



NATIONAL RESEARCH
UNIVERSITY

Высшая Школа Экономики
Московский Институт Электроники и Математики

**Групповой интернет-проект:
Разработка приложения для
мониторинга и предсказания
статистики по коронавирусу
COVID-19**

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Постановка задачи

Разработка приложения для мониторинга и предсказания статистики по коронавирусу COVID-19 на языке Python с использованием фреймворка Flask, JavaScript, HTML5, CSS3, SASS, SQL.

- Актуальная статистика по Коронавирусу
- Возможность предсказаний числа заболевших и умерших
- Разработка API для получения данных
- Реализация базы данных
- Система авторизации

Код проекта:

https://github.com/yaiestura/coronavirus_prediction

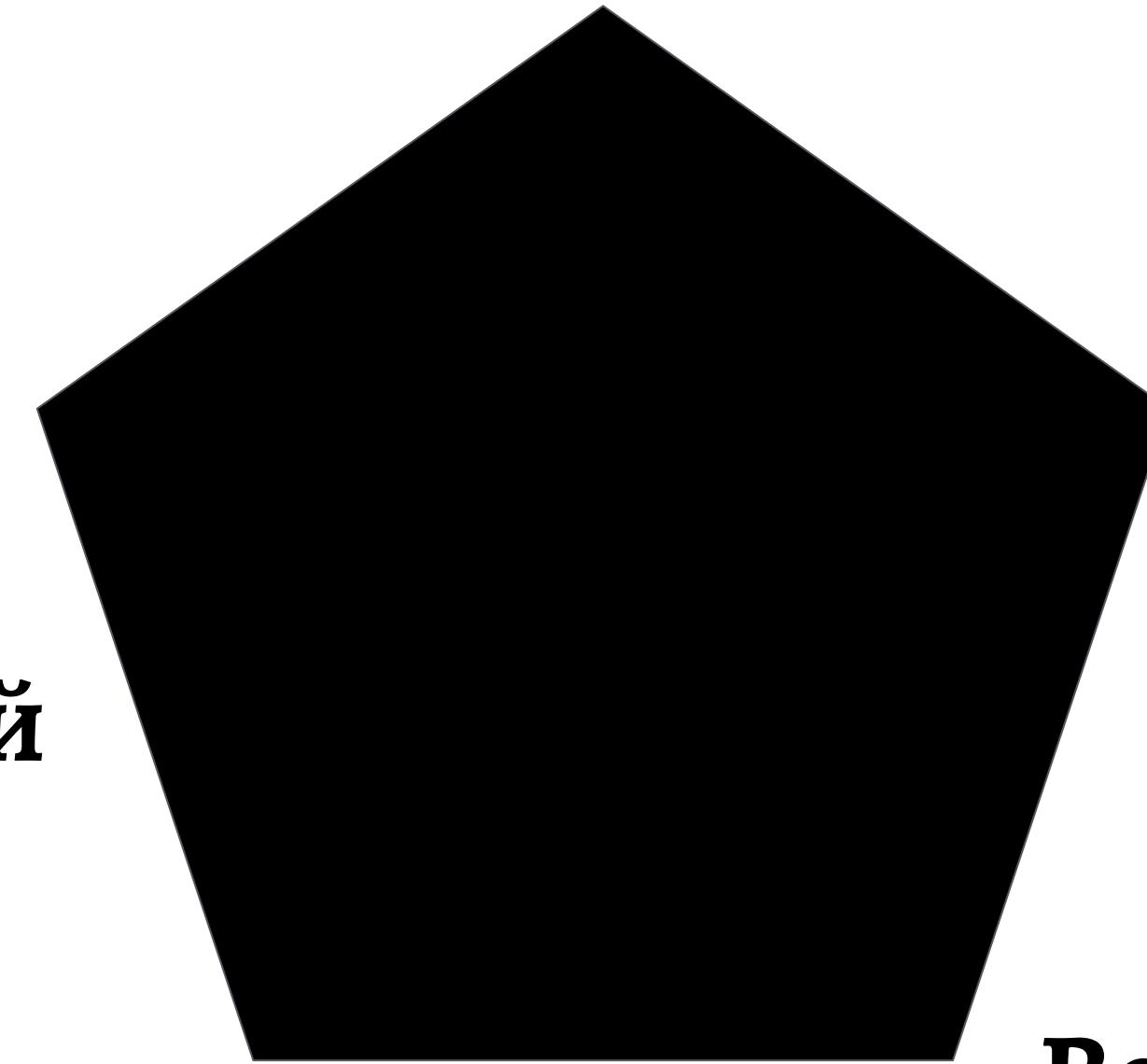


Актуальность

COVID-19

Более 390 тыс.
случаев
заражения,
17000+ смертей

Современные
приложения,
адаптивность, стиль



Использование
нейросетей для
предсказаний

Веб-разработка,
комплексные страницы,
Dashboard, инфографика,
разнообразие фреймворков



Новизна

- Веб-приложение для ознакомления со статистикой по Коронавирусу
- Возможность предсказаний числа Коронавирусных заболеваний
- Написание собственного API сервиса для получения данных
- Современный дизайн, собственный стиль, использование SASS
- Приложение с авторизацией
- Google Авторизация



Область применения

- Обычные пользователи интернета, просмотр последней информации и статистики
- Центры сбора статистики и анализа данных
- Возможность платной подписки с расширенными возможностями (напр. полноценный и расширенный PDF-отчет)
- Врачи, ученые, мировое сообщество
- Веб-программисты, Backend/FrontEnd разработчики
- Блог по Коронавирусу, публикация новостей и мнений
- Вклад в открытое сообщество / community (напр. Github)



Метрики проекта

1. 4 недели
2. Более 6800 строк кода
3. 20+ страниц
4. 24 HTML страницы
5. 20+ использованных сторонних JS скриптов, 25+ собственных JS скриптов
6. 15+ ключевых скриптов и файлов Python



Обзор и анализ аналогов

Как таковых комплексных аналогов не существует, т.к Коронавирус начал активно распространяться в последние 3 месяца.

Попытка написания полноценного комплексного Full-Stack Веб-приложения на Python комбинируя лучшее от существующих источников и аналогов.

Большинство аналогов, карт предлагают свежие и актуальные данные по статистике, предлагают интерактивный обзор, карты, инфографику по дням.

Большинство аналогов - зарубежные, все мониторы Коронавируса в основном от известных организаций по статистике и здравоохранению - WHO, John Hopkins University, Stanford, Зарубежных новостных агентств и центров по анализу данных.



Основной сайт-аналог, откуда берутся данные

worldometer Coronavirus Population

<https://www.worldometers.info/coronavirus/>

COVID-19 CORONAVIRUS PANDEMIC

Last updated: March 24, 2020, 10:24 GMT

[Case Graphs](#) - [Death Graphs](#) - [Countries](#) - [Death Rate](#) - [Incubation](#) - [Age](#) - [Symptoms](#) - [News](#)

Coronavirus Cases:

386,962

[view by country](#)

Deaths:

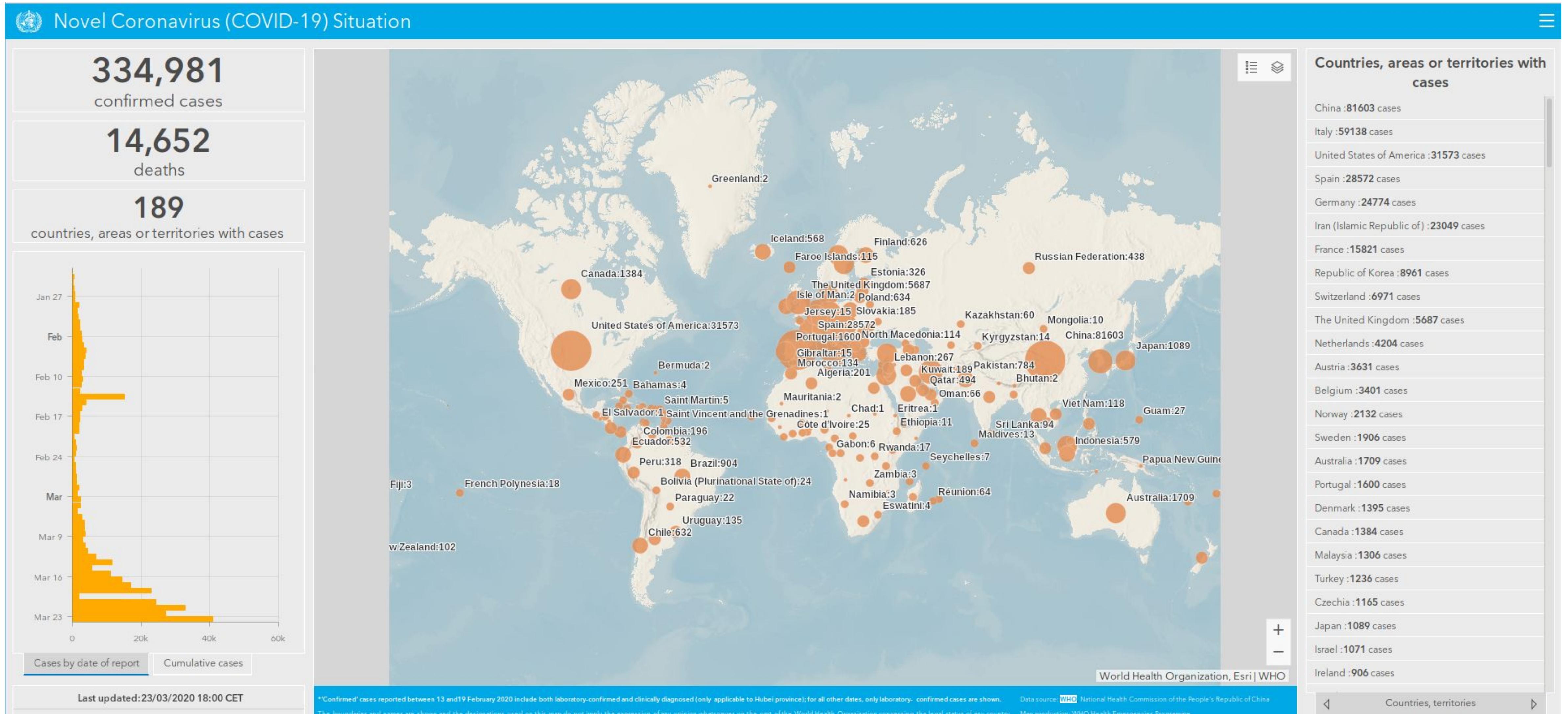
16,751

Recovered:

