

PONTIFÍCIA UNIVERSIDADE CATÓLICA DE MINAS GERAIS

Instituto de Informática

Unidade Praça da Liberdade

Curso: Engenharia de Software

Prof.: Laerte Xavier

Disciplina: Laboratório de Experimentação de Software

Alunos:

Laercio Nazareno Neto

Yan Max Rodrigues Sette Pinheiro

Laboratório 3 - Avaliando o Buzz de Issues do GitHub no StackOverflow

Hipótese

Há uma relação visível das issues dos repositórios mais populares do Github no Stackoverflow.

Questões de pesquisa investigadas

- As linguagens com mais issues entre os repositórios mais populares do Github também estão entre as mais mencionadas no Stackoverflow?
- Os repositórios mais famosos no Github são os que mais possuem menções no Stackoverflow?
- Qual tem mais usuários ativos nos temas em comum?
- A quantidade de issues dos repositórios do Github é proporcional a quantidade de menções que aquele repositório possui no Stackoverflow?

Metodologia

Para responder as perguntas foi utilizado a api do Github e o site <https://data.stackexchange.com/stackoverflow/query/> para coletar os dados. Apoiado nessas bases de dados, buscamos as seguintes informações:

- A quantidade de issues abertas no Github
- A quantidade de perguntas no Stack Overflow para os repositórios
- A quantidade de pergunta por tag
- A linguagem de dos repositórios

Para realizar as buscas na api foi construído um script para automatizar, que se encontra em um repositório no Github, <https://github.com/yanmaxsette/LaboratorioVI03>, assim buscamos os 1000 repositórios mais famosos.

Posteriormente, observamos que o tempo de consulta da próxima fase seria muito trabalhosa com 1000 repositórios, então limitamos aos 80 primeiros.

No caso do stack overflow as query realizadas foram:

- Quantidade de perguntas por repositório:
 - ```
SELECT COUNT(*) as TotalCount
FROM Posts
WHERE PostTypeId = 1
AND Title LIKE '%##repositorio##%'
```
- Quantidade de perguntas por tag
  - ```
SELECT
    DISTINCT Tags.TagName,
    COUNT(*) as TotalCount
FROM Posts
    inner join PostTags on PostTags.PostId = Posts.Id
    inner join Tags on Tags.Id = PostTags.TagId
WHERE
    Posts.PostTypeId = 1
Group By Tags.TagName
```
- Quantidade de perguntas por linguagem:
 - ```
DECLARE @keyword nvarchar(35) = ##keyword:string##;
SELECT
 COUNT(*)
FROM
 Posts
 inner join PostTags on PostTags.PostId = Posts.Id
 inner join Tags on Tags.Id = PostTags.TagId
Where
 Posts.PostTypeId = 1
 and
 Tags.TagName like '%' + @keyword + '%'
```

## Resultados Obtidos

Mediante as buscas realizadas encontramos os seguintes dados:

