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

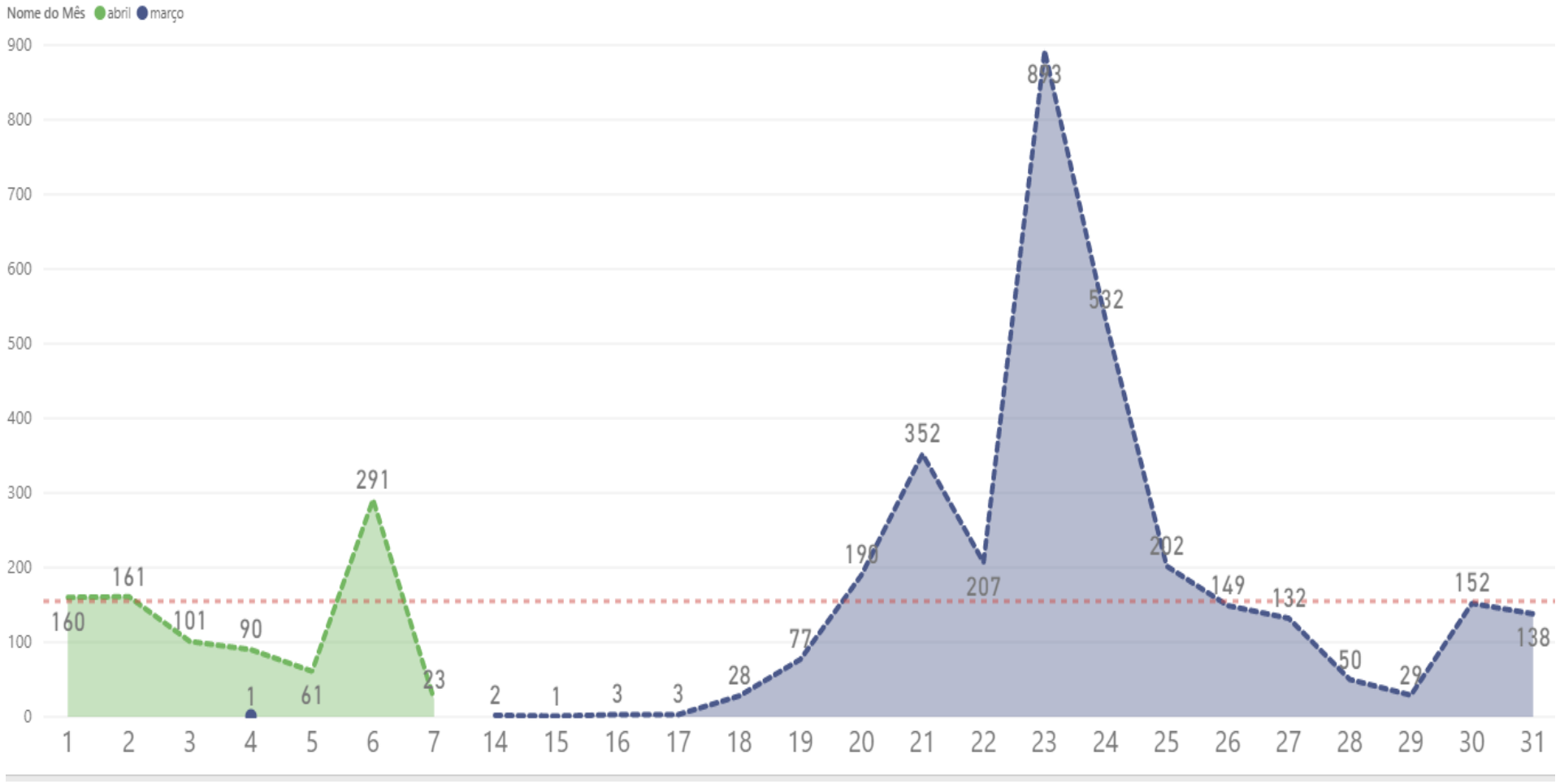
Methodology

- 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

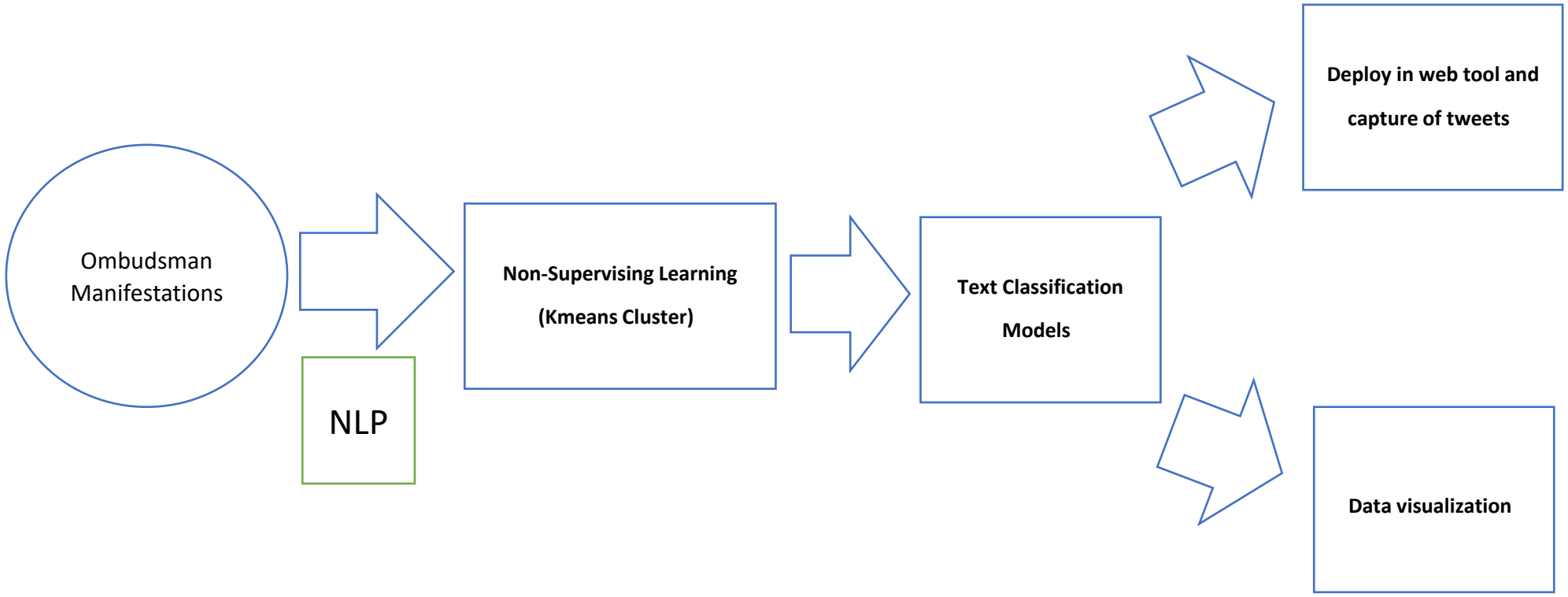
Complaints about the Corona Virus

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



2- Textual Analysis - Artificial Intelligence

FRAME


Ombudsman Manifestations
NLP
Non-Supervising Learning (Kmeans Cluster)