102,404

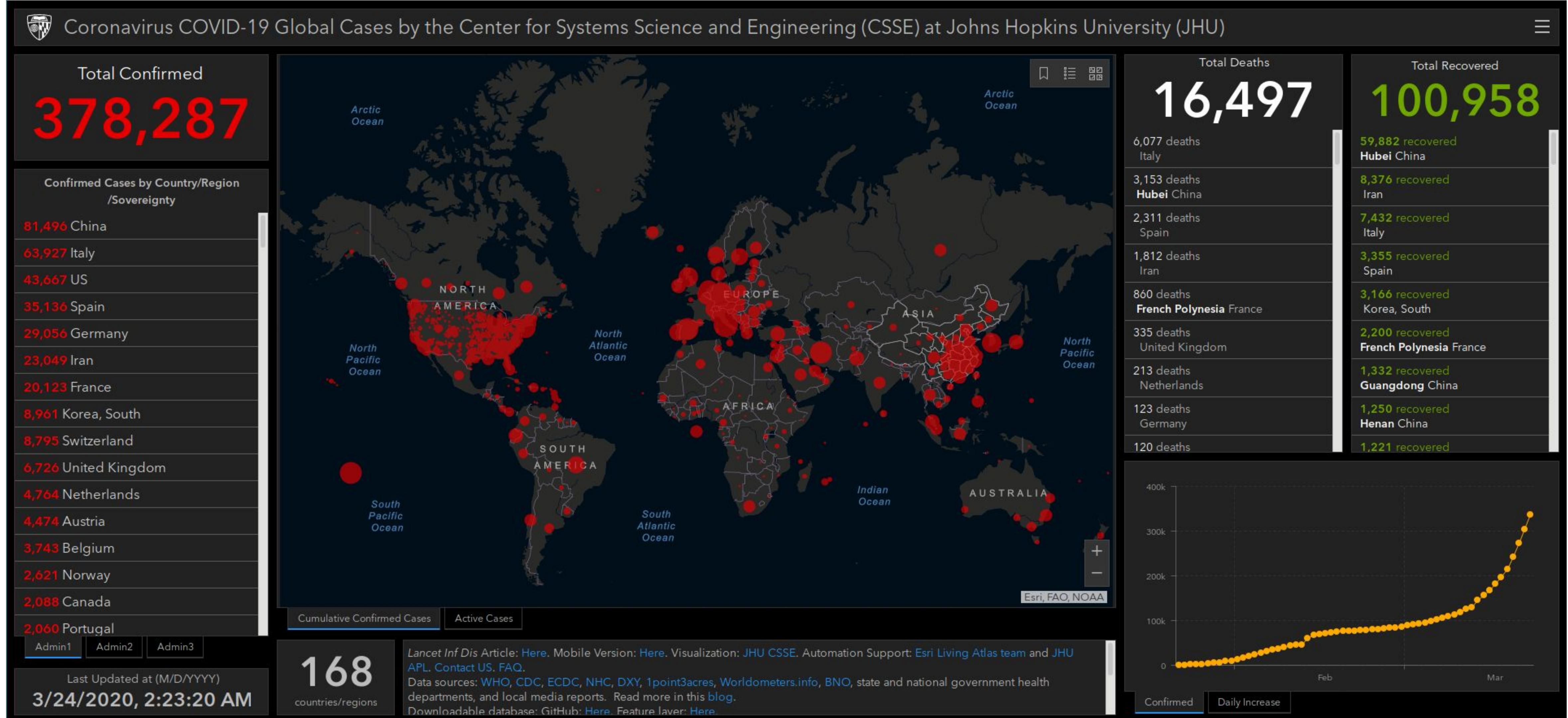


Примеры страниц аналогов (WHO Dashboard)





Примеры страниц аналогов (JHU University)





План выполнения проекта

1. Инициализация проекта
2. Определение структуры проекта
3. Размышления над дизайном проекта
4. Определение цветовой палитры, создание логотипа
5. Шаблонный HTML-код
6. Написание парсера данных
7. Создание и реализация Базы Данных
8. Инициализация логики приложения, путей
9. Landing страница
10. Dashboard страницы
11. Блог страницы
12. Написание нейросети
13. Обучение нейросети и сохранение моделей
14. Инфографика, карты, графики
15. Страница документации
16. Тестирование проекта
17. Публикация в репозиторий



Обоснование выбора средств разработки



Микрофреймворк для создания веб-приложений на языке программирования Python, использующий набор инструментов Werkzeug, а также шаблонизатор Jinja2.

	Flask	Django
Тип фреймворка	Минифреймворк	Full Stack Веб-фреймворк
Опыт	Легкость в обучении	Высокий порог входа
Аутентификация	Нет аутентификации, Flask-Login	Встроенная аутентификация
Базы данных	Flask-SQLAlchemy	Встроенная ORM и СУБД
Формы	Не поддерживает формы, WTForms	Встроенные формы
Админ-панель	Нет административного интерфейса, Flask-Admin	Панель администратора - Django Admin



Работа во Flask

HTML-Template (Jinja2)

```
{% extends  
"dashboard/coronavirus/layout.html"  
%}  
{% block scripts %}  
    Код CSS  
{% endblock %}  
{% block content %}  
{% for country in countries %}  
    <div></div>  
{% endfor %}  
{% endblock %}  
{% block scripts %}  
    Код JS скриптов  
{% endblock %}
```

Route (логика работы)

```
@main.route("/countries", methods=['GET', 'POST'])  
@login_required  
def countries():  
    countries = CountriesAdvDataParser()  
    countries_data = countries.get_countries()  
  
    return  
    render_template('dashboard/coronavirus/countries.ht  
ml', countries=countries_data,  
    username=current_user.username,  
    avatar=current_user.image_file,)
```



Обоснование выбора средств разработки

1. Bootstrap 4 - Веб фреймворк со встроенной адаптивностью, Grid-системой
2. JQuery - JS фреймворк
3. SASS - расширение над CSS, новые возможности и улучшения
4. AmCharts 4 - библиотека для работы с графикой, визуализацией, картами
5. БД SQLite - реляционная SQL база данных
6. Beautiful Soup 4 - библиотека Python для парсинга данных
7. Flask-SQLAlchemy - библиотека для работы с реляционными БД во Flask
8. Flask-Login - библиотека для работы с авторизацией и логикой Oauth во Flask
9. Pytorch 1.4 - библиотека Python для написания нейросетей
10. VSCode - редактор кода

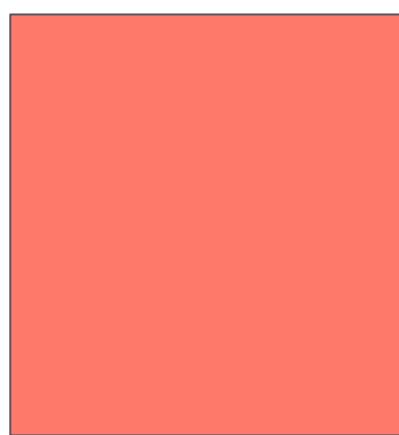
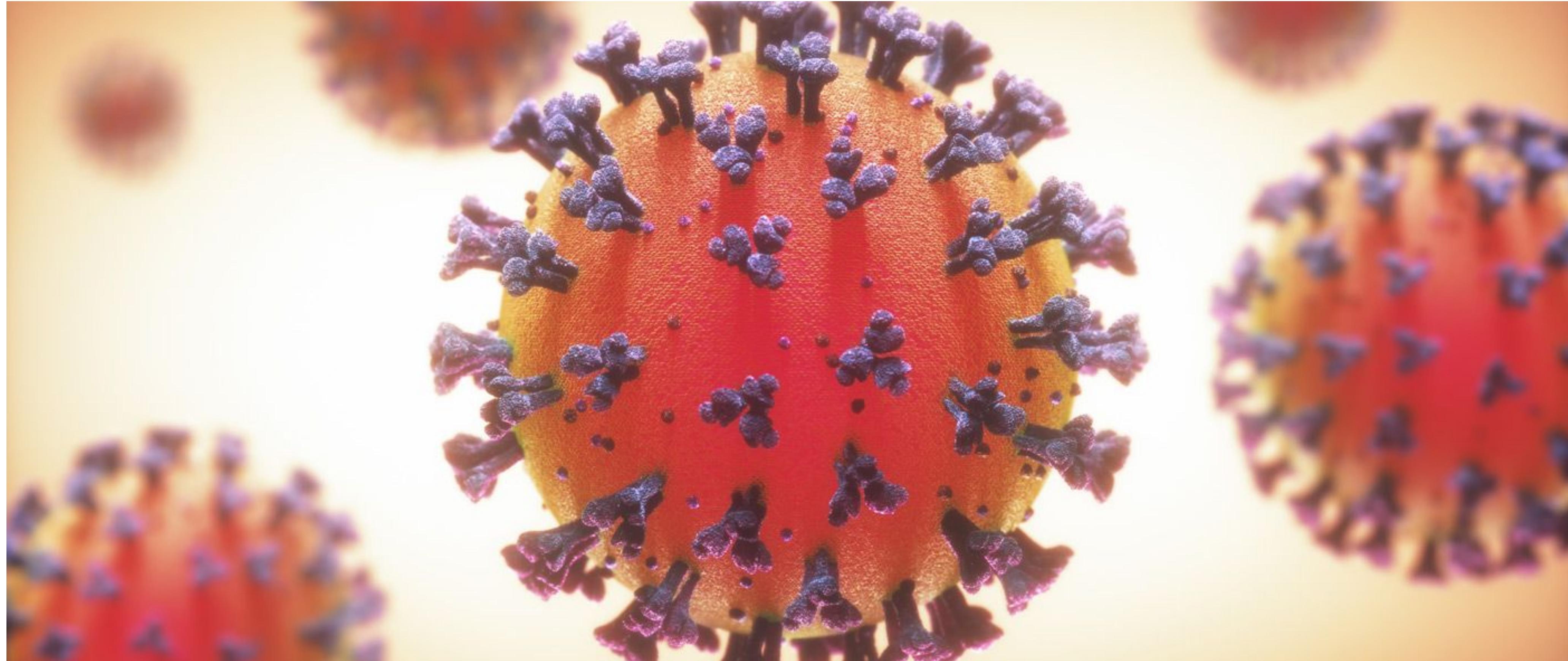


