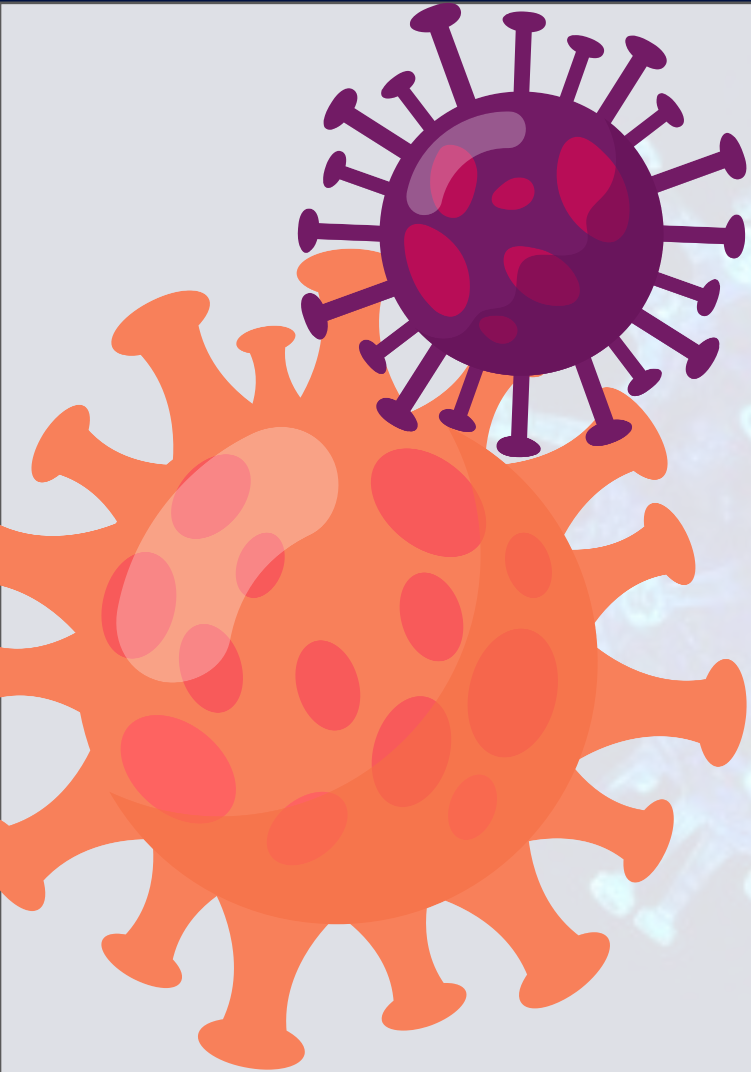

# Exploration of Netizen Concern About Covid-19

**Intro to NLP and Text Mining**
**Data Science 4 - Dataloper**

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# Introduction

**Source of Data**

https://twitter.com/

**Keyword**

Covid

**Time of Crawling Data**

21/07/2021 - 22/07/2021

**Total Data**

1000 data with 3 columns, i.e. Date, Tweet, and User

# Objectives

1

### Text Preprocessing

Cleaning the dataset

2

### Feature Extraction Implementation

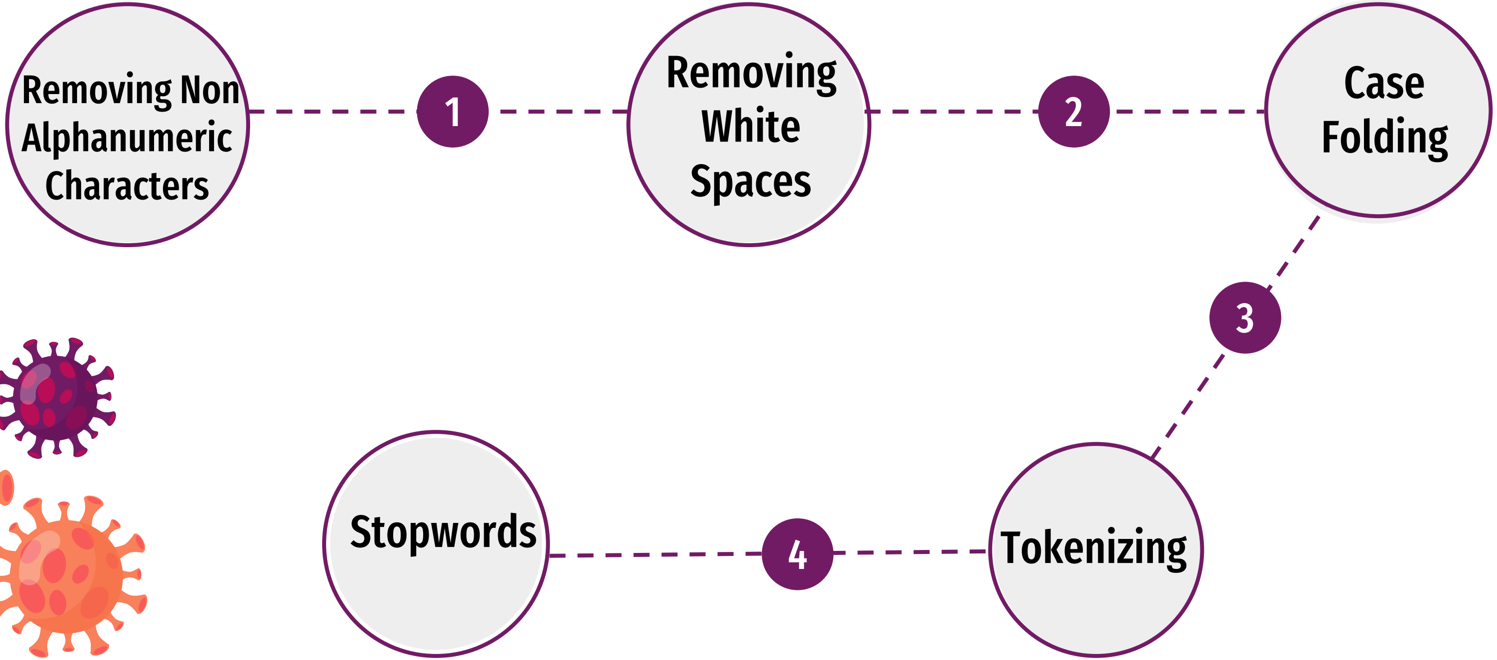
Implement Bag of Words and Tf-Idf

3

### Feature Extraction Exploration

Explore POS-Tagging and Named Entity Registered (NER)

