Doenças e tratamentos: Resultados de auto acompanhamentos

# Arti!

Arthur Biscaino Fruch

164373

Tiago de Paula Alves

187679

1

dados



# Acompanhamento do desenvolvimento de sintomas e tratamentos de centenas de milhares de usuários

- Dados gerais do paciente
- Progressão dos sintomas
- Acompanhamento de inúmeras variáveis



	A user_id Unique ID for each user	# age Age of Patient		A sex Sex of Patient	country Country	m checkin_date Date of Check In	trackable_id	A trackable_type	A trackable_name	A trackable_value
	QEVuQwEAIN 1% QEVuQwEAPE 1% Other (22069) 98%	-196693	2017	female         83%           male         6%           Other (3)         11%		17May12 12Jul18	1 103k	Symptom         45%           Weather         18%           Other (5)         37%	pressure 3% icon 3% Other (62680) 94%	0 17 1 15 Other (8626) 69
1	QEVuQwEAB1Ezkh7fsBBj	Ee26RyIVcg==				2015-11-26	1069	Condition	Ulcerative colitis	0
2	QEVuQwEAWRNGnuTRqXG2	996KSkTIEw==	31	male	US	2015-11-26	1069	Condition	Ulcerative colitis	0
3	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3168	Condition	pain in left upper arm felt like i was getting a shot	4
4	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3169	Condition	hip pain when gettin up	3
5	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3170	Condition	pain in hand joints	4
6	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3171	Condition	numbness in right hand	2
7	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	1356	Condition	Headache	2
3	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3172	Condition	pain in left ankle	1
9	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3173	Condition	pain in left leg	1
0	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3174	Condition	pain in joints on feet	2
1	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3175	Condition	neck and upper back pain	2
2	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3176	Condition	neck pain at base of scull	2
3	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3177	Condition	pain inside arm and around elbow	2
4	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3178	Condition	diziness	3
5	QEVuQwEA+WkNxtp/qkHv	N2YmTBBDqg==	1	female	CA	2017-04-28	3179	Condition	pain in face and jaw	1
6	OEVuOwEA+WkNxtn/akHv	N2VmTRRDaa==	1	female	CA	2017-04-28	123	Symptom	Joint stiffness	3



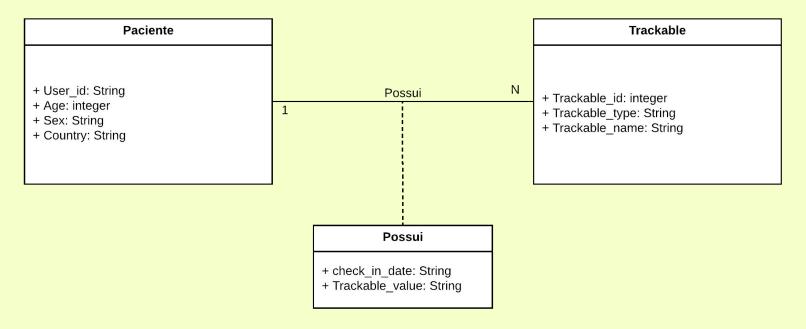
São cerca de 3,5 milhões de entradas.

Para agilizar os testes, usamos uma tabela de reduzida de 10 mil entradas escolhidas aleatoriamente.

2

SQL







Paciente(<u>user\_id</u>, age, sex, country)

Trackable(<u>trackable\_id</u>, trackable\_type, trackable\_name)

Possui(<u>id</u>, user\_id, trackable\_id, checkin\_date, trackable\_value)