| Nome do Repositório                    | url                                                                                                                               | Linguagem  | Total de issues | Total de Issues fechadas | Perguntas do StackOverflow |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------|-----------------|--------------------------|----------------------------|
| freeCodeCamp/freeCodeCamp              | <a href="https://github.com/freeCodeCamp/freeCodeCamp">https://github.com/freeCodeCamp/freeCodeCamp</a>                           | JavaScript | 14385           | 14198                    | 7                          |
| 996icu/996.ICU                         | <a href="https://github.com/996icu/996.ICU">https://github.com/996icu/996.ICU</a>                                                 | Rust       | 0               | 0                        | 0                          |
| vuejs/vue                              | <a href="https://github.com/vuejs/vue">https://github.com/vuejs/vue</a>                                                           | JavaScript | 8983            | 8669                     | 16162                      |
| facebook/react                         | <a href="https://github.com/facebook/react">https://github.com/facebook/react</a>                                                 | JavaScript | 9106            | 8615                     | 72118                      |
| EbookFoundation/free-programming-books | <a href="https://github.com/EbookFoundation/free-programming-books">https://github.com/EbookFoundation/free-programming-books</a> |            | 427             | 400                      | 0                          |
| tensorflow/tensorflow                  | <a href="https://github.com/tensorflow/tensorflow">https://github.com/tensorflow/tensorflow</a>                                   | C++        | 24788           | 21452                    | 11805                      |
| twbs/bootstrap                         | <a href="https://github.com/twbs/bootstrap">https://github.com/twbs/bootstrap</a>                                                 | JavaScript | 19237           | 18930                    | 43672                      |
| sindresorhus/awesome                   | <a href="https://github.com/sindresorhus/awesome">https://github.com/sindresorhus/awesome</a>                                     |            | 249             | 235                      | 2832                       |
| getify/You-Dont-Know-JS                | <a href="https://github.com/getify/You-Dont-Know-JS">https://github.com/getify/You-Dont-Know-JS</a>                               |            | 832             | 759                      | 1                          |
| jwasham/coding-interview-university    | <a href="https://github.com/jwasham/coding-interview-university">https://github.com/jwasham/coding-interview-university</a>       |            | 113             | 86                       | 0                          |
| ohmyzsh/ohmyzsh                        | <a href="https://github.com/ohmyzsh/ohmyzsh">https://github.com/ohmyzsh/ohmyzsh</a>                                               | Shell      | 3318            | 3087                     | 9                          |
| kamranahmedse/developer-roadmap        | <a href="https://github.com/kamranahmedse/developer-roadmap">https://github.com/kamranahmedse/developer-roadmap</a>               |            | 418             | 404                      | 0                          |
| github/gitignore                       | <a href="https://github.com/github/gitignore">https://github.com/github/gitignore</a>                                             |            | 0               | 0                        | 2152                       |
| CyC2018/CS-Notes                       | <a href="https://github.com/CyC2018/CS-Notes">https://github.com/CyC2018/CS-Notes</a>                                             | Java       | 397             | 367                      | 0                          |

|                                  |                                                                                                                       |                  |       |       |        |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------------|-------|-------|--------|
| microsoft/vscode                 | <a href="https://github.com/microsoft/vscode">https://github.com/microsoft/vscode</a>                                 | TypeScript       | 88657 | 83945 | 2541   |
| airbnb/javascript                | <a href="https://github.com/airbnb/javascript">https://github.com/airbnb/javascript</a>                               | JavaScript       | 981   | 902   | 172755 |
| donnemartin/system-design-primer | <a href="https://github.com/donnemartin/system-design-primer">https://github.com/donnemartin/system-design-primer</a> | Python           | 116   | 33    | 0      |
| flutter/flutter                  | <a href="https://github.com/flutter/flutter">https://github.com/flutter/flutter</a>                                   | Dart             | 36470 | 28974 | 10710  |
| d3/d3                            | <a href="https://github.com/d3/d3">https://github.com/d3/d3</a>                                                       | JavaScript       | 2034  | 2030  | 15724  |
| torvalds/linux                   | <a href="https://github.com/torvalds/linux">https://github.com/torvalds/linux</a>                                     | C                | 0     | 0     | 29813  |
| facebook/react-native            | <a href="https://github.com/facebook/react-native">https://github.com/facebook/react-native</a>                       | JavaScript       | 19320 | 18587 | 9901   |
| jackfrued/Python-100-Days        | <a href="https://github.com/jackfrued/Python-100-Days">https://github.com/jackfrued/Python-100-Days</a>               | Jupyter Notebook | 342   | 65    | 0      |
| electron/electron                | <a href="https://github.com/electron/electron">https://github.com/electron/electron</a>                               | C++              | 12879 | 11752 | 3118   |
| vinta/awesome-python             | <a href="https://github.com/vinta/awesome-python">https://github.com/vinta/awesome-python</a>                         | Python           | 166   | 165   | 0      |
| public-apis/public-apis          | <a href="https://github.com/public-apis/public-apis">https://github.com/public-apis/public-apis</a>                   | Python           | 128   | 123   | 0      |
| facebook/create-react-app        | <a href="https://github.com/facebook/create-react-app">https://github.com/facebook/create-react-app</a>               | JavaScript       | 5771  | 5282  | 1636   |
| Snailclimb/JavaGuide             | <a href="https://github.com/Snailclimb/JavaGuide">https://github.com/Snailclimb/JavaGuide</a>                         | Java             | 375   | 349   | 0      |
| jlevy/the-art-of-command-line    | <a href="https://github.com/jlevy/the-art-of-command-line">https://github.com/jlevy/the-art-of-command-line</a>       |                  | 163   | 79    | 0      |
| axios/axios                      | <a href="https://github.com/axios/axios">https://github.com/axios/axios</a>                                           | JavaScript       | 2274  | 2038  | 4059   |
| golang/go                        | <a href="https://github.com/golang/go">https://github.com/golang/go</a>                                               | Go               | 37618 | 31987 | 596732 |
| TheAlgorithms/Python             | <a href="https://github.com/TheAlgorithms/Python">https://github.com/TheAlgorithms/Python</a>                         | Python           | 287   | 276   | 344445 |
| danistefanovic/build-your-own-x  | <a href="https://github.com/danistefanovic/build-your-own-x">https://github.com/danistefanovic/build-your-own-x</a>   |                  | 314   | 264   | 0      |
| nodejs/node                      | <a href="https://github.com/nodejs/node">https://github.com/nodejs/node</a>                                           | JavaScript       | 11563 | 10590 | 146501 |