# Text Preprocessing



Removing Non Alphanumeric Characters

1

Removing White Spaces

2

Case Folding

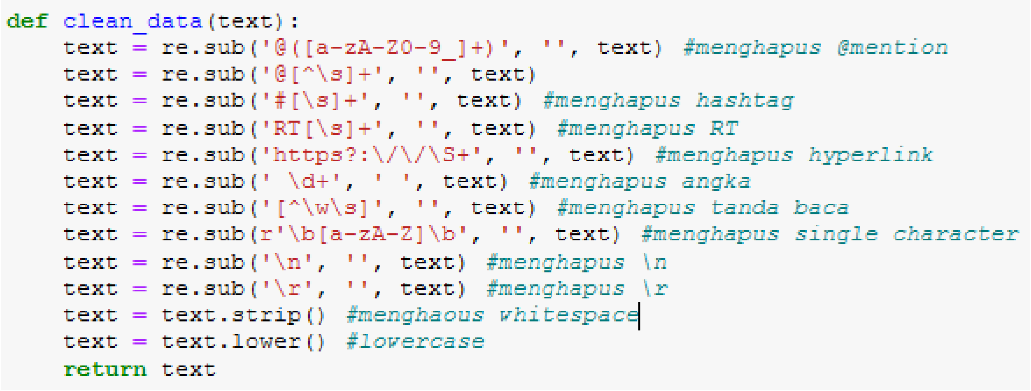
3

Tokenizing

4

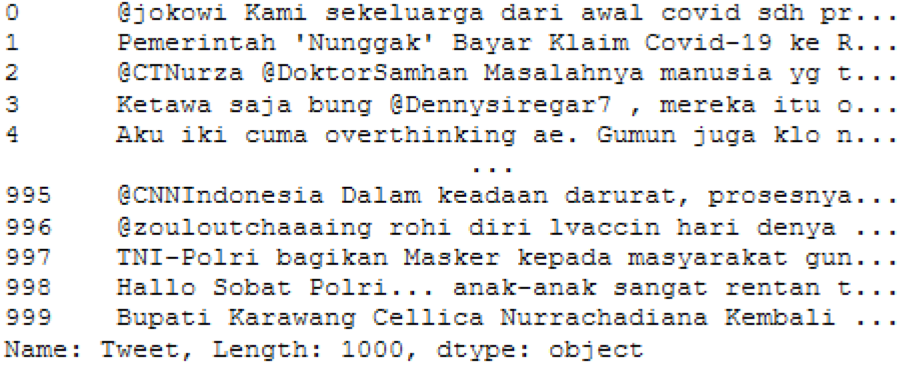
Stopwords

# Text Preprocessing



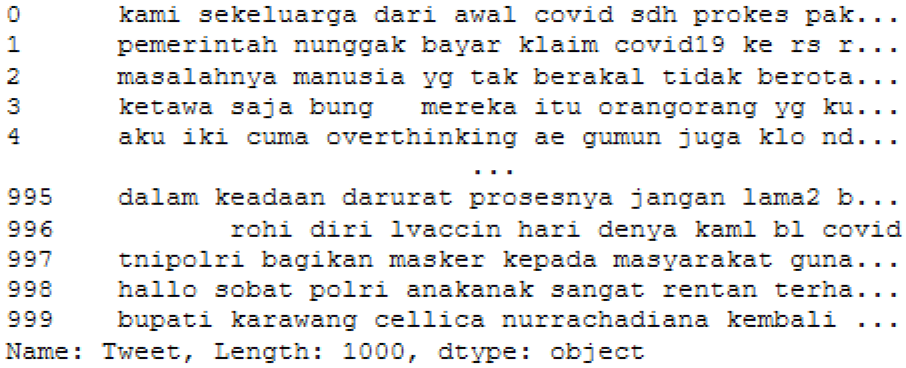
```
def clean_data(text):
    text = re.sub('@([a-zA-Z0-9_]+)', '', text) #menghapus @mention
    text = re.sub('@[^\s]+', '', text)
    text = re.sub('#[\s]+', '', text) #menghapus hashtag
    text = re.sub('RT[\s]+', '', text) #menghapus RT
    text = re.sub('https?:\/\/\S+', '', text) #menghapus hyperlink
    text = re.sub(' \d+', ' ', text) #menghapus angka
    text = re.sub('[^\w\s]', '', text) #menghapus tanda baca
    text = re.sub(r'\b[a-zA-Z]\b', '', text) #menghapus single character
    text = re.sub('\n', '', text) #menghapus \n
    text = re.sub('\r', '', text) #menghapus \r
    text = text.strip() #menghaous whitespace
    text = text.lower() #lowercase
    return text
```

## Before



```
0      @jokowi Kami sekeluarga dari awal covid sdh pr...
1      Pemerintah 'Nunggak' Bayar Klaim Covid-19 ke R...
2      @CTNurza @DoktorSamhan Masalahnya manusia yg t...