“Фишки” проекта

1. Данные по COVID-19 в режиме реального времени
2. REST API (API, возможность получить данные в сыром виде - json)
3. Система авторизации пользователей
4. Google Авторизация
5. Система обработки HTTP ошибок (ошибки 403, 404, 500) - соотв. страницы
6. Нейросеть, предсказания модели по случаям и смертям (до 10 дней)
7. Возможность переобучить модель по новым данным
8. База данных (реляционная, SQL)
9. Визуализации, инфографика, карты, графики и пр.
10. Блог (возможность написания и публикации постов)
11. Возможность генерации PDF-отчета



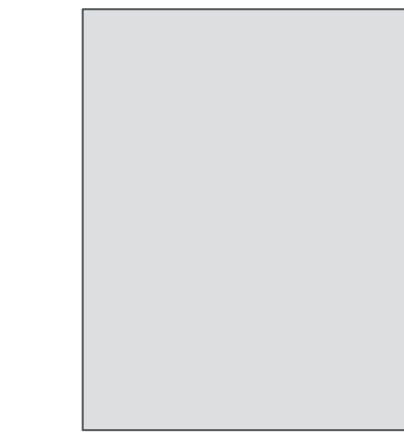
Основные цвета



#fd7a6b



#404e67



Белый, серый, оттенки
серого



Создание логотипа в фотошоп



Символ(значок) вируса и текст - covid (референс на коронавирус, COVID-2019)

Сохранение основных цветов в логотипе, на белом фоне используется синяя заливка текста



Обоснование выбора средств разработки

Библиотека JS - AmCharts для визуализации данных, графиков, карт

The screenshot shows the official website for AmCharts. At the top, there is a dark header bar with the AmCharts logo (a blue mountain icon) on the left and navigation links for Products, Demos, Download, Buy, Support, and Docs on the right. A magnifying glass icon for search is also present. Below the header, a large white text area contains the slogan "Hey, amCharts, can you bend it?" followed by the main title "JavaScript Charts & Maps" in a large, bold, white font. Underneath the title, a subtitle reads "Programming library for all your data visualization needs." To the right of the title, there is a large, stylized bar chart composed of several blue bars of increasing height, with one bar being yellow. At the bottom left, there is a blue button labeled "Check product features". Below this button are two smaller links: "Check demos" with a monitor icon and "Licensing" with a document icon.



Обоснование выбора средств разработки

Библиотека JS - AmCharts - пример для работы с картами (Maps)

The screenshot shows a world map visualization using the AmCharts library. The map is color-coded by country, primarily in shades of blue. A zoomed-in inset map of the world is visible in the top right corner. On the left side, there are navigation controls: 'Previous' and 'Next' buttons, a 'All demos' link, and a search bar. On the right side, there is a 'Select a theme:' dropdown menu with various color options and a 'Customize' button. At the bottom, there is a title 'Zooming to Countries Map', a 'Demo source' link, and a 'Open in:' button with icons for browser, cloud, and code editor.

Products Demos Download Buy Support Docs

Previous All demos Next

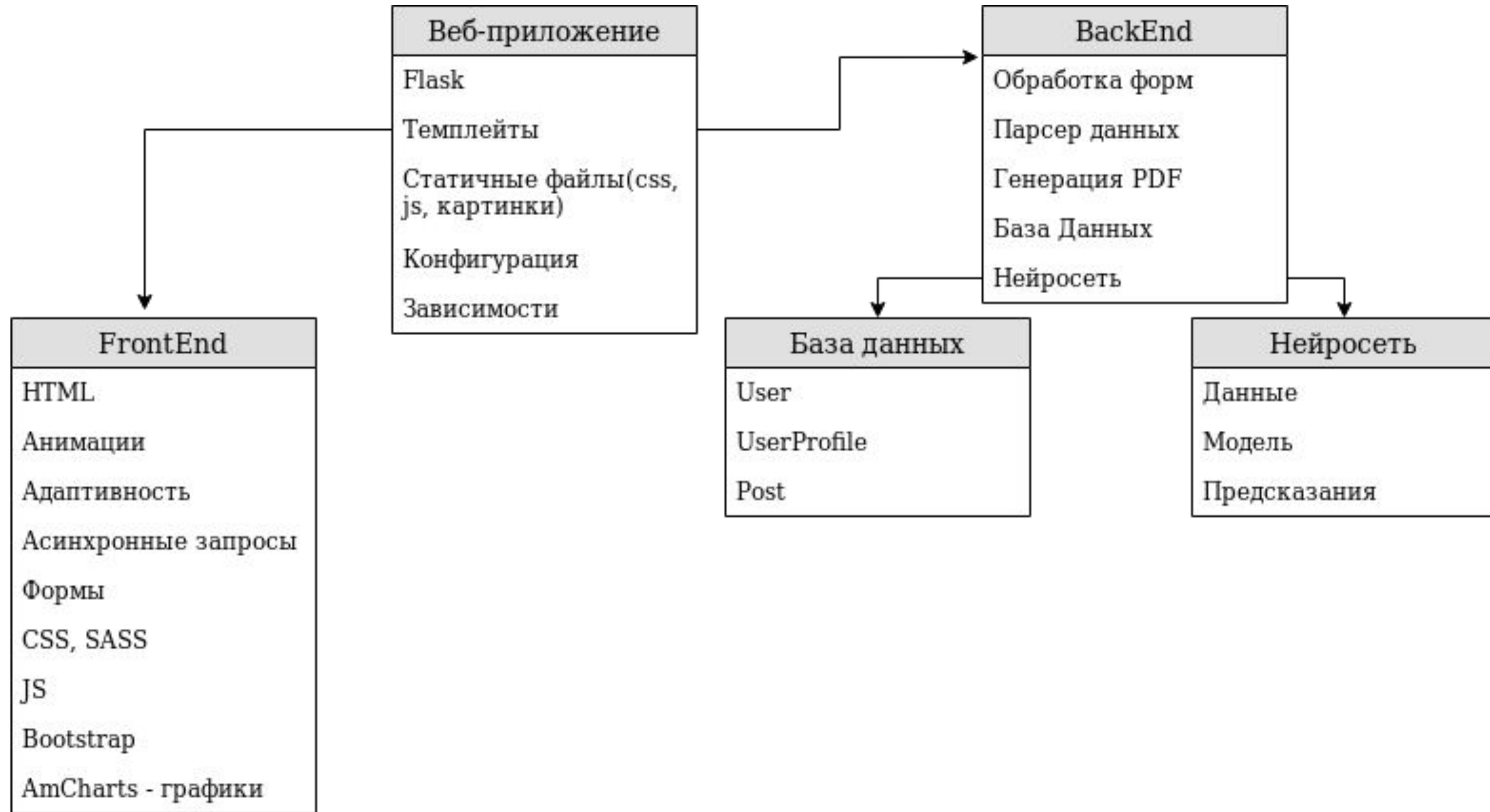
Select a theme:

Zooming to Countries Map

Demo source

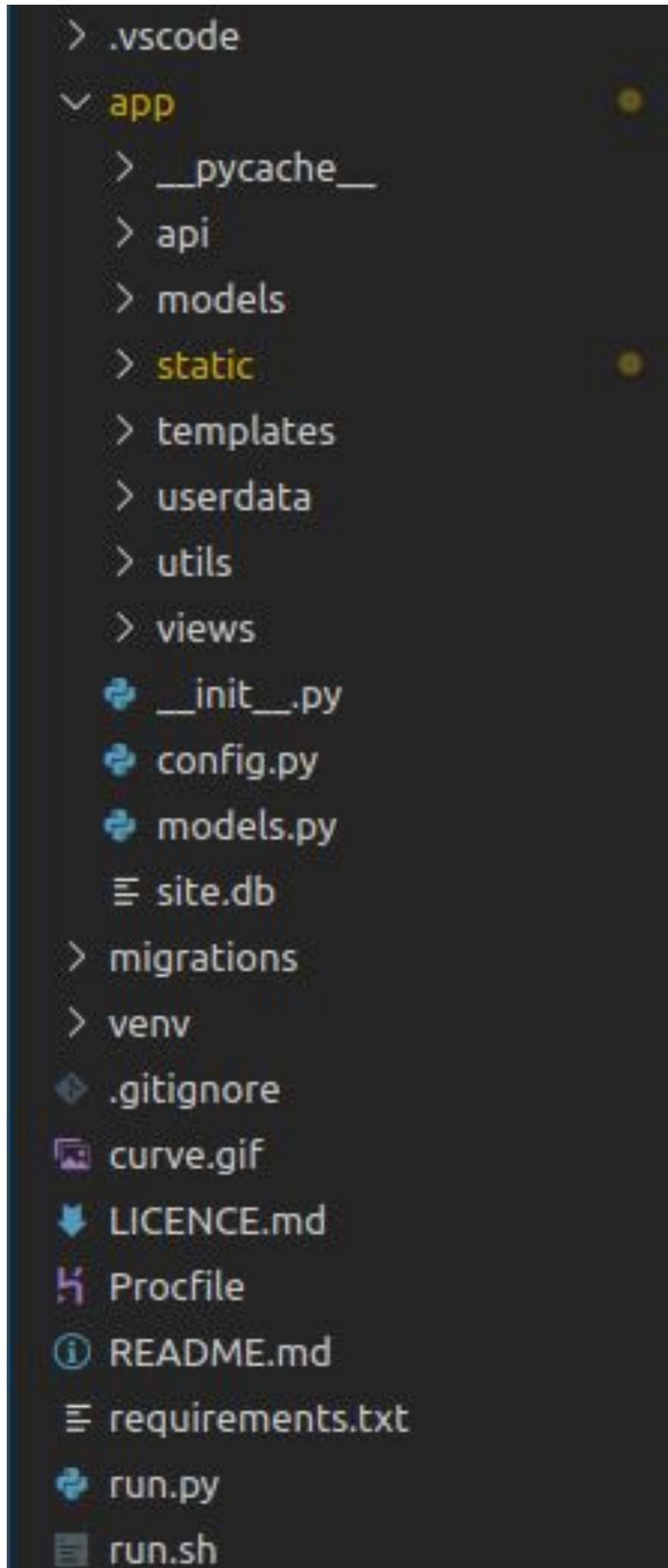
Open in:

Структура проекта





Структура проекта



Папка app - корневая папка с приложением Flask

Папка api - REST API приложения, парсеры, источники данных

Папка models - модели cases.pth, deaths.pth Нейронной сети

Папка static - статичные файлы приложения(javascript, css, sass, картинки, лого)

Папка templates - html темплейты и layout приложения

Папка userdata - пользовательские данные(напр. PDF отчеты)