|                                        |                                                                                                                                   |            |       |       |        |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------|-------|-------|--------|
| trekhleb/javascript-algorithms         | <a href="https://github.com/trehle/javascript-algorithms">https://github.com/trehle/javascript-algorithms</a>                     | JavaScript | 134   | 83    | 0      |
| animate-css/animate.css                | <a href="https://github.com/animate-css/animate.css">https://github.com/animate-css/animate.css</a>                               | CSS        | 702   | 701   | 201    |
| justjavac/free-programming-books-zh_CN | <a href="https://github.com/justjavac/free-programming-books-zh_CN">https://github.com/justjavac/free-programming-books-zh_CN</a> |            | 0     | 0     | 0      |
| kubernetes/kubernetes                  | <a href="https://github.com/kubernetes/kubernetes">https://github.com/kubernetes/kubernetes</a>                                   | Go         | 34610 | 32584 | 5149   |
| ytdl-org/youtube-dl                    | <a href="https://github.com/ytdl-org/youtube-dl">https://github.com/ytdl-org/youtube-dl</a>                                       | Python     | 20196 | 17406 | 311    |
| tensorflow/models                      | <a href="https://github.com/tensorflow/models">https://github.com/tensorflow/models</a>                                           | Python     | 5277  | 4438  | 24595  |
| FortAwesome/Font-Awesome               | <a href="https://github.com/FortAwesome/Font-Awesome">https://github.com/FortAwesome/Font-Awesome</a>                             | JavaScript | 15920 | 10644 | 170    |
| microsoft/terminal                     | <a href="https://github.com/microsoft/terminal">https://github.com/microsoft/terminal</a>                                         | C++        | 4528  | 3667  | 17496  |
| puppeteer/puppeteer                    | <a href="https://github.com/puppeteer/puppeteer">https://github.com/puppeteer/puppeteer</a>                                       | JavaScript | 3923  | 2945  | 1092   |
| angular/angular                        | <a href="https://github.com/angular/angular">https://github.com/angular/angular</a>                                               | TypeScript | 20696 | 17850 | 100326 |
| mrdoob/three.js                        | <a href="https://github.com/mrdoob/three.js">https://github.com/mrdoob/three.js</a>                                               | JavaScript | 9694  | 9247  | 3291   |
| microsoft/TypeScript                   | <a href="https://github.com/microsoft/TypeScript">https://github.com/microsoft/TypeScript</a>                                     | TypeScript | 26191 | 21790 | 12518  |
| angular/angular.js                     | <a href="https://github.com/angular/angular.js">https://github.com/angular/angular.js</a>                                         | JavaScript | 8986  | 8596  | 1522   |
| ossu/computer-science                  | <a href="https://github.com/ossu/computer-science">https://github.com/ossu/computer-science</a>                                   |            | 447   | 441   | 1      |
| ant-design/ant-design                  | <a href="https://github.com/ant-design/ant-design">https://github.com/ant-design/ant-design</a>                                   | TypeScript | 17159 | 16710 | 18     |
| laravel/laravel                        | <a href="https://github.com/laravel/laravel">https://github.com/laravel/laravel</a>                                               | PHP        | 0     | 0     | 16169  |
| iluwatar/java-design-patterns          | <a href="https://github.com/iluwatar/java-design-patterns">https://github.com/iluwatar/java-design-patterns</a>                   | Java       | 541   | 379   | 0      |
| mui-org/material-ui                    | <a href="https://github.com/mui-org/material-ui">https://github.com/mui-org/material-ui</a>                                       | JavaScript | 11027 | 10650 | 578    |

