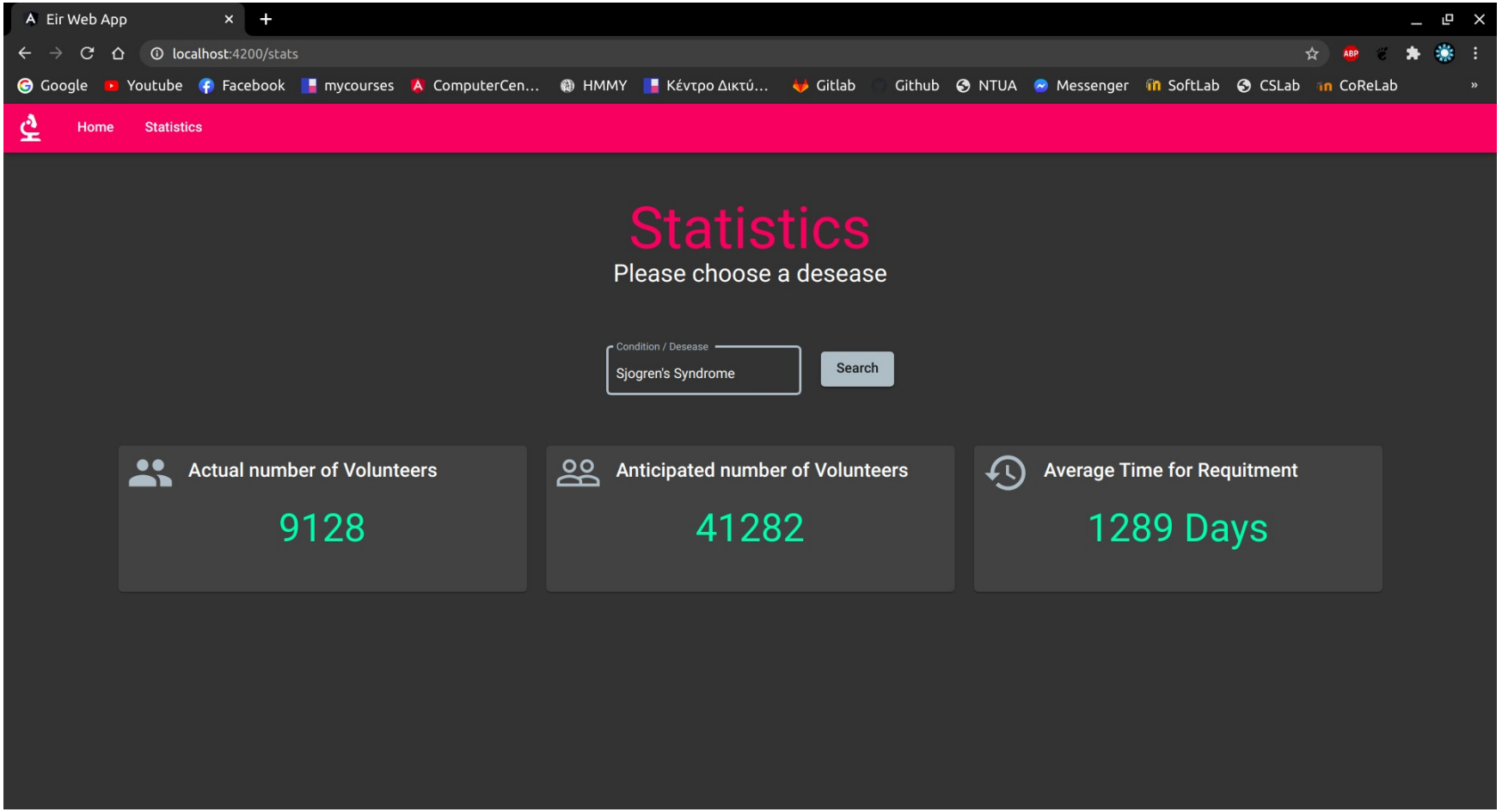
More Examples

Statistics Page



More Examples

Statistics Page



Further Information

- GitHub Repository: https://github.com/john98nf/Eir-Appathon-NTUA
- Appathon 2020 NTUA: http://147.102.19.19/wordpress (probably unavailable)
- Internet Applications:https://www.ece.ntua.gr/en/undergraduate/courses/3346
- School of Electrical & Computer Engineering: https://www.ece.ntua.gr/en
- National Technical University of Athens: https://www.ntua.gr/en/

Closure

Thank you for your time!

Giannis Fakinos