# Amostragem dos dados

VUSER_ID	AGE	SEX	COUNTRY
QEVuQwEAckhYKdUdx90n4biuC3CF5g==	36	F	US
QEVuQwEAcj4CrlphtIqDv35Bs2MRuA==	39	М	SE
QEVuQwEAci/KBISdy5nesGMtGAW8OA==	36	F	CA
QEVuQwEAcfqcfms0RF7xWQG0GPAPyg==	16	F	US
QEVuQwEAcfUs5ksym7PnZ5m6TNIBaA==	32	F	US
QEVuQwEAcez5u/k8BelNtK9kcXJYqg==	32	F	US
QEVuQwEAcecF55PjLEpDD5xX64GfjA==		F	AT
QEVuQwEAce9++DSsjy/SpqyHyIJ8+A==	58	F	US
QEVuQwEAcdmfliq4oJA8+k1m2L5s+A==	19	F	US
QEVuQwEAcaqYo+4GtwS1KIHbQ8HT8Q==	20	F	US
QEVuQwEAcaWkbValOu62BBYXb2wxoQ==	25	F	US
QEVuQwEAca6928Wlqe+fCaYxsxEX5Q==	37	М	GB
QEVuQwEAcXvTPfyIOMHhNT42m3+GQA==	28	F	US
QEVuQwEAcUevXpBT5xKdWyNd77x2wQ==	44	F	US
QEVuQwEAcUeTZ1ANqsWwM8Z7o8dC+Q==	28	F	US
QEVuQwEAcSvCekGNqvceiTa4hLWyVg==	24	F	GB
QEVuQwEAcSiSkC3OqcMRhH4cxkGW2Q==	30	F	US
QEVuQwEAcS36U3OJqYZiyqv06DZ45A==	24	F	US
QEVuQwEAcRrtJq4kpeysHfWEuMsnIg==	49	F	AU
QEVuQwEAcPjGn+eHDWirWCmkSs8FGQ==	27	F	GB
QEVuQwEAcNMySPMgwJOUumcjXCrA8A==	38	F	CA
QEVuQwEAcN0fFRcvY2nN2wp8hatPzg==	36	F	CA
QEVuQwEAcMIDYf5fNMb9snJMOijigw==	24	F	US
QEVuQwEAcLxjvyGXyMmZHtosON93dA==	26		CA
QEVuQwEAcKOKu9ZJc40cCt0gWQ1XvA==	27	F	US

ID_POSSUI	ID_PACIENTE	ID_TRACK	CHECKIN_DATE	TRACKABLE_VALUE
2326	QEVuQwEAXle6San98V2jtmqLP8FXow==	191	2017-07-07	1
2327	QEVuQwEAEO2qI7IAwX3/Pq879Uk6CQ==	9890	2017-12-25	1-2 x 4mg every six hours
2328	QEVuQwEAaN8YjAIptAvWkXVxLMyAPg==	629	2017-12-04	0
2329	QEVuQwEAgjSid5t5RhpUyf83z5+3vw==	10433	2018-03-17	
2330	QEVuQwEAiDeUPfSr612G0+mMvvAyIQ==	79280	2018-04-15	38.0
2331	QEVuQwEABnZ+FooPaffsY5aYcaoCug==	500	2015-06-09	0
2332	QEVuQwEAJaA25aS3NBYi9OMW2xGatg==	373	2018-05-01	0
2333	QEVuQwEA3JNUf8LPiNV/XKWROowolg==	7434	2017-04-09	1019.0
2334	QEVuQwEAkTgtNYOF9Cuid1Zxd8NjHA==	548	2015-08-18	0
2335	QEVuQwEAXUvqyvxHzx7G0zRhIVcuDw==	397	2017-07-20	3
2336	QEVuQwEA/vPZGY2PQ1luND8jNaP04A==	193	2018-04-26	3
2337	QEVuQwEAQ2txV8+/rVW0d8ibKpBkuQ==	151	2017-11-21	
2338	QEVuQwEAErpCmrltYAmn4BO41nQamA==	56	2018-01-09	4
2339	QEVuQwEAzHzTi5e5rkcqQi4JIQOJPA==	397	2018-06-13	3
2340	QEVuQwEA0h2Mi9Yz6o4aPkR/yaU18Q==	1	2018-02-21	
2341	QEVuQwEA/U5Cx7JzUsfByl6gYMvbxg==	576	2017-03-16	
2342	QEVuQwEAPdZKvOmLCdD7+2T7UW7a3A==	826	2018-05-29	4
2343	QEVuQwEACQ05OyWM34gpqBYzn95c1w==	2683	2018-06-01	1
2344	QEVuQwEAoRRhVnnLqm/rChE/++O/Ug==	31827	2017-10-11	78.0
2345	QEVuQwEAOrKgxDmk5jd0KuA1eHe11A==	38066	2017-11-04	1019.0
2346	QEVuQwEA9PXroYPUgLC6Kjm14+KYjQ==	1153	2017-01-24	2
2347	QEVuQwEAeO6CZTJ43P7yz7Jz8Yzjtw==	3674	2018-02-15	250mg
2348	QEVuQwEAVAxWMZjNr7iczkJSdkgyIA==	25890	2017-09-16	0.0057
2349	QEVuQwEA6qt9LrQdcVV7YEbe0jRDfA==	7	2018-02-22	1
2350	QEVuQwEAo7WDp/KN9mNYeTLAWI9LHA==	49412	2017-12-20	1021.0
2351	OFVuOwFAoDhhl iBVnu5pKrYcismBvw==	61517	2018-02-10	32.0