3      Ketawa saja bung @Dennysiregar7 , mereka itu o...
4      Aku iki cuma overthinking ae. Gumun juga klo n...
                             ...
995    @CNNIndonesia Dalam keadaan darurat, prosesnya...
996    @zouloutchaaaing rohi diri lvaccin hari denya ...
997    TNI-Polri bagikan Masker kepada masyarakat gun...
998    Hallo Sobat Polri... anak-anak sangat rentan t...
999    Bupati Karawang Cellica Nurrachadiana Kembali ...
Name: Tweet, Length: 1000, dtype: object
```

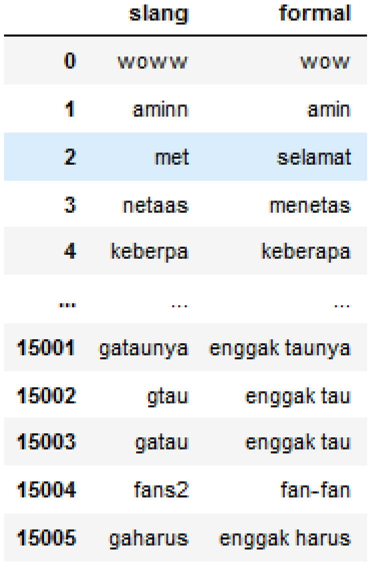
## After



```
0      kami sekeluarga dari awal covid sdh prokes pak...
1      pemerintah nunggak bayar klaim covid19 ke rs r...
2      masalahnya manusia yg tak berakal tidak berota...
3      ketawa saja bung   mereka itu orangorang yg ku...
4      aku iki cuma overthinking ae gumun juga klo nd...
                             ...
995    dalam keadaan darurat prosesnya jangan lama2 b...
996          rohi diri lvaccin hari denya kaml bl covid
997    tnipolri bagikan masker kepada masyarakat guna...
998    hallo sobat polri anakanak sangat rentan terha...
999    bupati karawang cellica nurrachadiana kembali ...
Name: Tweet, Length: 1000, dtype: object
```