Папка utils - вспомогательные Python скрипты и код

Папка views - Blueprints и Views приложения - формы и вся логика приложения

config.py - основная конфигурация приложения Flask

models.py - описание таблиц и создание таблиц БД

site.db - сама физическая БД, хранимая на диске / сервере

Папка migrations - папка с миграциями Базы Данных

Папка venv - виртуальное окружение Python

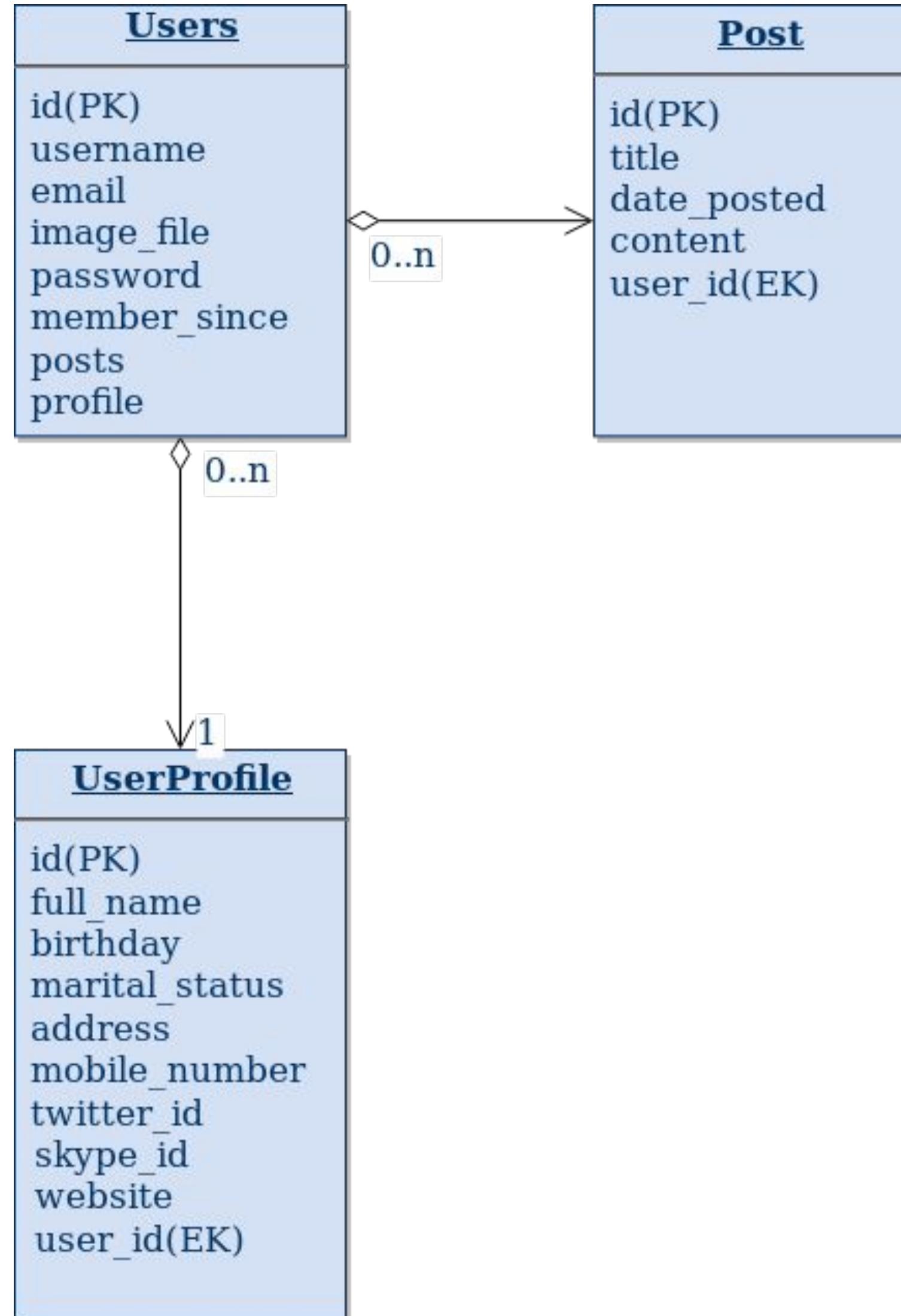
requirements.txt - список зависимостей(библиотек Python) приложения

Procfile - файл для деплоимента приложения на Heroku

run.py - Python скрипт для запуска приложения Flask локально

run.sh - bash скрипт для запуска приложения

База данных



База данных - реляционная SQLite 3, site.db

Для создания и управления БД используется
Flask-SQLAlchemy

Три таблицы в Базе данных: Юзер, Профиль Юзера,
Посты юзера

Добавление:

```

>>> me = User('admin', 'admin@example.com')
>>> db.session.add(me)
>>> db.session.commit()
  
```

Запросы:

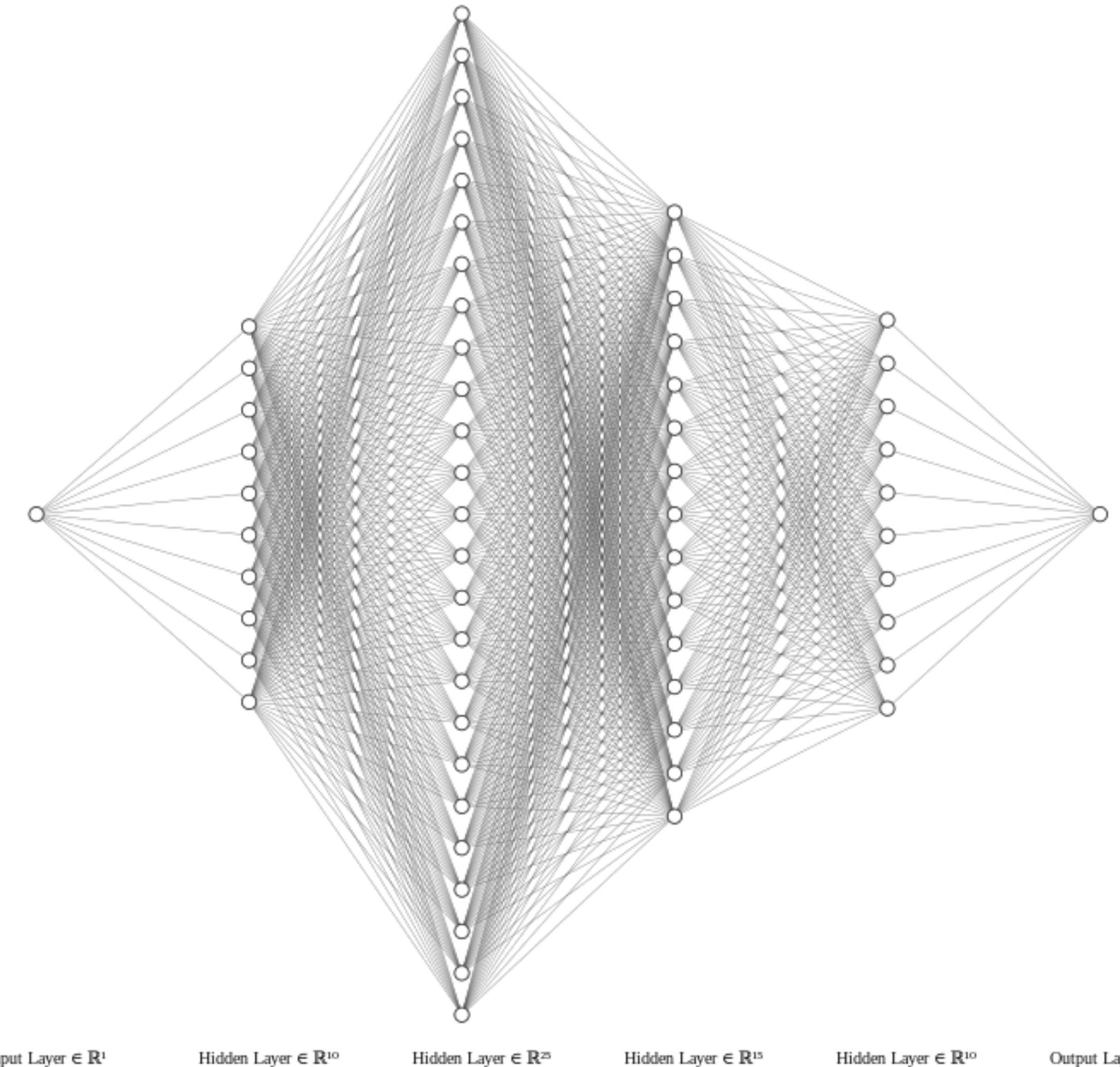
```

>>> user = User.query.filter_by(username='admin').first()
  
```

Архитектура нейросети

```
class Net(torch.nn.Module):
    def __init__(self, n_feature, n_hidden, n_output):
        super(Net, self).__init__()
        self.hidden = torch.nn.Linear(n_feature,
n_hidden).to(device)
        self.hidden1 = torch.nn.Linear(n_hidden, 800).to(device)
        self.hidden2 = torch.nn.Linear(800, 500).to(device)
        self.hidden3 = torch.nn.Linear(500, n_hidden).to(device)
        self.predict = torch.nn.Linear(n_hidden,
n_output).to(device)
```