Text Classification Models
Deploy in web tool and capture of tweets
Data visualization

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

$$\mathrm{tfidf}_{i,j} = \mathrm{tf}_{i,j} \times \log\left(\frac{N}{\mathrm{df}_i}\right)$$

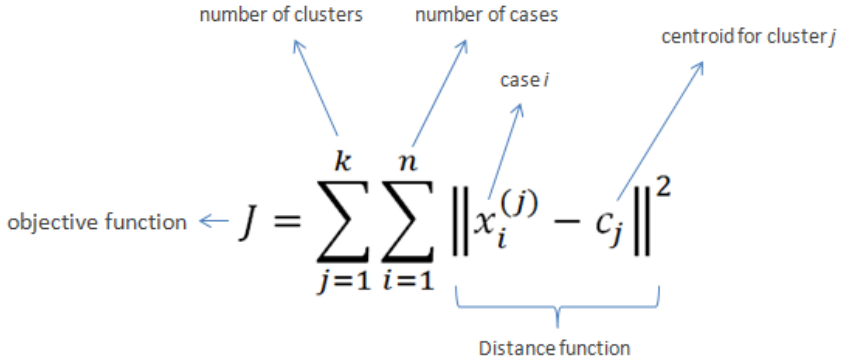
$\mathrm{tf}_{i,j}$ = total number of occurences of i in j

df_i = total number of documents (speeches) containing i

N = total number of documents (speeches)