#### Sintomas mais comuns nos usuários

```
SELECT DISTINCT trackable_name AS name, COUNT(trackable_name) AS contador
FROM Possui, Trackable, Paciente
WHERE Paciente. User_id = Possui.id_paciente AND Possui.id_track = Trackable.trackable_id
AND Trackable.trackable_type = 'Symptom'
GROUP BY name
ORDER BY contador DESC
```

TRACKABLE_NAME	CONTADOR
Headache	146
Fatigue	143
Joint pain	130
Abdominal pain	125
Nausea	119
Brain fog	101
Fatigue and tiredness	91
Anxiety	90
Diarrhea	72
Dizziness	64
Constipation	63



#### Tratamentos mais usados contra dor de cabeça (headache)

```
CREATE VIEW Head AS

SELECT id_paciente AS id

FROM Possui

WHERE id_track = 98;

SELECT DISTINCT trackable_name AS name, COUNT(trackable_name) as contador

FROM Possui, Head, Trackable

WHERE Head.id = Possui.id_paciente AND Trackable.trackable_type = 'Treatment'

AND Possui.id_track = Trackable.trackable_id

GROUP BY name

ORDER BY contador DESC
```

TRACKABLE_NAME	CONTADOR
Equilibrant	25
Multivitamin	18
Naltrexone	10
Zyrtec	10
b12 spray	10
Lorazepam	9
Ibuprofen	8



#### Sintomas mais acometidos em pacientes do sexo masculino e feminino

SELECT DISTINCT trackable\_name AS name, COUNT(trackable\_name) AS contador
FROM Possui, Trackable, Paciente
WHERE Paciente.User\_id = Possui.id\_paciente AND Possui.id\_track = Trackable.trackable\_id
AND Trackable.trackable\_type = 'Condition' AND Paciente.Sex = 'male'
GROUP BY name
ORDER BY contador DESC

#### Distribuição dos usuários por gênero

1 0	
Sexo	Usuários
Feminino	3059
Masculino	211

TRACKABLE_NAME	CONTADOR
Fibromyalgia	75
Depression	59
Anxiety	42
Migraine	40
Chronic fatigue syndrome	29
Endometriosis	22
Ehlers-Danlos syndrome	22
IBS	21
Dysautonomia	19
Fatigue	17
Asthma	16
Allergies	16
Post-traumatic stress disorder (PTSD)	15

TRACKABLE_NAME	CONTADOR
Fibromyalgia	4
Social anxiety disorder	4
Depression	4
breathing pain	3
IBS	3
Acid Reflux	3
Crohn's disease	2
Multiple sclerosis	2
Abdominal pain	2
Chronic fatigue syndrome	2
Ulcerative colitis	2



#### Doenças mais acometidas nos pacientes entre 20 e 50 anos

```
SELECT DISTINCT trackable_name AS name, COUNT(trackable_name) AS contador

FROM Possui, Trackable, Paciente

WHERE Paciente. User_id = Possui.id_paciente AND Possui.id_track = Trackable.trackable_id

AND Trackable.trackable_type = 'Condition' AND Paciente.Age >= 20 AND Paciente.Age <= 50

GROUP BY name

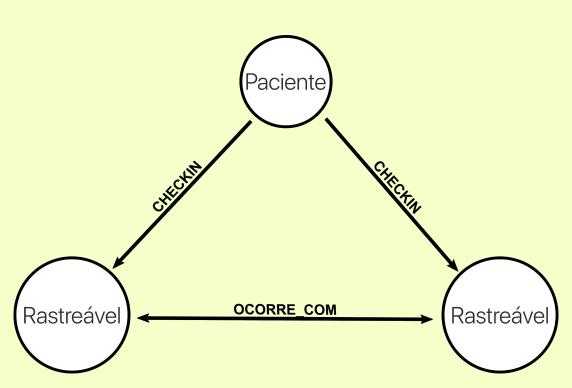
ORDER BY contador DESC
```

ITRACKABLE_NAME	CONTADOR
Fibromyalgia	66
Depression	53
Anxiety	42
Migraine	40
Chronic fatigue syndrome	29
Ehlers-Danlos syndrome	22
Endometriosis	21
IBS	20
Dysautonomia	18
Asthma	16
Allergies	16
Fatigue	15
Acid Reflux	15