1 входной слой, 4 скрытых линейных слоя, 1 выходной слой





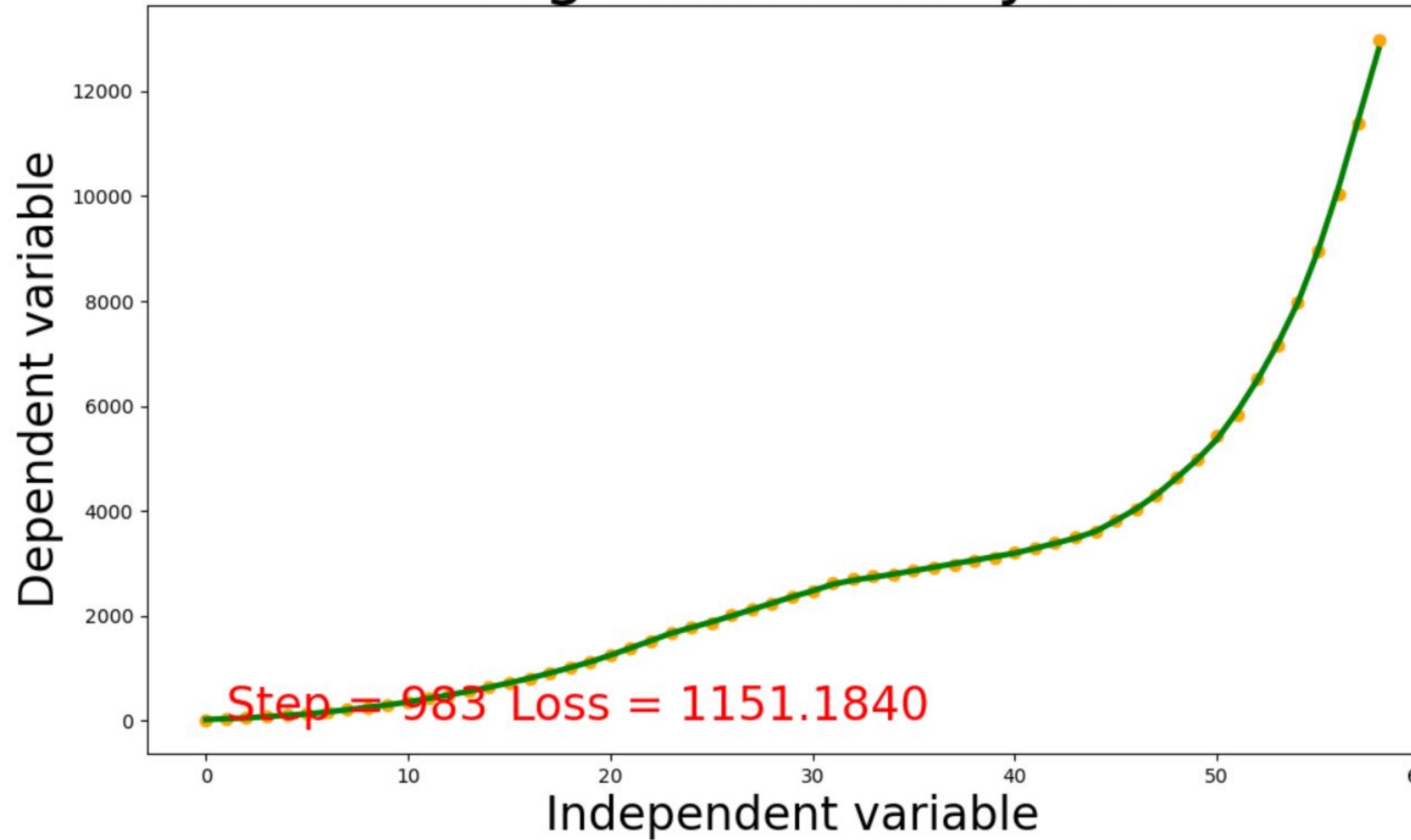
Работа с нейросетью

```
28 class Net(torch.nn.Module):
29     def __init__(self, n_feature, n_hidden, n_output):
30         super(Net, self).__init__()
31         self.hidden = torch.nn.Linear(n_feature, n_hidden).to(device)
32         self.hidden1 = torch.nn.Linear(n_hidden, 800).to(device)
33         self.hidden2 = torch.nn.Linear(800, 500).to(device)
34         self.hidden3 = torch.nn.Linear(500, n_hidden).to(device) # hidden layer
35         self.predict = torch.nn.Linear(n_hidden, n_output).to(device) # output layer
36
37     def forward(self, x):
38         x = F.relu(self.hidden(x))      # activation function for hidden layer
39         x = F.relu(self.hidden1(x))
40         x = F.relu(self.hidden2(x))
41         x = F.relu(self.hidden3(x))
42         x = self.predict(x)           # linear output
43
44     return x
```



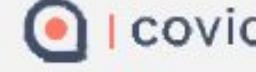
Работа с нейросетью

Regression Analysis





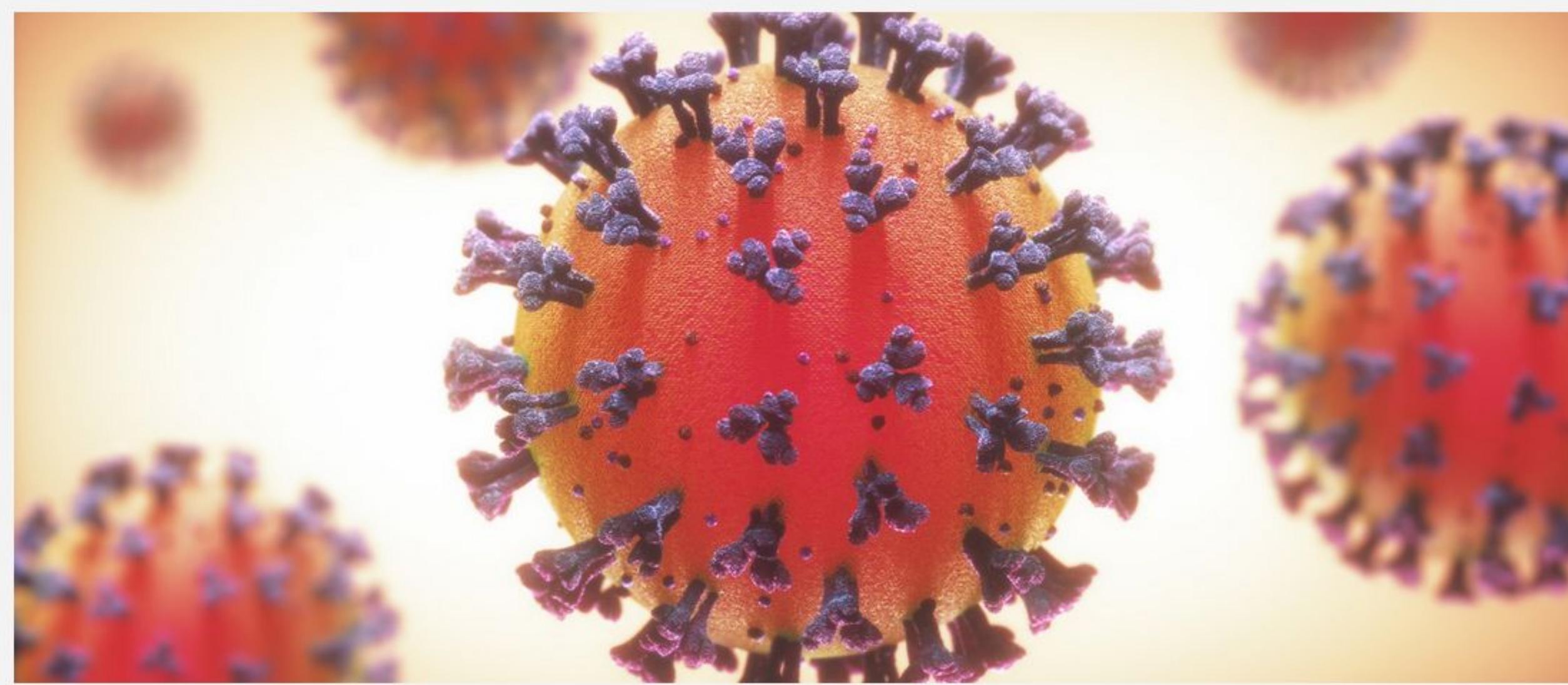
Сценарии работы приложения (Landing)

 covid DASHBOARD BLOG DOCS IMPORTANT BENEFITS TESTIMONIALS PRICING CONTACT LOGOUT

Coronavirus Prediction Web Application

Coronavirus disease (COVID-19) Latest Information

DASHBOARD SOLUTIONS





Сценарии работы приложения (Pricing)

The screenshot shows a pricing table for the i covid application. It features three plans: FREE, STANDARD, and PREMIUM. The STANDARD plan is highlighted with a red background. Each plan includes a price, a list of features, and a 'GET PLAN' button.

Plan	Price	Features
FREE	\$0 /MON	5 Countries 1 day update delay World map 24/7 Support
STANDARD	\$2 .99 /MON	170+ Countries Live updates World map 24/7 Support Predictions
PREMIUM	\$4 .99 /MON	170+ Countries Live updates World map Predictions Premium advices 24/7 Support

Pricing Table
We provide several membership variants. Get the right plan that suits you.



Сценарии работы приложения (Sign Up)

The screenshot shows the sign-up screen of a mobile application. At the top left is the app's logo, "covid". At the top right is a small square icon with a grid pattern. The main form is titled "Sign up" and includes a red "Login With Google" button. Below it is a link "Sign up with your regular account". The form has fields for "Username" (empty), "Email" (empty), "Password" (empty), and "Confirm Password" (empty). There is also a checkbox labeled "I read and accept Terms & Conditions." which is unchecked. At the bottom is a red "Sign Up" button and a link "Already have an account? Sign in here".

covid

Sign up

Login With Google

Sign up with your regular account

Username

Email

Password

Confirm Password

I read and accept Terms & Conditions.

Sign Up

Already have an account? [Sign in here](#)



Сценарии работы приложения (Terms & Cond)

The screenshot shows a mobile application interface. At the top left is a navigation bar with a camera icon and the text "covid". On the right side of the screen is a large, semi-transparent dark overlay. In the center of this overlay is a white modal window titled "Terms & Conditions." Below the title is a section titled "Terms of Service" with a detailed legal text. At the bottom of the modal are two buttons: "Close" (gray) and "Accept" (orange). The background of the main screen is dark and features a sign-up form. The form includes fields for "Username" (empty), "Email" (empty), "Password" (empty), and "Confirm Password" (empty). Below these fields is a checkbox labeled "I read and accept Terms & Conditions." followed by a "Sign Up" button (orange). At the bottom of the sign-up form, there is a link "Already have an account? Sign in here".