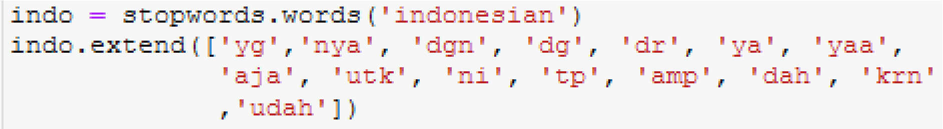
# Text Preprocessing

## Stopword



| | slang | formal |
|---|---|---|
| 0 | woww | wow |
| 1 | aminn | amin |
| 2 | met | selamat |
| 3 | netaas | menetas |
| 4 | keberpa | keberapa |
| ... | ... | ... |
| 15001 | gataunya | enggak taunya |
| 15002 | gtau | enggak tau |
| 15003 | gatau | enggak tau |
| 15004 | fans2 | fan-fan |
| 15005 | gaharus | enggak harus |

Source:
https://github.com/nasalsabila/kamus-alay/blob/master/colloquial-indonesian-lexicon.csv

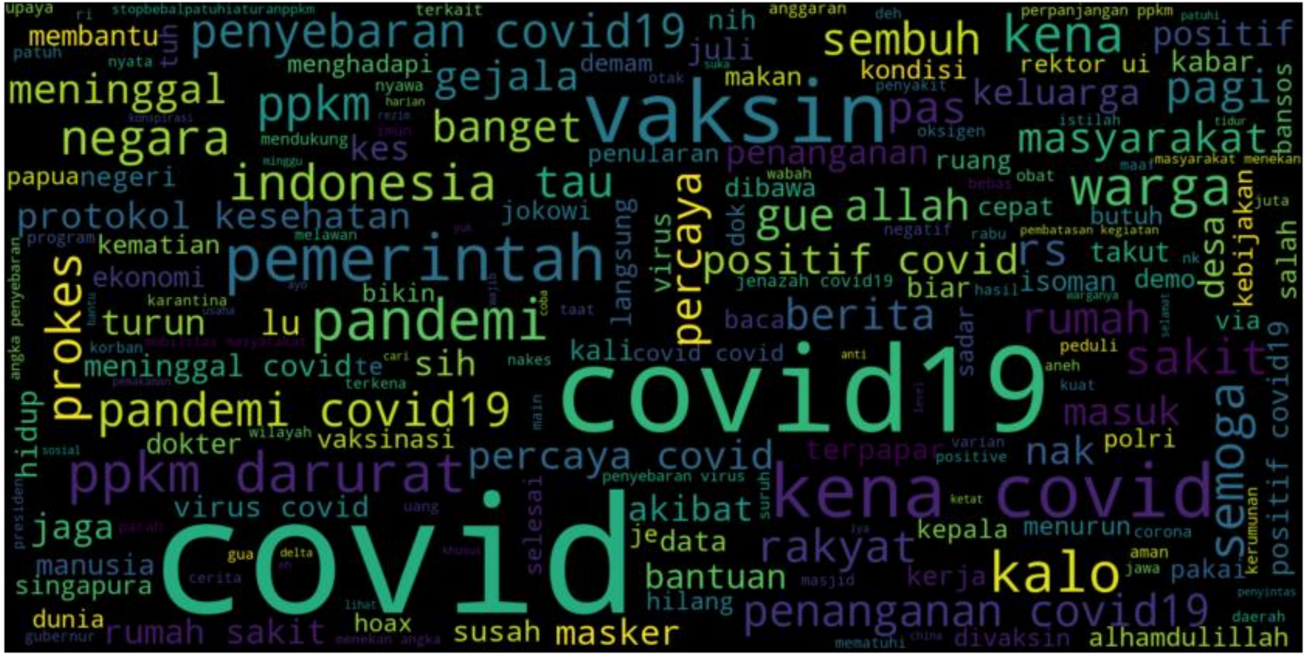


```
indo = stopwords.words('indonesian')
indo.extend(['yg','nya', 'dgn', 'dg', 'dr', 'ya', 'yaa',
              'aja', 'utk', 'ni', 'tp', 'amp', 'dah', 'krn'
             ,'udah'])
```

