# COVID-19 Ombudsman Analysis



Problem: COVID-19 brought a large number of requests. The team was unable to attend.

Objective: How to apply machine learning to identify the interaction profiles in the ombudsman channels in the state of Goias





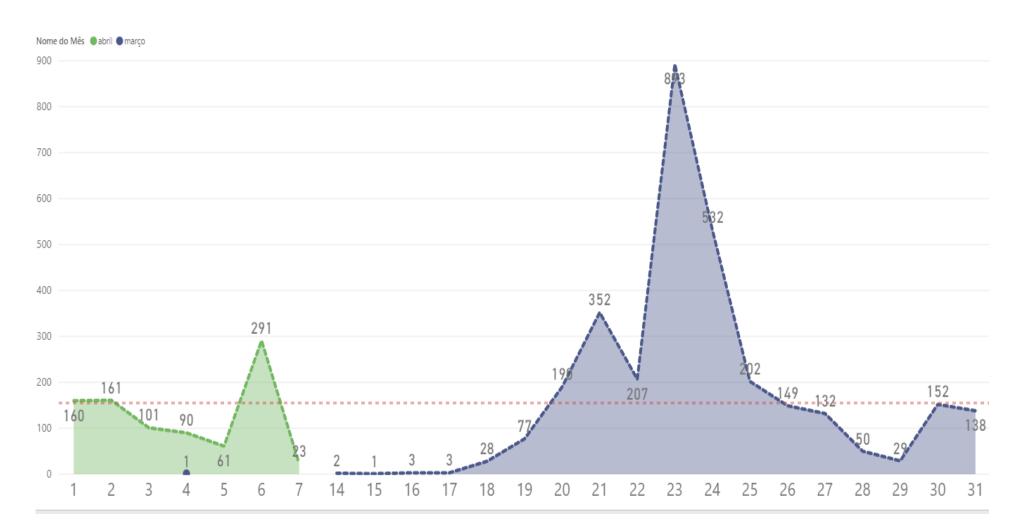
### Methodology

- Analysis of the population that interacts in the ombudsman channels
- Descriptive analysis of interactions
- Textual analysis of texts using clustering techniques
- Personas Identification
- Recommendations

# 2- Descriptive Analysis

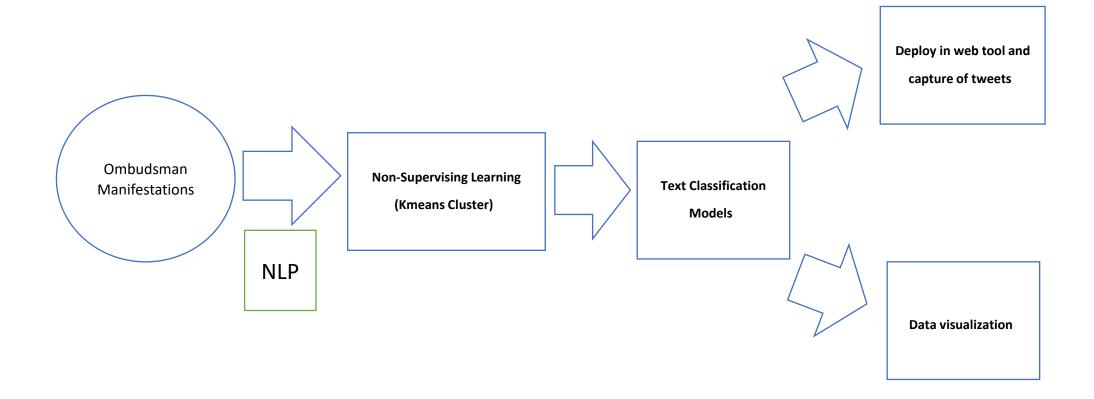
# Complaints about the Corona Virus

Total Manifestations: 2509 between 03/13/2020 to 03/26/2020



# 2- Textual Analysis - Artificial Intelligence

## **FRAME**



#### TF-IDF

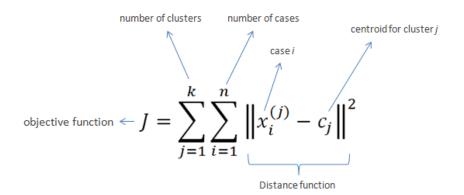
With the TF-IDF (term frequency - inverse document frequency), we consider the frequency of a word in the sentence, divided by the number of documents in which it appears

$$tfidf_{i,j} = tf_{i,j} \times log(\frac{N}{df_i})$$

 $tf_{i,j}$  = total number of occurrences of i in j  $df_i$  = total number of documents (speeches) containing i N = total number of documents (speeches)