3/

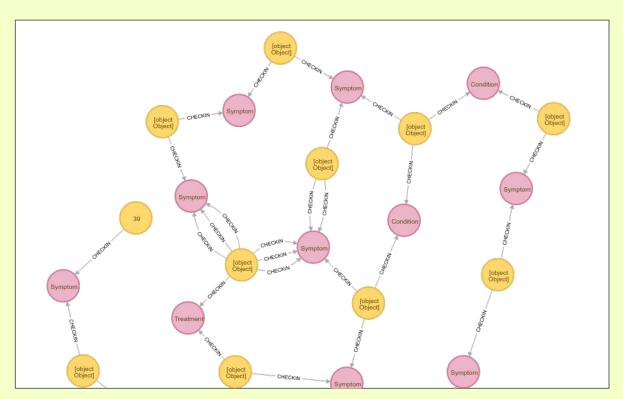
# Cypher







# Grafo Principal





#### Preparação dos Dados

#### Coocorrências com pesos

#### Especificação dos nós

```
MATCH (r:Rastreavel {tipo: 'Symptom'})

SET r:Sintoma;

MATCH (r:Rastreavel {tipo: 'Condition'})

SET r:Condicao;

MATCH (r:Rastreavel {tipo: 'Treatment'})

SET r:Tratamento;

MATCH (r:Rastreavel)

WHERE NOT r:Sintoma AND NOT r:Condicao AND NOT r:Tratamento

SET r:Outro;
```

#### Forçando um grafo conexo

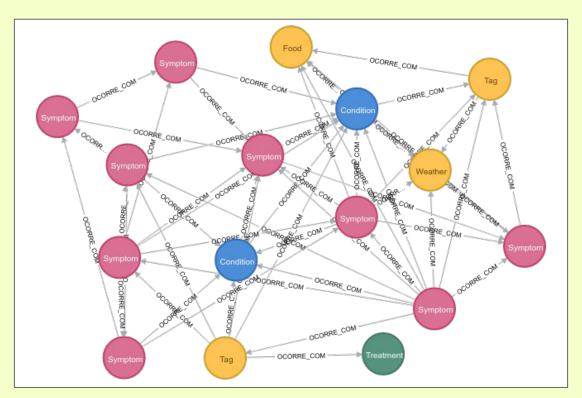
```
// Agrupamento de rastráveis por coocorrência
CALL algo.unionFind.stream('Rastreavel', 'OCORRE COM', {})
YIELD nodeId, setId
WITH setId AS grupo, algo.getNodeById(nodeId) AS no
SET no.grupo = grupo
// encontrando o grupo com mais rastreáveis interligados
WITH grupo AS maior grupo, COUNT(no) AS nos
ORDER BY nos DESC
LIMIT 1
// remove os rastreáveis fora desse grupo
MATCH (r:Rastreavel)
WHERE r.grupo <> maior grupo
DETACH DELETE r;
// limpando os dados de grupo
MATCH (r:Rastreavel)
SET r.grupo = NULL;
```

#### Cálculo dos pesos das arestas

```
Peso(A_{i,j}) = \frac{Ocorrências(V_i, V_j) * Ocorrências(V_i, V_j)}{Ocorrências(V_i) * Ocorrências(V_j)}
```



## Rede Complexa





#### Consulta

#### Comparação de similaridades pelo índice de Jaccard e pelos pesos calculados

```
MATCH (s:Sintoma)-[:0CORRE_COM]-(r:Rastreavel)
WITH {item: id(s), categories: collect(id(r))} as ligacoesPorCondicao
WITH collect(ligacoesPorCondicao) as dados
CALL algo.similarity.jaccard.stream(dados)
YIELD item1, item2, similarity
WHERE item1 < item2
WITH algo.getNodeById(item1) AS s1, algo.getNodeById(item2) AS s2, similarity AS similaridade
MATCH (s1)-[o:0CORRE_COM]-(s2)
WHERE o.vezes > 1
RETURN s1.nome, s2.nome, similaridade, o.peso, o.vezes
ORDER BY similaridade DESC
```