Source:

- Nltk.corpus
- Add manually

# The Most Frequent Word



TOP 10

```
('covid', 661),
('covid19', 347),
('kena', 109),
('ppkm', 101),
('vaksin', 100),
('pandemi', 72),
('pemerintah', 60),
('positif', 54),
('darurat', 53),
('masyarakat', 52),
```

# Feature Extraction

## Bag of Words

Using library sklearn

## TF-IDF

Using library sklearn

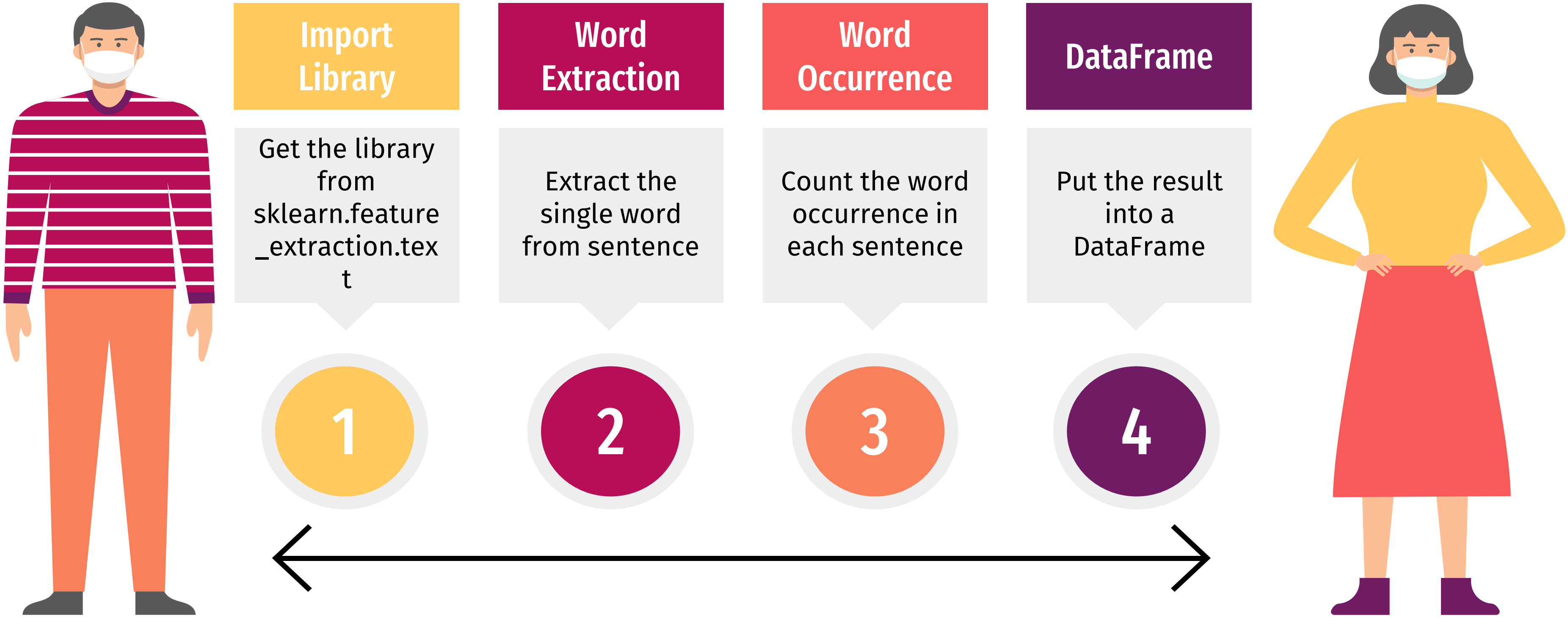
## POS-Tagging

Using library flair

