Project: Fast Migrate

COMP 3100

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Team 16

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(a) Introduction

Our main datasets originates from the World Happiness Report, which ranks countries by happiness levels from Gallup World Poll. Experts from different fields recognise that well-being is crucial in the progress of a nation. So, we shall apply these happiness indicators to develop a tool for informing people in decision-making such as migration. Another potential user is a student who is interested in studying abroad, but has difficulties in choosing a country. Who does not seek happiness? We believe that it plays a crucial role in deciding where to move. The dataset consists of scores and rankings of different countries based on answers to surveys from nationally representative samples, which then use Gallup weights to make estimates representative. The happiness score estimate is affected by the following factors: economic production, social support, life expectancy, freedom, absence of corruption and generosity.

We plan to build a dashboard and implement a world map with different colors corresponding to levels of happiness. Data visualization including bar charts, graphs and rankings shall be designed to help users in comparing and deciding between countries. An account feature is to be integrated to save users time from having to perform the same searches several times.

(b) Proposal

With the overwhelming number of possibilities that the world has to offer, immigration can be a challenging decision for people interested in settling in foreign countries. Fast Migrate is the web application our team will work on to bring relevant information of countries around the world all in one place. Whether it is global rankings, happiness scores, cost of living index, employment or crime rates among others, we want to ease the problem of looking all over the internet by saving users time and searches. Moreover, we will provide statistics with presentation of requested data to users interested in analyzing trends or contrasting between countries.

Unfortunately, our main dataset consists of happiness only and might not be sufficient for users looking for other criteria while evaluating their choice of destination. Hence, we consider getting access to a third-party API, which will complement our original dataset and provide the following factors: cost of living index, quality of life index, employment rates, crime rates, health care index.

Hence, our goal is to deliver a web application targeted to people seeking information about different countries, designed for, but not limited to immigration. Our team aims to achieve all the unique functionalities of Fast Migrate without compromising on aesthetics or website performance by the end of the third iteration.

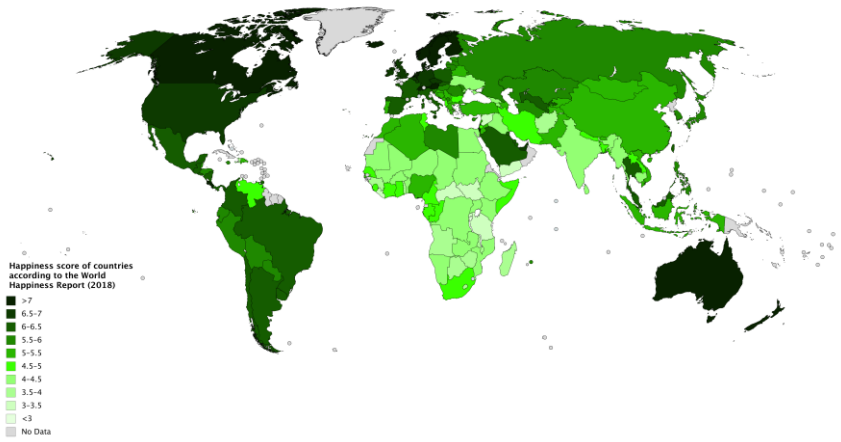
(c) Functionalities

- The user can get the information of a particular country he/she desires to immigrate to by inputting the name of the country.

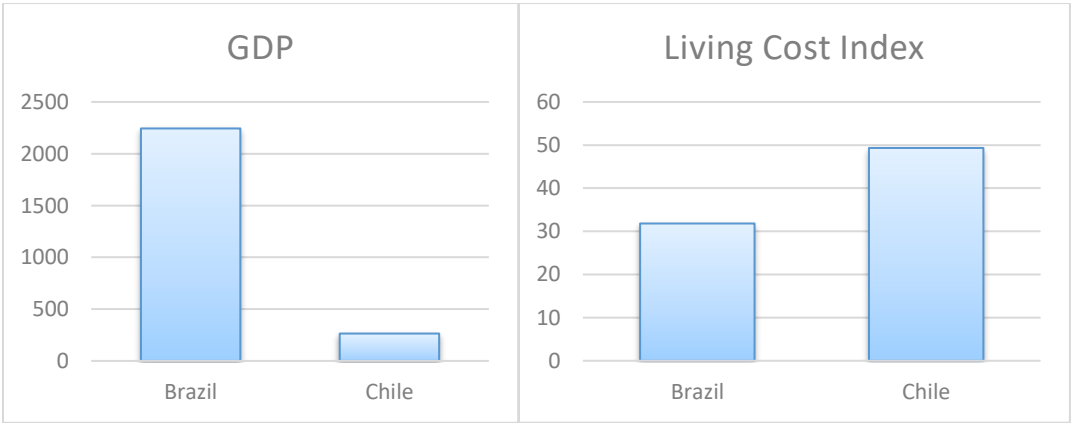
- The user can input a criterion he/she values most to get the rankings of countries accordingly, such as sorting by low crime rate or high employment level.