### Kmean Clustering Technique

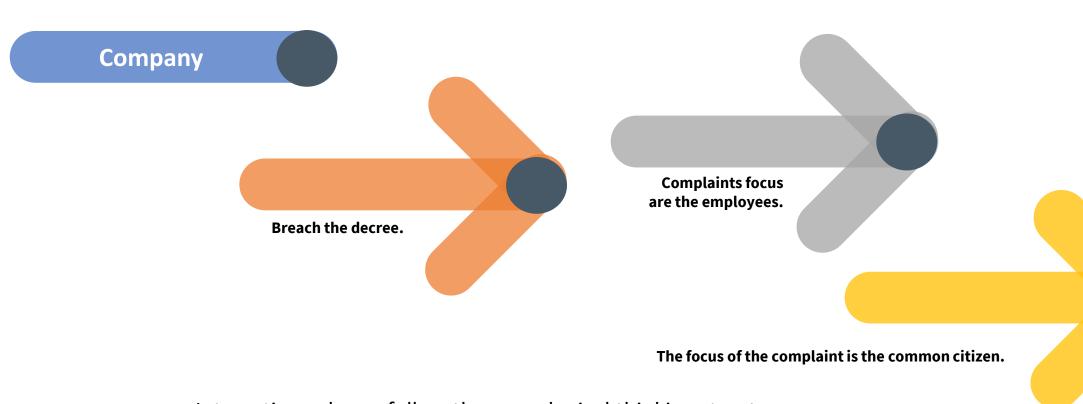
Clustering method that aims to partition n observations among k groups, where each observation belongs to the group closest to the average. This results in a division of the data space in a Voronoi Diagram.



# **Manifestations Tag Cloud**



## Logic in interaction



Interactions always follow the same logical thinking structure
The employee has doubts as to whether his company should be open, so he creates a complaint.

The citizen has doubts about an activity that must be working, then the citizen a complaint.

# Demandas por Cluster

Cluster	Manifestações	%
<ul> <li>Running Activities, employees and agglomerations</li> </ul>	600	28.18
<ul> <li>Citizen complaint about open services</li> </ul>	438	20.57
Employees Requesting Protection	303	14.23
Entertainment	353	15.88
Closed door companies	167	7.84
Decoration Stores	156	7.33
Open bars	112	5.26

# CLUSTER - Operating activities, employees and agglomerations

# 1- Operating Activities, employees and agglomerations

- Reported activity:
- Workshops
- Works and Constructions
- Administrative activities
- Colleges maintaining activities -
  - Cambury more than 10 requests,
  - UNIALFA,
  - PUC
- IT companies
- The company "Elétrica Radiante" made 20 requests