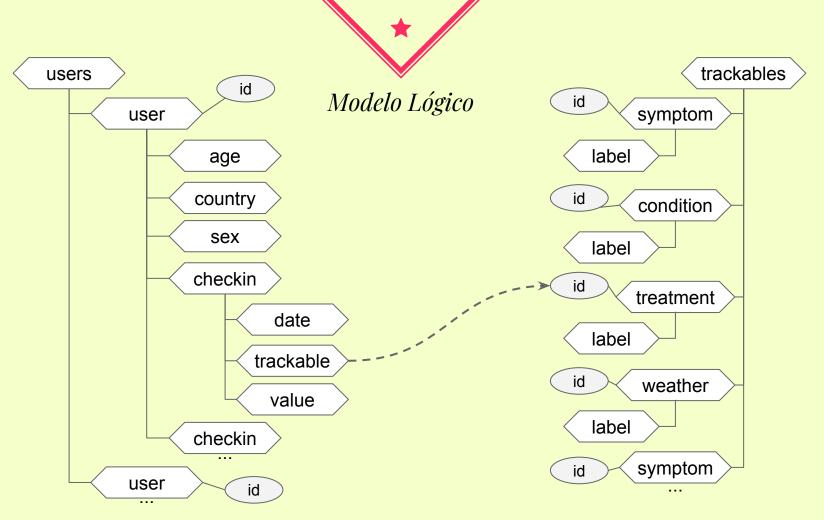
#### Consulta

#### Detecção de comunidades pela Modularidade de Louvain

```
CALL algo.louvain('Rastreavel', 'OCORRE COM', {weightProperty:'peso', write:true, writeProperty:'comunidade'})
YIELD nodes, communityCount, iterations, loadMillis, computeMillis, writeMillis;
MATCH (r:Rastreavel)
WITH r.comunidade AS comunidade, COUNT(r) AS nos
WHERE nos < 10
WITH comunidade
ORDER BY nos DESC
LIMIT 1
MATCH (r:Rastreavel {comunidade: comunidade})
                                                                                       OCORRECORRE
RETURN r
```

4

# XQuery





### Amostra dos Dados

```
<?xml version="1.0" encoding="UTF-8" ?>
<trackables>
  <tag id="2">
    <label>stressed</label>
  </tag>
  <treatment id="6315">
    <label>Nortriptyline</label>
  </treatment>
  <symptom id="11176">
    <label>Painful neck</label>
  </symptom>
 <symptom id="347">
    <label>Cold Extremities </label>
  </symptom>
 <symptom id="566">
   <label>physical fatigue</label>
  </symptom>
  <condition id="64">
   <label>Anxiety</label>
  </condition>
  <condition id="411">
    <label>GERD</label>
  </condition>
  <symptom id="1677">
   <label>Skin sensitivity</label>
 </symptom>
 <symptom id="710">
   <label>Swollen glands</label>
  </symptom>
  <symptom id="242">
   <label>Fatigue</label>
  </symptom>
  <symptom id="547">
    <label>Skin Pain</label>
  </symptom>
  <condition id="2085">
```

```
<user id="QEVuQwEAQL8ojazVvMktZe3AxDPjeA==">
  <sex>female</sex>
   <value>800 mg x 6 pills a day</value>
```



#### Usuários com mais check-ins

```
let $users := doc('https://raw.githubusercontent.com/TiagodePAlves/mc536-projeto/master/dados/users.xml')
for $user in ($users//user)
  order by count($user/checkin) descending
  return
  <user checkins="{count($user/checkin)}">
      {data($user/@id)}
  </user>
```

```
<user checkins="100">QEVUQWEAlNMIHBRXhjZvx6HzoW8iXQ==</user>
<user checkins="83">QEVUQWEAPEOXGFKArZ9POVOtEufMcA==</user>
<user checkins="78">QEVUQWEAPEOXGFKArZ9POVOtEufMcA==</user>
<user checkins="56">QEVUQWEAVaa7SCCq9wZKg//dpv5Xyw==</user>
<user checkins="56">QEVUQWEAICZSfGQR0NefHujW9fVI/A==</user>
<user checkins="56">QEVUQWEA+ncvJRvfo6PtArpLX1N8xA==</user>
<user checkins="54">QEVUQWEATILrJKGLQqxekeTVDtjrGw==</user>
<user checkins="51">QEVUQWEATILrJKGLQqxekeTVDtjrGw==</user>
<user checkins="49">QEVUQWEAQU4h6TUSURerctVPXKDehA==</user>
<user checkins="49">QEVUQWEAMIV3n+J3kqt0E8dlBup+g==</user>
<user checkins="48">QEVUQWEAMIV3n+J3kqt0E8dlBup+g==</user>
<user checkins="48">QEVUQWEAMINAROXRyPkH4ryfv2Q==</user>
<user checkins="46">QEVUQWEAMINTP/7opHf8bz+aYaPb9qQ==</user>
<user checkins="46">QEVUQWEADhTp/7opHf8bz+aYaPb9qQ==</user>
<user checkins="45">QEVUQWEA/LXYWRG3fa1UMAl5GwTn0g==</user>
<user checkins="39">QEVUQWEA/LXYWRG3fa1UMAl5GwTn0g==</user>
<user checkins="39">QEVUQWEAHBn9PfvMceuuky/L/gXfNw==</user>
<user checkins="39">QEVUQWEARRT2mYkt13Fokcu7zW5UA==</user>
<user checkins="39">QEVUQWEAU8LWk782hBZqsGTbLIbeAQ==</user>
<user checkins="39">QEVUQWEAU8LWk782hBZqsGTbLIbeAQ==</user></user checkins="34">QEVUQWEAU8LWk782hBZqsGTbLIbeAQ==</user></user checkins="34">QEVUQWEAU8LWk782hBZqsGTbLIbeAQ==</user checki
```