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Сценарии работы приложения (Sign In)

The screenshot shows the sign-in interface of the iCovid app. At the top left is the app's logo and name. The main screen has a dark background with a white sign-in card centered. The card features a "Sign In" title at the top, followed by a red "G Login With Google" button. Below it is a "Sign in with your regular account" link. There are two input fields: "Email" and "Password". Underneath them are "Remember Me" and "Forgot Password?" links. At the bottom is a large red "Login" button, and below it is a link for users who don't have an account: "Don't have an account? Register here for free!".

i covid

Sign In

G Login With Google

Sign in with your regular account

Email

Password

Remember Me [Forgot Password?](#)

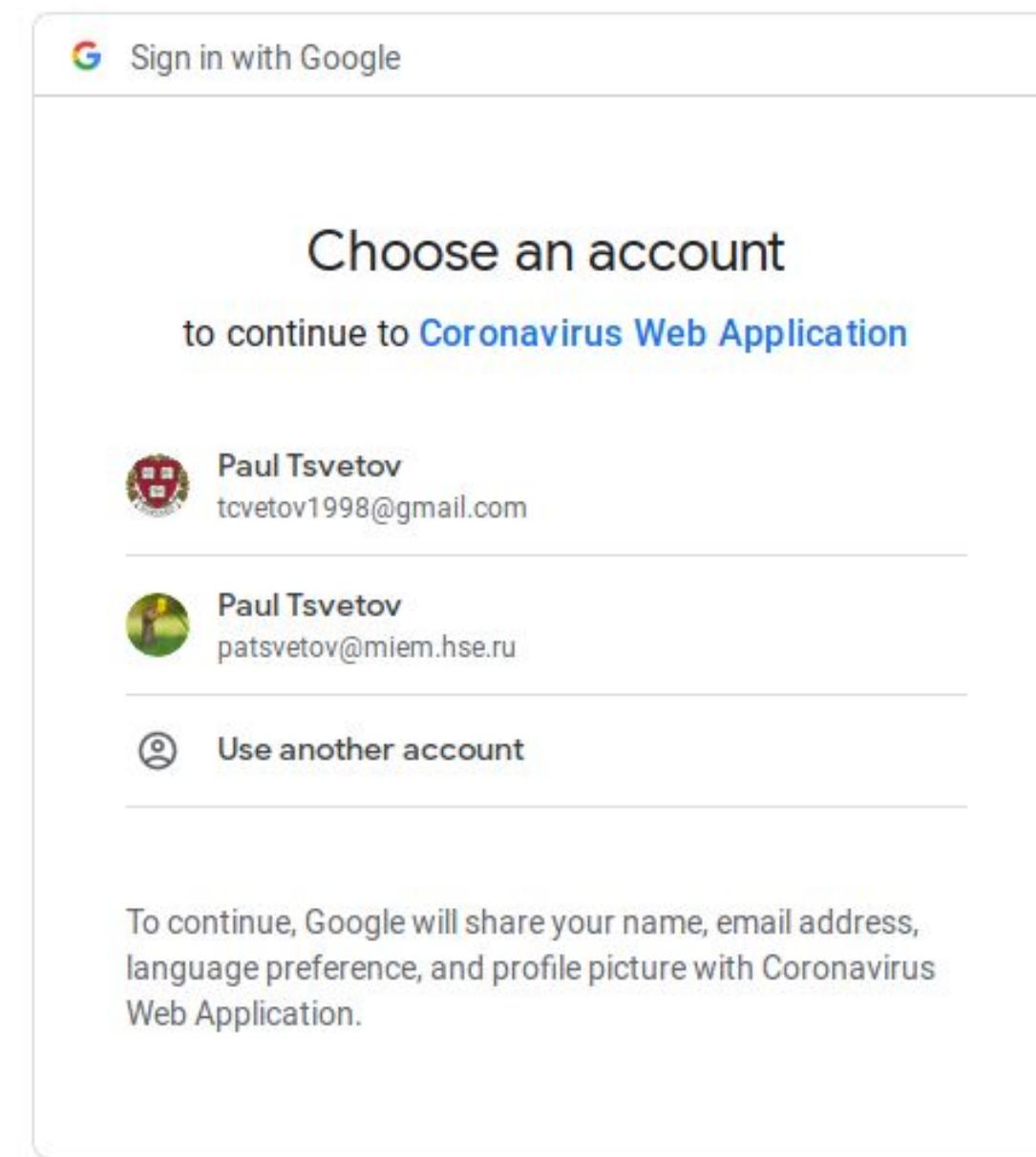
Login

Don't have an account? [Register here for free!](#)

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Сценарии работы приложения (Google Sign In)





Сценарии работы приложения (Документация)

Coronavirus App Documentation

[Go back, to Homepage](#)

[API Documentation](#)
[Files & Sources](#)
[Version History](#)
[\(Changelog\)](#)

Getting Started

Application Name: Flask Web Application: COVID-19 Live Dashboard with Predictions
Application Version: v.0.1.0
Authors: [Paul Tsetov, Vladislav Ustimov](#)
Support: <https://github.com/yaiestura>
License: [MIT Licence](#)

Installation process

You will need the following in order to install our Application to your PC / Server



Сценарии работы приложения (API)

API Documentation

Files & Sources

Version History
(Changelog)

3. Minimal Coronavirus Cases and Deaths API by Country

```
1 | $ curl localhost:5000/api/countries_min
```

```
1 | {
2 |   "countries_affected": 195,
3 |   "countries_min_data": [
4 |     [
5 |       "China",
6 |       "81093",
7 |       "3270",
8 |       "Asia"
9 |     ],
10 |     [
11 |       "Italy",
12 |       "63927",
13 |       "6077",
14 |       "Europe"
15 |     ],
16 |     [
17 |       "United States",
18 |       "42163",
19 |       "512",
20 |       "North America"
21 |     ]
22 |   }
```

4. Advanced Coronavirus Cases and Deaths API by Country

```
1 | $ curl localhost:5000/api/countries_adv
```



Сценарии работы приложения (COVID-19 Blog)

The screenshot shows a web application interface for a COVID-19 blog. At the top, there is a navigation bar with the logo 'covid' (a red square with a white 'Q'), followed by links for 'HOME', 'DASHBOARD', 'ALL POSTS', 'NEW POST', 'DOCS', and a 'LOGOUT' button.

The first post, titled 'Coronavirus cases pass 381,000 globally', was posted by 'yalestura' on 2020-03-24. The content discusses the global impact of the virus, mentioning India's movement restrictions and Europe's lockdowns. It also notes the situation in the US.

The second post, titled 'Coronavirus Russia Cases', was posted by 'yalestura' on 2020-03-21. This post provides a technical explanation of how the author generated data points for a graph, using NumPy's linspace function to create a range of values between 1 and 10. It also mentions the creation of y-axis data.

A small red box at the bottom left contains the number '1', likely indicating the current page or item in a series.



Сценарии работы приложения (Blog - Новый пост)

The screenshot displays a user interface for creating a new blog post. At the top, there is a navigation bar with the logo 'covid' and links for HOME, DASHBOARD, ALL POSTS, NEW POST, and DOCS. On the right side of the navigation bar is a red 'LOGOUT' button. The main content area is titled 'New Post'. It contains two input fields: 'Title' and 'Content'. The 'Title' field is filled with the text 'Coronavirus cases pass 381,000 globally'. The 'Content' field contains a paragraph of text: 'The world under lockdown: Two-thirds of India's 1.34 billion people are under movement restrictions, as countries across Europe remain under lockdown, and the UK has banned people from leaving home except for "very limited" reasons.' At the bottom left of the content area is a red 'Post' button.



Сценарии работы приложения (Dashboard)

tcvetov1998@gmail.com

covid

Navigation

- Dashboard
- Live Monitor
- Coronavirus Data
- History (JHU CSSE)
- Countries NEW
- Predictions NEW
- News NEW
- Download Report NEW

Economics

Markets SOON

Miscellaneous

Documentation

Submit an Issue

382431 Coronavirus Cases 0.94% change since yesterday

16569 Deaths 0.33% change since yesterday

102513 Recovered 0.43% change since yesterday

263349 Active Cases 1.18% change since yesterday

Confirmed Deaths
Last updated: March 24, 2020, 08:05 GMT

Coronavirus Cases Distribution Chart

Total Deaths	Active Cases	Total Recovered
4.33%	68.86%	26.81%

Confirmed Cases and Deaths by Country (195 affected)

Flag	Country	Total cases	Total deaths
🇨🇳	China	81171	3277

Age of Coronavirus Deaths

36



Сценарии работы приложения (Dashboard)

i covid

Navigation

- Dashboard
- Economics
- Markets SOON >
- Miscellaneous
- Documentation
- Submit an Issue

Confirmed Cases and Deaths by Country (195 affected)

Flag	Country	Total cases	Total deaths
🇨🇳	China	81171	3277
🇮🇹	Italy	63927	6077
🇺🇸	USA	46145	582
🇪🇸	Spain	35136	2311
🇩🇪	Germany	29056	123

[View all Coronavirus Confirmed Locations](#)

Age of Coronavirus Deaths

Death Rate Of Confirmed Cases By Sex

Male	Female
4.7%	2.8%

Coronavirus Tests Performed by Countries

COVID-19 Fatality Rate by Pre-existing medical conditions

Pre-existing condition	Fatality Rate (%)
no pre-existing conditions	0.5%
Cancer	5.60%
Hypertension	6.00%
Chronic respiratory disease	6.30%
Diabetes	7.30%
Cardiovascular disease	10.50%



Сценарии работы приложения (Профиль)

Screenshot of a COVID-19 tracking application interface.

Top Bar: covid | [Dashboard](#) | [Live Monitor](#) | [Coronavirus Data](#) | [History \(JHU CSSE\)](#) | [Countries](#) (NEW) | [Predictions](#) (NEW) | [News](#) (NEW) | [Download Report](#) (NEW) | [Message](#)

Left Sidebar (Navigation):

- Navigation
- Dashboard
- Live Monitor
- Coronavirus Data
- History (JHU CSSE)
- Countries (NEW)
- Predictions (NEW)
- News (NEW)
- Download Report (NEW)

Economics

Markets (SOON)