|                                 |                                                                                                                     |            |       |       |       |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------|------------|-------|-------|-------|
| moby/moby                       | <a href="https://github.com/moby/moby">https://github.com/moby/moby</a>                                             | Go         | 20160 | 16563 | 4     |
| 30-seconds/30-seconds-of-code   | <a href="https://github.com/30-seconds/30-seconds-of-code">https://github.com/30-seconds/30-seconds-of-code</a>     | JavaScript | 241   | 241   | 0     |
| avelino/awesome-go              | <a href="https://github.com/avelino/awesome-go">https://github.com/avelino/awesome-go</a>                           | Go         | 217   | 209   | 0     |
| webpack/webpack                 | <a href="https://github.com/webpack/webpack">https://github.com/webpack/webpack</a>                                 | JavaScript | 7080  | 6724  | 5001  |
| vuejs/awesome-vue               | <a href="https://github.com/vuejs/awesome-vue">https://github.com/vuejs/awesome-vue</a>                             |            | 170   | 109   | 0     |
| PanJiaChen/vue-element-admin    | <a href="https://github.com/PanJiaChen/vue-element-admin">https://github.com/PanJiaChen/vue-element-admin</a>       | Vue        | 2683  | 2100  | 0     |
| MisterBooo/LeetCodeAnimation    | <a href="https://github.com/MisterBooo/LeetCodeAnimation">https://github.com/MisterBooo/LeetCodeAnimation</a>       | Java       | 32    | 32    | 0     |
| nvbn/thefuck                    | <a href="https://github.com/nvbn/thefuck">https://github.com/nvbn/thefuck</a>                                       | Python     | 540   | 349   | 1     |
| jquery/jquery                   | <a href="https://github.com/jquery/jquery">https://github.com/jquery/jquery</a>                                     | JavaScript | 2006  | 1942  | 50081 |
| reduxjs/redux                   | <a href="https://github.com/reduxjs/redux">https://github.com/reduxjs/redux</a>                                     | TypeScript | 1757  | 1728  | 3833  |
| atom/atom                       | <a href="https://github.com/atom/atom">https://github.com/atom/atom</a>                                             | JavaScript | 15659 | 15086 | 829   |
| apple/swift                     | <a href="https://github.com/apple/swift">https://github.com/apple/swift</a>                                         | C++        | 0     | 0     | 10407 |
| hakimel/reveal.js               | <a href="https://github.com/hakimel/reveal.js">https://github.com/hakimel/reveal.js</a>                             | JavaScript | 1779  | 1311  | 72    |
| pallets/flask                   | <a href="https://github.com/pallets/flask">https://github.com/pallets/flask</a>                                     | Python     | 1927  | 1906  | 4551  |
| socketio/socket.io              | <a href="https://github.com/socketio/socket.io">https://github.com/socketio/socket.io</a>                           | JavaScript | 2838  | 2362  | 2857  |
| shadowsocks/shadowsocks-windows | <a href="https://github.com/shadowsocks/shadowsocks-windows">https://github.com/shadowsocks/shadowsocks-windows</a> | C#         | 2486  | 2441  | 0     |
| django/django                   | <a href="https://github.com/django/django">https://github.com/django/django</a>                                     | Python     | 0     | 0     | 23285 |
| elastic/elasticsearch           | <a href="https://github.com/elastic/elasticsearch">https://github.com/elastic/elasticsearch</a>                     | Java       | 23638 | 21204 | 3857  |
| chartjs/Chart.js                | <a href="https://github.com/chartjs/Chart.js">https://github.com/chartjs/Chart.js</a>                               | JavaScript | 5099  | 4709  | 541   |