## NER

Using library SpaCy

# Bag of Words (CountVectorizer )



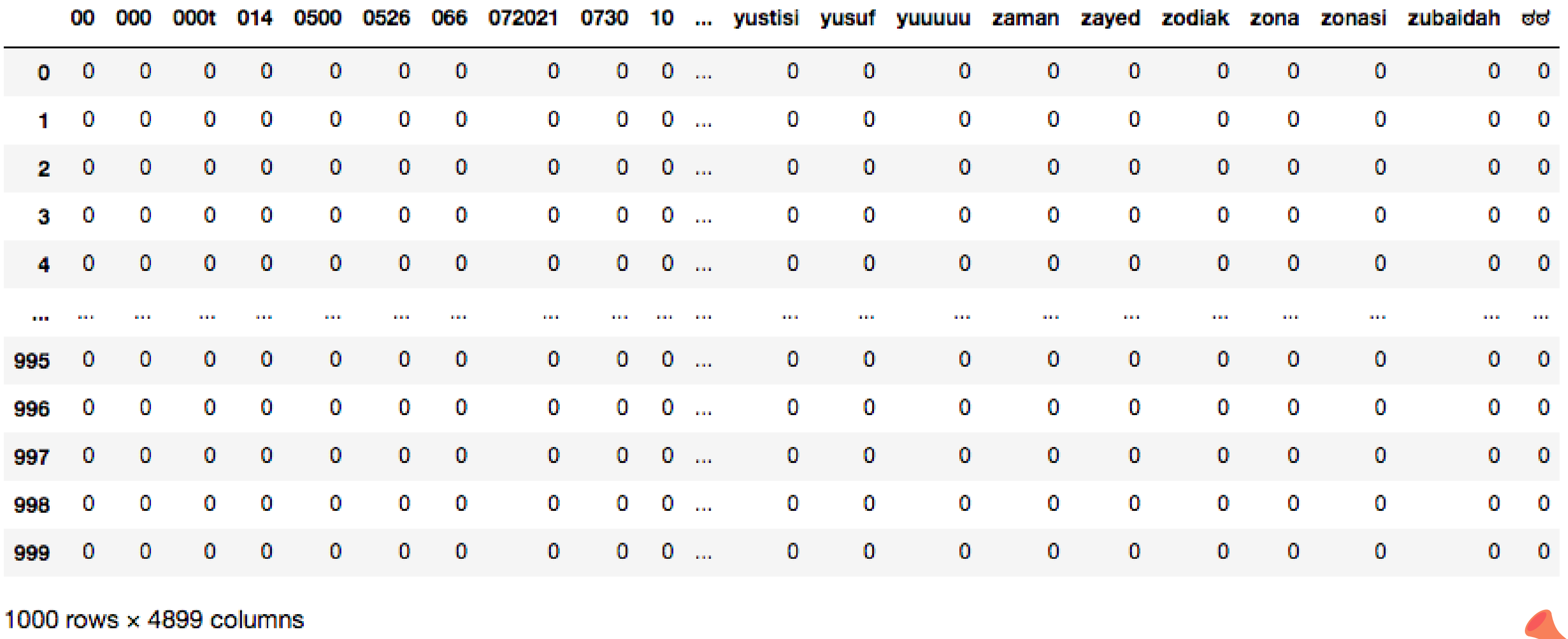
1. **Import Library**
   Get the library from sklearn.feature_extraction.text

2. **Word Extraction**
   Extract the single word from sentence

3. **Word Occurrence**
   Count the word occurrence in each sentence

4. **DataFrame**
   Put the result into a DataFrame

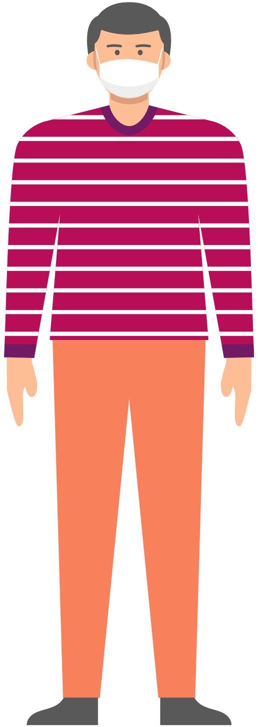
# Bag of Words (CountVectorizer )