#### Usuários com mais novos que 20 anos que têm dor de cabeça

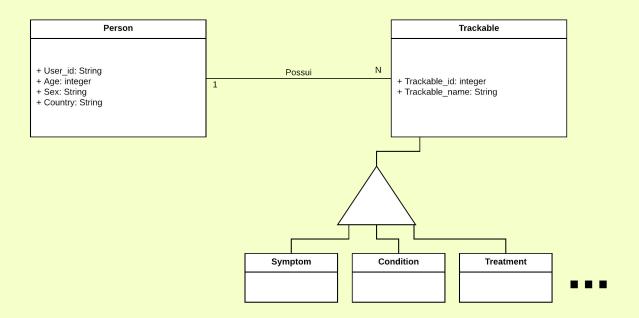
```
<user><age>18</age><country>CA</country></user>
<user><age>12</age><country>US</country></user>
<user><age>17</age><country>US</country></user>
<user><age>19</age><country>US</country></user>
<user><age>0</age><country>NZ</country></user>
<user><age>16</age><country>US</country></user>
<user><age>16</age><country>US</country></user>
<user><age>17</age><country>US</country></user>
<user><age>17</age><country>US</country></user></si></or>
<user><age>17</age><country>US</country></user></or>
<user><age>17</age><country>US</country></user></or>
```

# 5

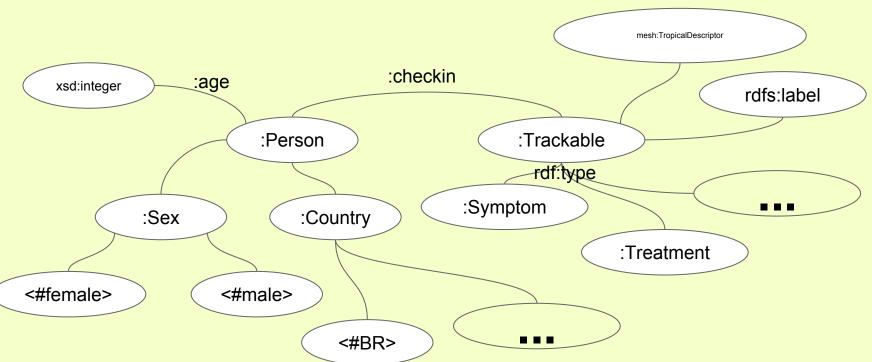
SparQL



#### Modelo Conceitual









### Preparação dos Dados

- Criação do RDF com os dados (em Turtle)
  - cabeçalho com prefixos e classes
  - especificação da imagem e do domínio dos atributos
  - adaptação dos valores para dos valores
- Remoção de valores muito específicos
- Montagem do banco no Blazegraph

```
def:Person rdf:type rdfs:Class .
def:Sex rdf:type rdfs:Class .
<#male> rdf:type def:Sex .
<#female> rdf:type def:Sex .
def:Country rdf:type rdfs:Class .
val:age
    rdf:type rdf:Property ;
    rdf:range xsd:integer;
    rdf:domain def:Person .
val:sex
    rdf:type rdf:Property ;
    rdf:range def:Sex :
    rdf:domain def:Person .
val:country
    rdf:type rdf:Property;
    rdf:range def:Country;
    rdf:domain def:Person .
def:Trackable rdf:type rdfs:Class .
def:Sympton rdf:type def:Trackable .
def:Treatment rdf:type def:Trackable .
def:Condition rdf:type def:Trackable .
def:Tag rdf:type def:Trackable .
def:Weather rdf:type def:Trackable .
def:Food rdf:type def:Trackable .
val:checkin
    rdf:type rdf:Property;
    rdf:range def:Trackable ;
    rdf:domain def:Person .
```