Miscellaneous

Documentation

Submit an Issue

User Profile: yalestura

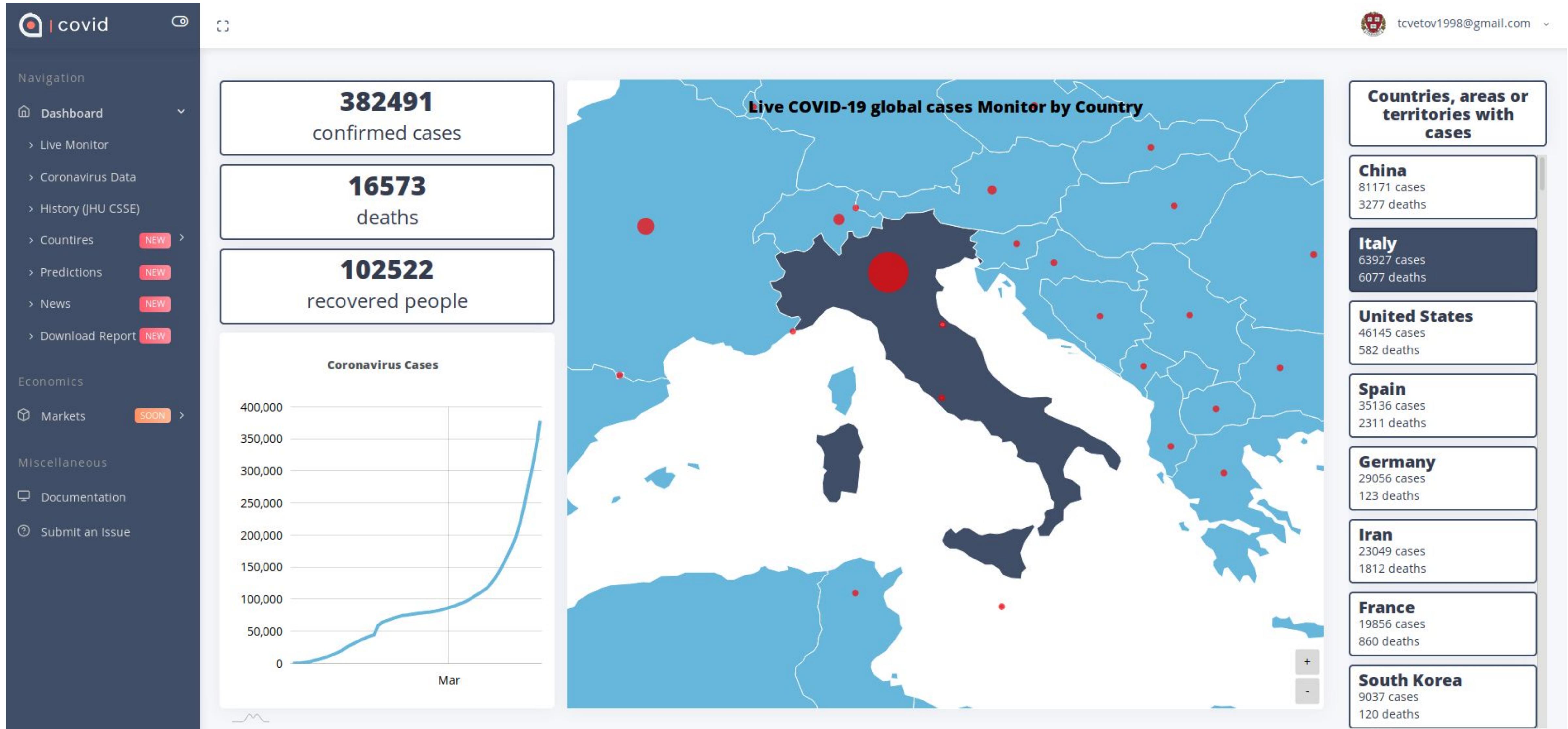
Profile Picture: Placeholder image of a person wearing a headset.

Background Image: A scenic landscape with trees and a misty field.

Profile Details:

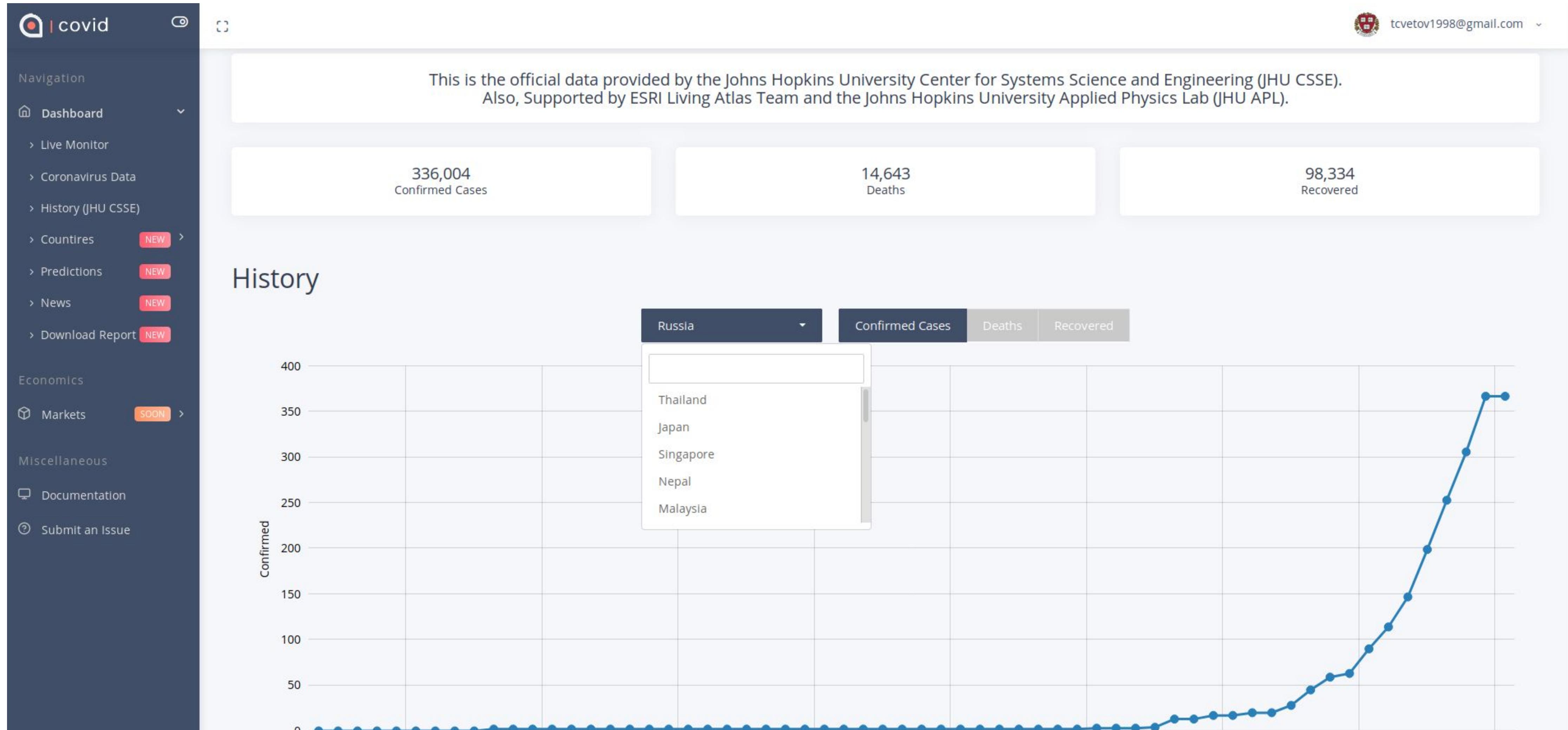
About Me	
Full Name	Not completed
Gender	Not completed
Birth Date	Not completed
Marital Status	Not completed
Location	Not completed
Email	patsvetov@edu.hse.ru
Mobile Number	Not completed
Twitter	Not completed
Skype	Not completed
Website	Not completed

Сценарии работы приложения (Live Monitor)





Сценарии работы приложения (JHU Data History)





Сценарии работы приложения (Countries)

covid

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Confirmed Cases and Deaths by Country and Territory
The coronavirus COVID-19 is affecting 194 countries and territories around the world and 1 international conveyance (the Diamond Princess cruise ship harbored in Yokohama, Japan).

Search:

Flag ↑↓	Country ↑↓	Total Cases ↑↓	New Cases ↑↓	Total Deaths ↑↓	New Deaths ↑↓	Total Recovered ↑↓	Active Cases ↑↓	Serious, Critical ↑↓	Tot Cases / 1M pop ↑↓
🇨🇳	China	81171	+78	3277	+7	73159	4735	1573	56
🇮🇹	Italy	63927		6077		7432	50418	3204	1057
🇺🇸	USA	46145	+2411	582	+29	295	45268	1040	139
🇪🇸	Spain	35212	+76	2316	+5	3355	29541	2355	753
🇩🇪	Germany	29056		123		453	28480	23	347
🇮🇷	Iran	23049		1812		8376	12861		274
🇫🇷	France	19856		860		2200	16796	2082	304

Showing 1 to 195 of 195 entries



Сценарии работы приложения (Country - Italy)

Navigation

- Dashboard
- Live Monitor
- Coronavirus Data
- History (JHU CSSE)
- Countries NEW
- Predictions NEW
- News NEW
- Download Report NEW

Economics

- Markets SOON

Miscellaneous

- Documentation
- Submit an Issue

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Last updated: March 24, 2020, 08:22 GMT

Population: 60,461,826

Land Area(km²): 294,140

Density(P/km²): 206

Total cases: 63927 (16.710% of world's)

Total deaths: 6077 (36.657% of world's)

Total recovered: 7432

Italy Coronavirus Cases Plot

Italy Coronavirus Deaths Plot

Date	Total Cases	Total Deaths
Mar 10	~10,000	~500
Mar 14	~20,000	~1,000
Mar 18	~35,000	~1,500
Mar 22	~65,000	~3,000



Сценарии работы приложения (Country - Canada)

□



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Country: **Canada**

Last updated: March 24, 2020, 08:22 GMT

Population:	37,742,154
Land Area(km²):	9,093,510
Density(P/km²):	4
Total cases:	2091 (0.547% of world's)
Total deaths:	24 (0.145% of world's)
Total recovered:	320

A map of Canada where the province of Quebec is highlighted in dark blue, while the rest of the country and surrounding areas are light blue. A single red dot is placed on the southern part of Quebec, indicating the location of the first reported case.

Canada Coronavirus Cases Plot

A line graph showing the cumulative number of COVID-19 cases in Canada over time. The y-axis is labeled "Cases" and ranges from 0 to 2,500. The x-axis represents time. The data shows a slow, steady increase until late March, followed by a sharp spike starting in early April, reaching approximately 2,000 cases by the end of the period shown.

Date	Cases
March 1	~100
March 15	~200
March 30	~400
April 10	~800
April 15	~1,200
April 20	~1,500
April 24	~2,000

Canada Coronavirus Deaths Plot

A line graph showing the cumulative number of COVID-19 deaths in Canada over time. The y-axis is labeled "Deaths" and ranges from 0 to 25. The x-axis represents time. The data shows a very low rate of deaths until mid-March, followed by a gradual increase through April, reaching about 22 deaths by the end of the period.

Date	Deaths
March 1	~1
March 15	~1
March 30	~1
April 10	~1
April 15	~4
April 20	~8
April 24	~22



Сценарии работы приложения (Predictions)

Q | covid

Navigation

- Dashboard
- Live Monitor
- Coronavirus Data
- History (JHU CSSE)
- Countries NEW
- Predictions NEW
- News NEW
- Download Report NEW

Economics

- Markets SOON

Miscellaneous

- Documentation
- Submit an Issue

COVID-19 Cases Predictions Graph using Neural Network

The graph displays a neural network prediction for COVID-19 cases. The x-axis represents the date from February to March, and the y-axis represents the number of cases from 50,000 to 450,000. The actual data points (red dots) show a steady increase from about 70,000 in early February to over 400,000 by mid-March. A smooth blue curve represents the predicted trend, which closely follows the actual data.