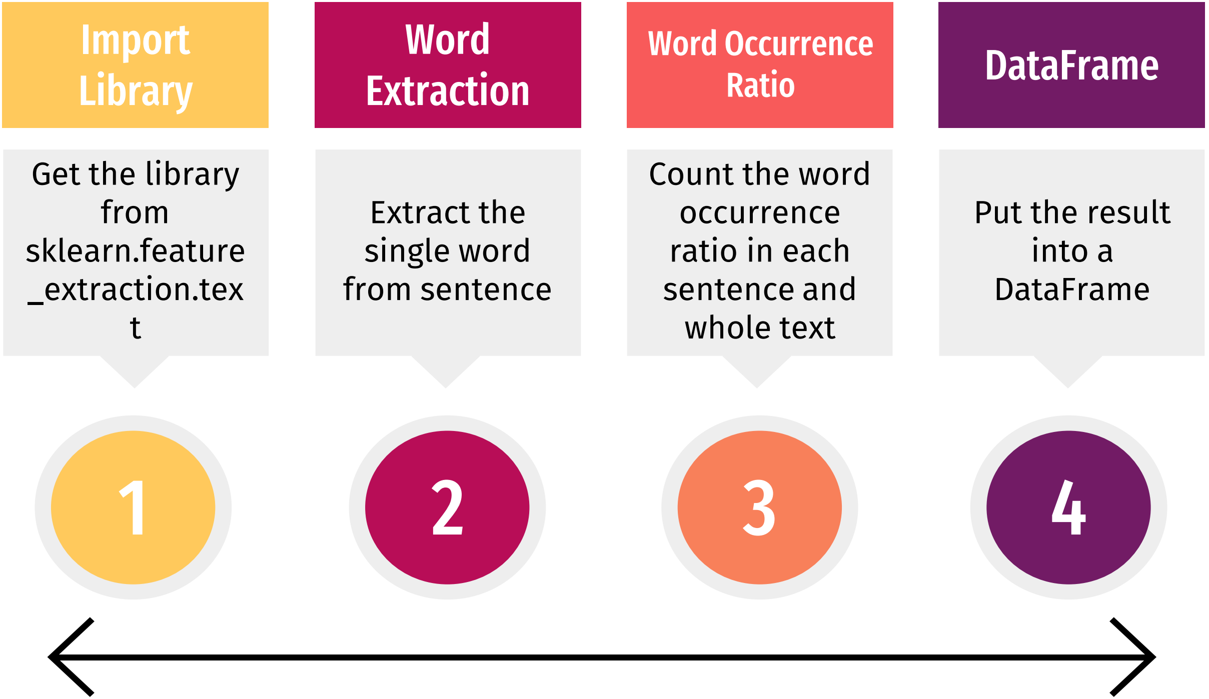


| | 00 | 000 | 000t | 014 | 0500 | 0526 | 066 | 072021 | 0730 | 10 | ... | yustisi | yusuf | yuuuuu | zaman | zayed | zodiak | zona | zonasi | zubaidah | ಠಠ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **995** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **996** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **997** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **998** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **999** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | ... | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