# Exemplo no Blazegraph

nter a URI to begin	navigation						
<http: localho:<="" td=""><td>st:9999/blazegraph</td><td>n/kb#T347&gt;</td><td></td><td></td><td></td><td></td><td>Submit Query</td></http:>	st:9999/blazegraph	n/kb#T347>					Submit Query
http://localhost	t:9999/blazegraph/	kb#T347>					
utgoing Links							
df:type <http: io<="" td=""><td>d.nlm.nih.gov/mesh/D0</td><td>012816&gt;</td><td></td><td></td><td></td><td></td><td></td></http:>	d.nlm.nih.gov/mesh/D0	012816>					
df:type <http: lo<="" td=""><td>ocalhost:9999/blazegra</td><td>aph/kb/def#Symptom&gt;</td><td></td><td></td><td></td><td></td><td></td></http:>	ocalhost:9999/blazegra	aph/kb/def#Symptom>					
df:type <http: lo<="" th=""><th>ocalhost:9999/blazegr</th><th>aph/kb/def#Trackable&gt;</th><th></th><th></th><th></th><th></th><th></th></http:>	ocalhost:9999/blazegr	aph/kb/def#Trackable>					
df:type   <http: lo<="" td=""><td>ocalhost:9999/blazegr</td><td>aph/kb/def#Trackable&gt;</td><td></td><td></td><td></td><td></td><td></td></http:>	ocalhost:9999/blazegr	aph/kb/def#Trackable>					
df:type   <http: ld<="" td=""><td>ocalhost:9999/blazegr</td><td>aph/kb/def#Trackable&gt;</td><td></td><td></td><td></td><td></td><td></td></http:>	ocalhost:9999/blazegr	aph/kb/def#Trackable>					
coming Links		aph/kb/def#Trackable>	s2knrlYG7tNWg==>	<a href="http://localhost:9999/b"><a href="http://localhost:9999/b"></a></a>	lazegraph/kb/val#c	heckin>	
coming Links	9999/blazegraph/kb#U			<a href="http://localhost:9999/b"><a href="http://localhost:9999/b">http://localhost:9999/b</a></a>			
coming Links <a href="http://localhost:9">http://localhost:9</a> <a href="http://localhost:9">http://localhost:9</a>	9999/blazegraph/kb#U 9999/blazegraph/kb#U	IQEVuQwEA/e3RF1Nb0s	peF2c/Bv8HqmA==>		lazegraph/kb/val#c	heckin>	
coming Links <a href="http://localhost:9">http://localhost:9</a> <a href="http://localhost:9">http://localhost:9</a> <a href="http://localhost:9">http://localhost:9</a>	999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U	JQEVuQwEA/e3RF1Nb0s JQEVuQwEA/OT5Rb8/wb	beF2c/Bv8HqmA==> HF3LwFtDA+BZA==>	<a href="http://localhost:9999/b"><a href="http://localhost:9999/b"><a href="http://localhost:9999/b"></a></a></a>	lazegraph/kb/val#c	heckin>	
coming Links chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9	9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U	IQEVuQwEA/e3RF1Nb0s IQEVuQwEA/OT5Rb8/wb IQEVuQwEA9qrc0HGOth	beF2c/Bv8HqmA==> HF3LwFtDA+BZA==> 11y1nV211Mx8ww==>	<a href="http://localhost:9999/b"><a href="http://localhost:9999/b"><a href="http://localhost:9999/b"><a href="http://localhost:9999/b"><a href="http://localhost:9999/b"><a href="http://localhost:9999/b"></a></a></a></a></a></a>	lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c	heckin>	
coming Links chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9	9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U	IQEVuQwEA/e3RF1Nb0s IQEVuQwEA/OT5Rb8/wb IQEVuQwEA9qrc0HGOth IQEVuQwEAk3hERawvM	beF2c/Bv8HqmA==> HF3LwFtDA+BZA==> 11y1nV211Mx8ww==> )XRyPkH4ryfv2Q==>	<a href="http://localhost:9999/b"><a href="http://localhost:9999/b">http://localhost:9999/b</a></a></a></a></a></a></a></a></a></a></a>	lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c	heckin> heckin> heckin>	
coming Links chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9	9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U	IQEVuQwEA/e3RF1Nb0s IQEVuQwEA/OT5Rb8/wb IQEVuQwEA9qrc0HGOth IQEVuQwEAk3hERawvM IQEVuQwEAm3m1nkaRO	beF2c/Bv8HqmA==> HF3LwFtDA+BZA==> 11y1nV211Mx8ww==> )XRyPkH4ryfv2Q==>	<a href="http://localhost:9999/b"><a href="http://localhost:9999/b">http://localhost:9999/b</a></a></a></a></a></a></a></a></a></a></a>	lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c	heckin> heckin> heckin>	
coming Links chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9 chttp://localhost:9	9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U 9999/blazegraph/kb#U	IQEVuQwEA/e3RF1Nb0s IQEVuQwEA/OT5Rb8/wb IQEVuQwEA9qrc0HGOth IQEVuQwEAk3hERawvM IQEVuQwEAm3m1nkaRO	beF2c/Bv8HqmA==> HF3LwFtDA+BZA==> 11y1nV211Mx8ww==> )XRyPkH4ryfv2Q==>	<a href="http://localhost:9999/b"><a href="http://localhost:9999/b">http://localhost:9999/b</a></a></a></a></a></a></a></a></a></a></a>	lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c lazegraph/kb/val#c	heckin> heckin> heckin>	