Date	Prediction
24-03-2020 (today)	381213 cases (-1357 left)
25-03-2020	389567 cases
26-03-2020	395974 cases
27-03-2020	401214 cases
28-03-2020	406449 cases
29-03-2020	411682 cases
30-03-2020	416865 cases
31-03-2020	422048 cases
01-04-2020	427231 cases
02-04-2020	432303 cases

COVID-19 Deaths Predictions for 10 days

16578 Deaths Now

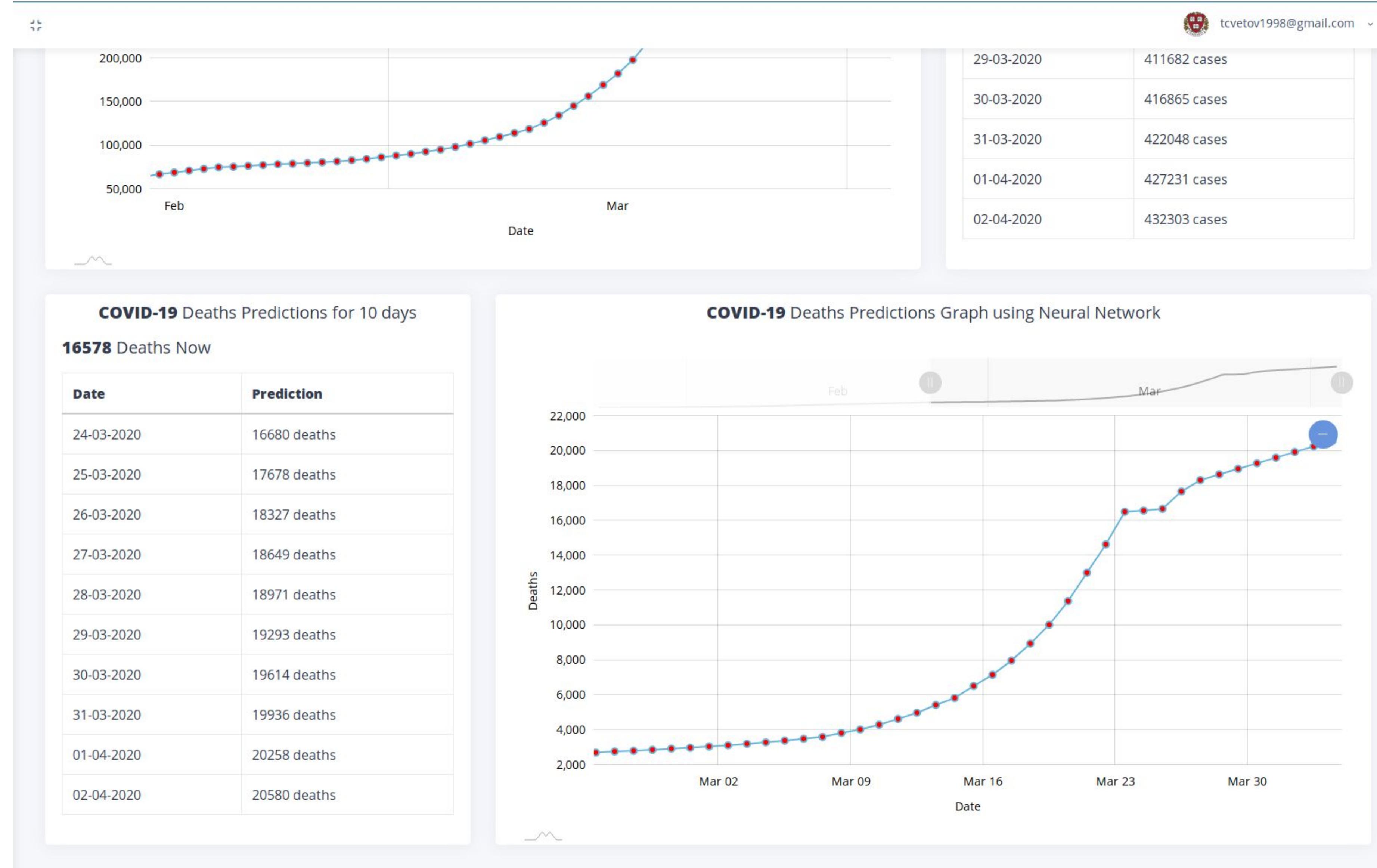
COVID-19 Deaths Predictions Graph using Neural Network

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44



Сценарии работы приложения (Predictions)





Сценарии работы приложения (News)

covid

Navigation

Dashboard

- > Live Monitor
- > Coronavirus Data
- > History (JHU CSSE)
- > Countries NEW
- > Predictions NEW
- > News NEW
- > Download Report NEW

Economics

Markets SOON

Miscellaneous

Documentation

Submit an Issue

212. 122 new cases in Thailand. 2nd day in a row with a rise of 100 or more cases

213. 64 new cases and 7 new deaths in South Korea

214. 39 new cases, 9 new deaths (all in Hubei), and 459 new discharges occurred in China on March 22, as reported by the National Health Commission (NHC) of China. For the 5th day in a row, no new confirmed or suspected cases have been reported in Wuhan and in Hubei

215. After nearly 2 months, Wuhan (the epicenter of the pandemic in China) announced today that it would be loosening the lockdown by gradually resuming public transportation and allowing healthy people to go back to work. China had put Wuhan and other cities into lockdown on Jan. 23 when a total of 25 deaths had been reported in the country. After about 3 weeks of lockdown, the number of new deaths reached its peak in China [see graphs] and then began declining. Italy went into a similar lockdown on March 11, when 827 deaths had already been reported, and 8 days after reaching 79 deaths (March 3) [see graphs] and 19 days after the beginning of the outbreak in the country (Feb. 21) [see archived news] On Feb. 22, Italy had become the country with the highest number of cases among all non-Asian nations. [see archived news] When China reached a similar number of deaths (811 deaths on Feb. 8) the lockdown had already been implemented for 2 weeks. The Report of the WHO-China Joint Mission noted that by rolling out "perhaps the most ambitious, agile and aggressive disease containment effort in history" China "has changed the course of a rapidly escalating and deadly epidemic" and that the remarkable speed with which Chinese scientists and public health experts isolated the causative virus, established diagnostic tools, and determined key transmission parameters, such as the route of spread and incubation period, provided the vital evidence base for China's strategy.

Source: <https://www.reuters.com/article/us-health-coronavirus-china/china-scrambles-to-curb-rise-in-imported-coronavirus-cases-wuhan-eases-lockdown-idUSKBN21903C>

216. 9359 new cases and 111 new deaths in the United States New deaths and cases include: 4 new deaths and 590 new cases in New Jersey 6 new deaths in Georgia 4 new deaths in California: including the 1st death in Monterey County (an adult with an underlying health condition) 4 new deaths in Louisiana (the other 2 mentioned in the report have been already counted in yesterday's totals for the state): an 83-year-old Orleans Parish resident, a 50-year-old Orleans resident, a 77-year-old Jefferson Parish resident and a 90-year-old Orleans Parish resident. All aside from the 83-year-old individual had underlying medical conditions 3 new deaths in Michigan: a 52-year-old man with underlying health conditions , the first death in West Michigan: a man in his 70s and an 90-year-old woman 1 new death in Florida 1 new death in Colorado 1 new death in Virginia, the 1st in Fairfax County: a man in his 60s who acquired COVID-19 through contact with a previously reported case 1 new death in Indiana 1 new death in Kentucky: a 67-year-old man from Anderson County with underlying health conditions 1 new death in Kansas. Health officials have ordered Kansas City-area residents to stay at home for 30 days, starting Tuesday

217. 142 new cases and 1 new death in Canada

218. 44 new cases in Lithuania

219. 48 new cases in Uruguay

220. 4 new cases in Aruba



Сценарии работы приложения (PDF-отчет)

COVID-19 Main Live Statistics

COVID-19 Total Cases: 382741

COVID-19 Total Deaths: 16578

COVID-19 Total Recovered: 102522

COVID-19 Demographics Data:

Fig.1. Age of Coronavirus Deaths:

Age	Death Rate of Confirmed Cases
80+	14.8%
70-79	8.0%
60-69	3.6%
50-59	1.3%
40-49	0.4%
30-39	0.2%
20-29	0.2%
10-19	0.2%
0-9	no fatalities

Fig.2. Sex of Coronavirus Deaths:

Sex	Death Rate of Confirmed Cases	Death Rate of All Cases



Сценарии работы приложения (PDF-отчет)

**COVID-19 Confirmed Cases and Deaths by Country,
Territory, or Conveyance**

Country	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Serious	Cases 1M Pop
China	81171	+78	3277	+7	73159	4735	1573	56
Italy	63927		6077		7432	50418	3204	1057
USA	46145	+2411	582	+29	295	45268	1040	139
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Germany	29056		123		453	28480	23	347
Iran	23049		1812		8376	12861		274
France	19856		860		2200	16796	2082	304
S. Korea	9037	+76	120	+9	3507	5410	59	176
Switzerland	8795		120		131	8544	141	1016
UK	6650		335		135	6180	20	98
Netherlands	4749		213		2	4534	435	277
Austria	4517	+43	25	+4	9	4483	16	502
Belgium	3743		88		401	3254	322	323
Norway	2625		11	+1	6	2608	41	484
Australia	2136	+249	8	+1	118	2010	11	84
Canada	2091		24		320	1747	1	55
Portugal	2060		23		14	2023	47	202
Sweden	2059	+13	33	+6	16	2010	110	204
Brazil	1924		34		2	1888	18	9
Israel	1656	+214	1		49	1606	31	191
Turkey	1529		37			1492		18
Malaysia	1518		15	+1	150	1344	57	47



Участие в проекте

Тип работы	Цветов Павел	Устимов Владислав
Разработка дизайна и макета приложения	+	+
Инфографика, графика, карты, JS скрипты	+	
Разработка HTML страниц	+	
JavaScript, CSS Developer	+	
Парсер данных, API	+	+
Python Developer	+	+
База данных	+	+
Построение и тренировка нейронной сети		+
Внедрение нейронной сети в существующую веб-платформу		+
Тестирование	+	+
Документация	+	+



Возможные доработки и нововведения

1. Нейросеть - влияние коронавируса на экономику, американские рынки, акции
2. Инфографика, статистика по экономике в режиме Live
3. Несколько различных моделей предсказания для Коронавируса
4. Система уведомлений в приложении(Notification)
5. Форма для оплаты для доступа в приложение
6. Разделение пользователей на группы(администраторы, обычные, и т.д.)
7. Кастомный и расширенный профиль пользователя
8. Flask-Mail - отправка приложением сообщений на почту, восстановление пароля
9. Рефакторинг кода, улучшение кода, избавление от зависимостей