# 1- Operating Activities, employees and agglomerations

```
trabalhadores funcionário fechado office servidores nenhuma funcionário fechado lojas fojporém anos idosos Boavários estabelecimento día esses tenho inclusive pela empresas podem contato MAIS 60 assim seja muito de creto foram governador Ela 19 seus medidas sestos medidas esses tenho inclusive pela empresas grupo máscaras aros Gostaria também trabalham pode onde ou ônibus lápelo virus setor MAS colos rua correndo mundo público momento só trabalhando esta adui nós colaboradores estor MAS risco fazer pessoa atendimento aberta aqui nós colaboradores estor MAS risco fazer pessoa indústria aos medo pra outros parar cidade Go ainda nao pra outros denunciar cidade Go ainda nao já pois aleles Goiánia quarentena contaminação denunciar cidade mesma loja sem estor moral funcionarios sou FECHAR TOGOS o vida Eu fica esta ir normalmente porque das toda nem plas colocando muitos suspeita Aparecida Av Peço funcionando serviço gente alguns hoje segurança riscos aberto alcool situação saber Quero entre entre serviços serviço sente alguns hoje serviço gente alguns hoje serviço gente alguns hoje alcontinua dispondente entre serviços serviç
```

```
model w2v.most similar("funcionários", topn=20)
/usr/local/lib/python3.6/dist-packages/ipykernel launche
  """Entry point for launching an IPython kernel.
/usr/local/lib/python3.6/dist-packages/gensim/matutils.p
  if np.issubdtype(vec.dtype, np.int):
[('os', 0.9992155432701111),
  '<mark>risco', 0</mark>.9986992478370667),
  '<mark>colocando'</mark>, 0.9982835054397583),
   seus', 0.997401237487793),
   'c<mark>lientes', 0.</mark>9970037937164307),
   'trabalhar', 0.9969195127487183),
   para', 0.9962433576583862),
   'e', 0.9961492419242859),
   'todos', 0.9958095550537109),
   'que', 0.9952868223190308),
  'Colocando', 0.9944332838058472),
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   'saúde', 0.9936031103134155),
   com', 0.9934160709381104),
   'estão', 0.9933100938796997),
   'nem', 0.9932254552841187),
   'sendo', 0.9929190874099731),
   casa', 0.9926334619522095),
   'sem', 0.9923228621482849),
  'coloca', 0.9921894669532776)]
```

# CLUSTER - Citizen complaint about open services

### Citizen complaint about open services

- Activity reported that citizens have doubts:
  - Drugstores
  - Hardware Stores
  - Auto parts doubt whether to stay open or closed
  - Laundries
  - Administrative Service
  - Concessionaires
  - Parking
  - Churches
  - Car wash
  - Motel Neighborhood of São Francisco e Ipiranga
  - Ambulance

### Citizen complaint about open services

```
descumprindo venda Manifestação várias Ferragista eles funcionar inclusive continuam fechados todas colaboradores estado Qd reclamante serviço ATIVIDADES estado Qd reclamante serviço ATIVIDADES pegas diá hoje comercial governo gel lado muita disse vários Jardim bebidas abrir funcionarios portas entre nome empresas mais 74 ser loja região portas recebida muitos continua porta CEP gov CIDADE comercios EMPRESA Centro mail garavelo esquina indústria 445 aprecida foi já estabelecimentos peda supermercado setormas AINDA DE servicios aprecida foi já estabelecimento mesmo dos lojas abértos pessoas sendo Flamboyant respeitando Lt fechamento mesmo dos lojas abértos próximo la funcionarios como desrespeitando saúde alcool todorua Rio Há Val Rio Há V
```

```
IT ub.I22nparAbe(Aec.arAbe' ub'Iur):
[('trabalhando', 0.999360203742981),
  'aberta', 0.9993194937705994),
  'está', 0.999252438545227),
  'sem', 0.9992316961288452),
 ('na', 0.9992247819900513),
 ('as', 0.999164342880249),
  'todos', 0.9991506338119507),
  'do', 0.9991428852081299),
 ('A', 0.9991245269775391),
  'mesmo', 0.9990899562835693),
  'mais', 0.9990863800048828),
  'empresa', 0.9990564584732056),
  'ao', 0.9990538358688354),
  'com', 0.9990503787994385),
 'funcionários', 0.999049186706543),
 'no', 0.9990339279174805),
  'da', 0.9989385604858398),
 'normalmente', 0.9989032745361328),
  'decreto', 0.9988428950309753),
  'estão', 0.9988372325897217)]
```

#### Code:

https://colab.research.google.com/drive/1TVC3b7pgKmjC5ANy2HUkgUUsvIKIL4M8#scrollTo=J8WGU3 TZhqV

https://colab.research.google.com/drive/1TVC3b7pgKmjC5ANy2HUkgUUsvIKlL4M8#scrollTo=J8WGU3 TZhqV

http://ferreirabruno7.pythonanywhere.com/

# Thank You!

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