symptom1	symptom2
Hyopomania	Bowel problems
Hip pain	Bowel problems
Bowel problems	Hyopomania
Hip pain	Hyopomania
Bowel problems	Hip pain
Hyopomania	Hip pain
Bowel problems	Back pain
Hyopomania	Back pain
Hip pain	Back pain
Bowel problems	Leg pain
Hyopomania	Leg pain
Hip pain	Leg pain
Facial heating/feels feverish (but temp is low)	Chronic widespread pain
Bowel problems	Nausea
Hyopomania	Nausea
Hip pain	Nausea
Bowel problems	Neck pain
Hyopomania	Neck pain
Hip pain	Neck pain
Bowel problems	Pelvic pain

#### Coocorrência de sintomas

```
PREFIX def: <a href="http://localhost:9999/blazegraph/kb/def#">http://localhost:9999/blazegraph/kb/def#>
PREFIX val: <a href="http://localhost:9999/blazegraph/kb/val">http://localhost:9999/blazegraph/kb/val">
PREFIX rdfs: <a href="http://www.w3.org/2000/01/rdf-schema">http://www.w3.org/2000/01/rdf-schema">
SELECT DISTINCT ?symptom1 ?symptom2
WHERE {
     ?t1 a def:Symptom ;
           rdfs:label ?symptom1 .
     ?t2 a def:Symptom ;
           rdfs:label ?symptom2 .
     ?user val:checkin ?t1 .
     ?user val:checkin ?t2 .
     FILTER (?t1 != ?t2)
LIMIT 20
```



# Sintomas que só foram relacionados ao sexo masculino

```
BASE <a href="http://localhost:9999/blazegraph/kb">BASE <a href="http://localhost:9999/blazegraph/kb">http://localhost:9999/blazegraph/kb</a>>
PREFIX def: <a href="http://localhost:9999/blazegraph/kb/def#>">http://localhost:9999/blazegraph/kb/def#>">
PREFIX val: <a href="http://localhost:9999/blazegraph/kb/val#">http://localhost:9999/blazegraph/kb/val#>
PREFIX rdfs: <a href="http://www.w3.org/2000/01/rdf-schema">http://www.w3.org/2000/01/rdf-schema">
SELECT DISTINCT ?symptom
WHERE {
      ?sympt node a def:Symptom;
             rdfs:label ?symptom .
      FILTER (EXISTS {
            ?user val:sex <#male>;
                  val:checkin ?sympt node .
      } && NOT EXISTS {
            ?user val:sex <#female> :
                  val:checkin ?sympt node .
      })
LIMIT 20
```

#### symptom angst vor polizei Torso Twitching Numbness and burning in feet shoulder ache Difficulty swallowing Hypersensitivity to pain Anger/Irritation Happiness appetite Incontinence Stomach upset Neck/shoulder pain Energy Level rage attacks Lack of Consentration sore / stiff Lie down now or fall down Brain vibrations Joint pain fingers missed medicine



age	links	users	treatments
18	2	2	2
19	2	1	2
20	2	2	2
22	1	1	1
24	1	1	1
25	9	1	9
26	3	1	3
27	6	4	6
29	1	1	1
30	1	1	1
31	20	2	20
32	9	4	9
33	10	5	9
34	20	3	11
37	19	5	19
38	2	2	2
39	7	1	7
40	5	1	5
41	1	1	1
42	5	1	5
48	1	1	1
49	2	1	2
53	1	1	1

#### Análise de ansiedade por idade

```
PREFIX def: <http://localhost:9999/blazegraph/kb/def#>
PREFIX val: <a href="http://localhost:9999/blazegraph/kb/val">http://localhost:9999/blazegraph/kb/val</a>
PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
SELECT
    ?age
    (COUNT(?user) AS ?links)
    (COUNT(DISTINCT ?user) AS ?users)
    (COUNT(DISTINCT ?treatment) AS ?treatments)
WHERE {
    ?user val:age ?age ;
        val:checkin ?symptom ;
        val:checkin ?treatment .
    ?treatment a def:Treatment .
    ?symptom rdfs:label ?label .
    FILTER REGEX(?label, 'anxiety', 'i')
GROUP BY ?age
ORDER BY ?age
```



# Mais detalhes em

github.com/TiagodePAlves/mc536-projeto