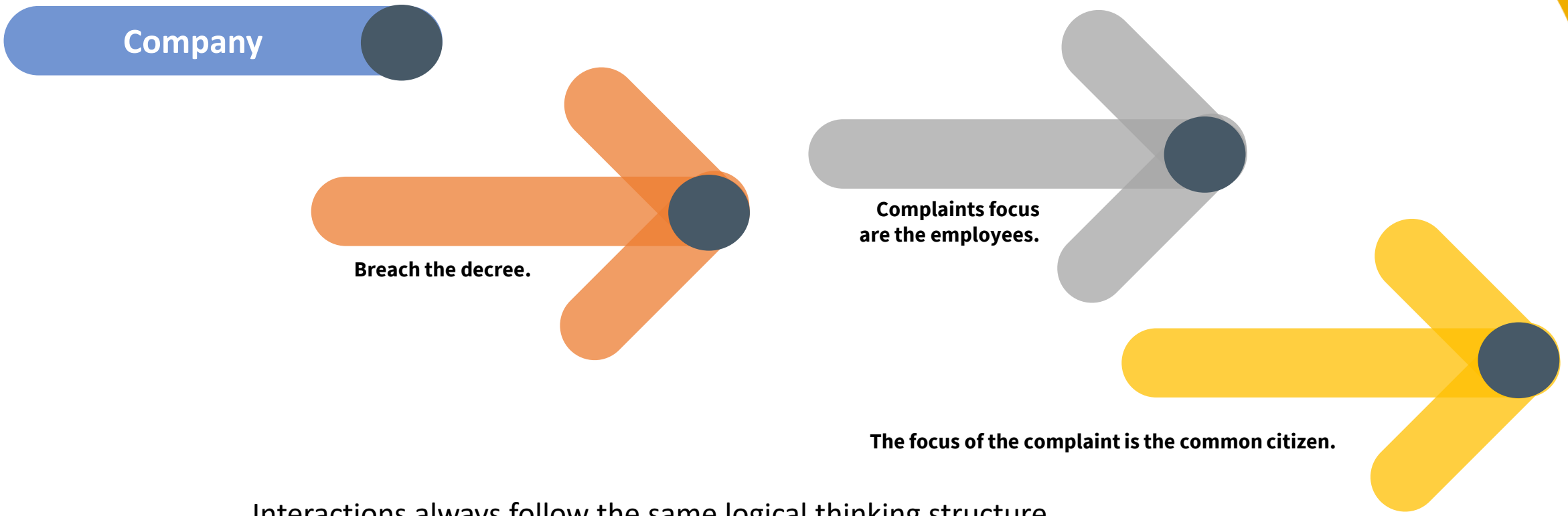
Kmean Clustering Technique

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	%
• Running Activities, employees and agglomerations	600	28.18
• Citizen complaint about open services	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


```
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),
 ('risco', 0.9986992478370667),
 ('colocando', 0.9982835054397583),
 ('seus', 0.997401237487793),
 ('clientes', 0.9970037937164307),
 ('trabalhar', 0.9969195127487183),
 ('para', 0.9962433576583862),
 ('e', 0.9961492419242859),
 ('todos', 0.9958095550537109),
 ('que', 0.9952868223190308),
 ('Colocando', 0.9944332838058472),
 ('não', 0.9938465356826782),
 ('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


```
  if np.issubdtype(vec.dtype, np.int):
[('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/1TVC3b7pgKmjC5ANy2HUkgUUsvIKlL4M8#scrollTo=J8WGU3_TZhqV

https://colab.research.google.com/drive/1TVC3b7pgKmjC5ANy2HUkgUUsvIKlL4M8#scrollTo=J8WGU3_TZhqV

http://ferreirabruno7.pythonanywhere.com/

Thank You!

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