|                                              |                                                                                                             |            |              |          |            |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------|------------|--------------|----------|------------|
| expressjs/express                            | <a href="https://github.com/expressjs/express">https://github.com/expressjs/express</a>                     | JavaScript | 3274         | 3180     | 8917       |
| denoland/deno                                | <a href="https://github.com/denoland/deno">https://github.com/denoland/deno</a>                             | TypeScript | 1871         | 1471     | 3          |
| keras-team/keras                             | <a href="https://github.com/keras-team/keras">https://github.com/keras-team/keras</a>                       | Python     | 10094        | 7133     | 3747       |
| zeit/next.js                                 | <a href="https://github.com/zeit/next.js">https://github.com/zeit/next.js</a>                               | JavaScript | 6303         | 5867     | 125        |
| Semantic-Org/Semantic-UI                     | <a href="https://github.com/Semantic-Org/Semantic-UI">https://github.com/Semantic-Org/Semantic-UI</a>       | JavaScript | 6091         | 5211     | 65         |
| storybookjs/storybook                        | <a href="https://github.com/storybookjs/storybook">https://github.com/storybookjs/storybook</a>             | TypeScript | 5276         | 4750     | 105        |
| spring-projects/spring-boot                  | <a href="https://github.com/spring-projects/spring-boot">https://github.com/spring-projects/spring-boot</a> | Java       | 17051        | 16618    | 793        |
| typicode/json-server                         | <a href="https://github.com/typicode/json-server">https://github.com/typicode/json-server</a>               | JavaScript | 864          | 394      | 58         |
| chrislgarry/Apollo-11                        | <a href="https://github.com/chrislgarry/Apollo-11">https://github.com/chrislgarry/Apollo-11</a>             | Assembly   | 359          | 264      | 0          |
| tonsky/FiraCode                              | <a href="https://github.com/tonsky/FiraCode">https://github.com/tonsky/FiraCode</a>                         | Clojure    | 892          | 652      | 5          |
| Media                                        |                                                                                                             |            | 7776,6125    | 6966,625 | 22365,8375 |
| Mediana                                      |                                                                                                             |            | 2154         | 2034     | 559,5      |
| Coeficiente de Pearson - (All Issues; Title) |                                                                                                             |            | 0,2007091453 |          |            |

| Linguagem  | Quantidade de perguntas |
|------------|-------------------------|
| Javascript | 2029574                 |
| Java       | 3861568                 |
| Python     | 1856733                 |
| PHP        | 1476920                 |
| C          | 18295668                |
| TypeScript | 119398                  |
| Ruby       | 669318                  |
| swift      | 317401                  |
| kotlin     | 44041                   |

### Discussão

Analisando os resultados, observamos que as 6 linguagens mais buscadas no no Stackoverflow também estão entre as linguagens principais dos top 80 repositório do Github.

Porém, nas demais questões, chegamos à conclusão de que não há uma relação visível das issues dos repositórios mais populares do Github no Stackoverflow quando observado o nome do repositório do GitHub no Stackoverflow.

Esse resultado foi validado por meio do coeficiente de pearson, em que encontramos o valor de 0,2007091453. Por ser um resultado próximo de 0, não há uma relação entre os atributos.

### Ameaças à validade do estudo

- Não ter um tópico no Stackoverflow que referencia diretamente o repositório.
- Existir perguntas que não referenciam as tags de linguagens
- Não existir um tópico no Stackoverflow que define quais são as linguagens referenciadas.