- The user can create an account, login and save its progress and search history.

- The user can get a colorized overview of all countries by a world map with each country having a specific color depending on its happiness level, shown below:



- The user can compare different factors (happiness, employment level, living cost, crime rate, GDP, etc.) of two countries of their choosing through charts, for example:



Iteration 2 - Documentation

1. Server-side of FastMigrate

The server-side of our application follows the MVC pattern which consists of model, view (routes) and controller. The model consists of data-related logic, that is, the transfer of data between the Routes and Controller components. For example, a user can retrieve country information from the database. The routes component is required for the user interface of the application, which will be assembled in the client-side of the project. The controller comprises interactions between the model and routes for requests processing and data manipulation. FastMigrate API was implemented using express to provide functionalities over HTTP requests.

Functionalities

At this point, we have implemented the functionalities required for the back-end of the application. For instance, a country's name is used as input to query the database and extract relevant information. The remaining functionalities are to be implemented when the front-end is assembled. The functionality of user account might be removed if the implementation of sessions and login might be too complex and beyond our knowledge. It is until the client-side has been implemented that we will be able to test and check if it works.

2. Models

Methods required for the manipulation of our datasets to/from mongoDB. They are necessary for the correct insertion, update and retrieval of countries' information.

Methods	Descriptions
_get_country_collection()	Connects to the proper collection
addCountryInfo(happiness_score, Gdp, unemployment_rate, crime_index, quality_of_life, health_care, cost_of_living)	Adds different factors of country to the database
isValid()	Checks if passed parameters match the required fields
save(db)	Saves country to the database
update(db, name, happiness_score, Gdp, unemployment_rate)	Updates information of a given country to the database
delete(db, name)	Deletes information about a given country from the database
getCountryByName(db, name)	Gets a country by name and returns all data of requested country from the database

3. Controllers

Methods
create
getOne
updateOne
deleteOne
all

Routes

Parameter name: name
Description: name of country (First letter capitalized)

```
// To access paths:
'http://localhost:3000/country'

// To add a new country to the database over HTTP request:
router.post('/', country_controller.create);

// To get the list of all countries
// from database over HTTP request:
router.get('/', country_controller.all);

// To get the information of a country from database
// by inputting name of country over HTTP request:
router.get('/:name', country_controller.getOne);

// To update the information of a country in database
// by inputting name of country over HTTP request:
router.put('/:name', country_controller.updateOne);

// To delete the information of a country from database
// by inputting name of country over HTTP request:
router.delete('/:name', country_controller.deleteOne);
```

Resource Information

Response formats JSON
Requires api_key for 3rd-party API (provided in code)

Example Requests:

GET
https://localhost:3000/Canada

Example Response:


```
{
  _id: 6046d4a462f2b3357cf762dd,
  name: 'Canada',
  happiness_score: 7.278,
  Gdp: 1794,
  unemployment_rate: 6.5,
  crime_index: 41.422305967278035,
  quality_of_life: 159.20378435706945,
  health_care_index: 71.71889142374837,
  cost_of_living: 69.25370113027466
}
```


4. Design of Data Model collection(s)

Our data is designed for usage pattern such that data model evolution is made easy. Hence, the data model collection follows the embedded pattern because there are small subdocuments (happiness.json, unemployment.json and the rest of the factors from the 3rd-party API) which do not grow by large amounts. Our data does not need to change regularly and faster reads are preferred for data visualization.

For a sneak peak of our sample data, please run ‘node populate_sample.js’ to populate the mongo database with 10 countries (**Note**: It is not required for the testing of our API).

5. Tests

Mocha is used for the testing of our server-side. Tests of simple and complex cases covering success and failure were performed on models.

Simple Cases:

Success 1 - Test creation of a valid country with parameters matching
Fail 1 - Test an invalid Country name
Fail 2 - Test an invalid Country happiness
Fail 3 - Test an invalid Country gdp
Fail 4 - Test an invalid Country unemployment
Success 2 - Test the insertion of a valid Country (Country.save)
Success 3 - Test the update of a valid Country (Country.update)
Success 4 - Test the deletion of a valid Country (Country.delete)
Success 5 - Test the retrieval of a Country by name (Country.getCountryByName)
Success 6 - Test the retrieval of all Countries (Country.getCountries)

Complex Cases:

Success 1 - POST /country, DELETE /country/name
Success 2 - POST /country, GET /country (retrieval greater than 1), DELETE /country/:name
Success 3 - POST /country, GET /country/:name, DELETE /country/:name
Success 4 - POST /country, PUT /country/:name, GET /country/:name, DELETE /country/:name