1000 rows × 4899 columns

# TF-IDF





## 1 Import Library

Get the library from sklearn.feature_extraction.text

## 2 Word Extraction

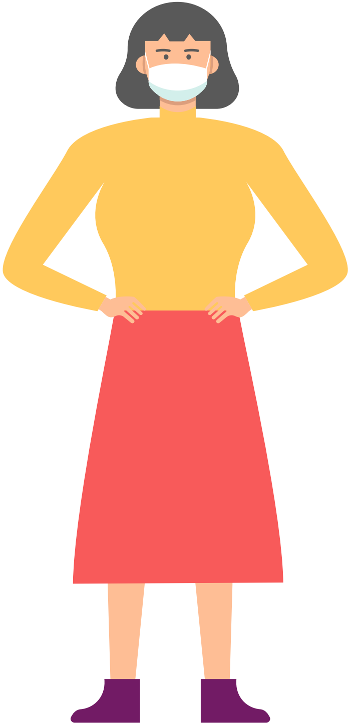
Extract the single word from sentence

## 3 Word Occurrence Ratio

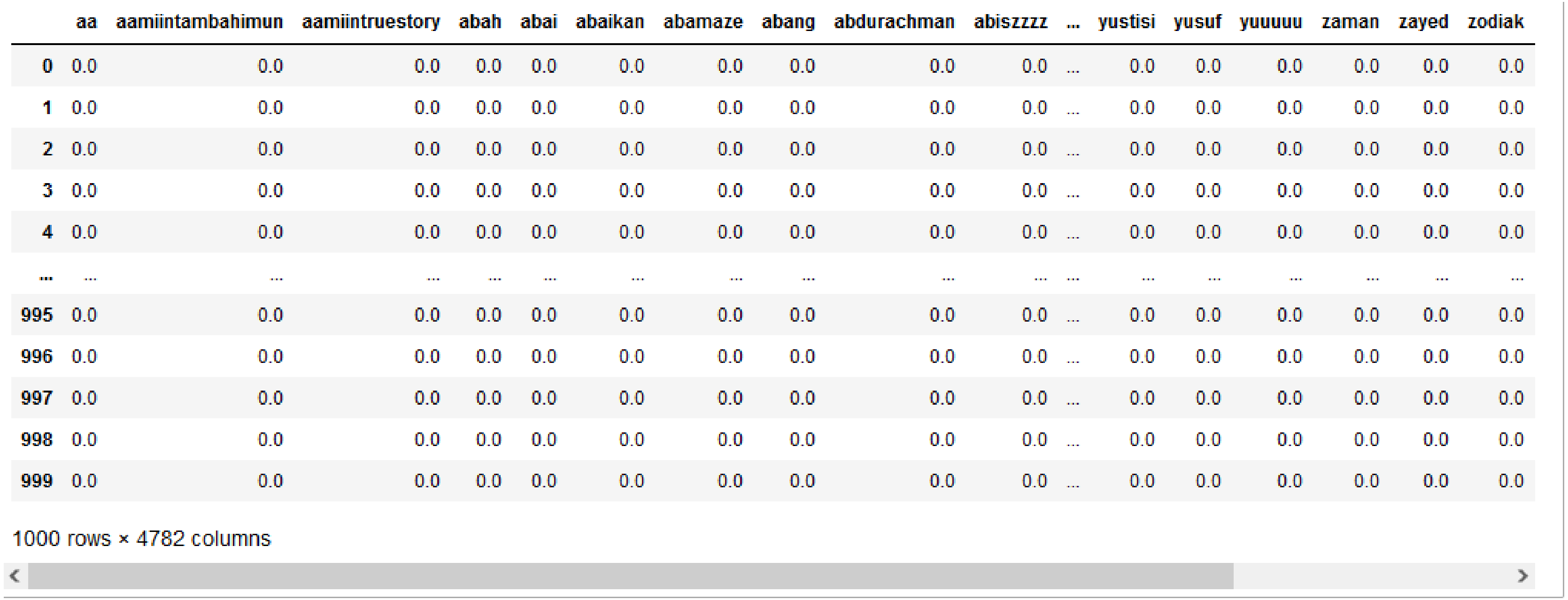
Count the word occurrence ratio in each sentence and whole text

## 4 DataFrame

Put the result into a DataFrame



# TF-IDF



| | aa | aamiintambahimun | aamiintruestory | abah | abai | abaikan | abamaze | abang | abdurachman | abiszzzz | ... | yustisi | yusuf | yuuuuu | zaman | zayed | zodiak |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **1** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **2** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **3** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **4** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **995** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **996** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **997** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **998** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **999** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ... | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

1000 rows × 4782 columns

# POS (Part Of Speech) Tagging

Classify the word into their part of speech based on its definition and its context such as Subject, Noun, Object, Verb, so on.

## Two main parts in POS Tagging Classification Technique

Tagger

a method that labels words as one of several categories to identify the word's function in a given language

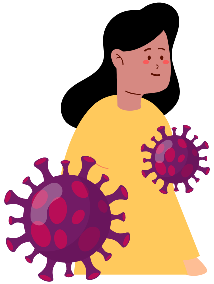
Corpus

A collection of words that already tagged

## Two Types of POS Tagger:

Rule-Based POS Tag

Stochastic Tagger



# POS (Part Of  Speech) Tagging Experiment

### Import Library

Import Flair library and create Tagger and Corpus

### Train Model

Train Tagger and Corpus in the Flair Model

### Apply Model

Apply the model to preprocessed data

## Input:

```
from flair.data import Sentence
sentence = Sentence('arahan menteri desa dalam penangan covid')
tag_pos = SequenceTagger.load('resources/taggers/example-universal-pos/best-model.pt')
tag_pos.predict(sentence)
```

## Output:

```
arahan <NOUN> menteri <NOUN> desa <NOUN> dalam <ADP> penangan <NOUN> covid <PUNCT>
```

# Named Entity Recognition

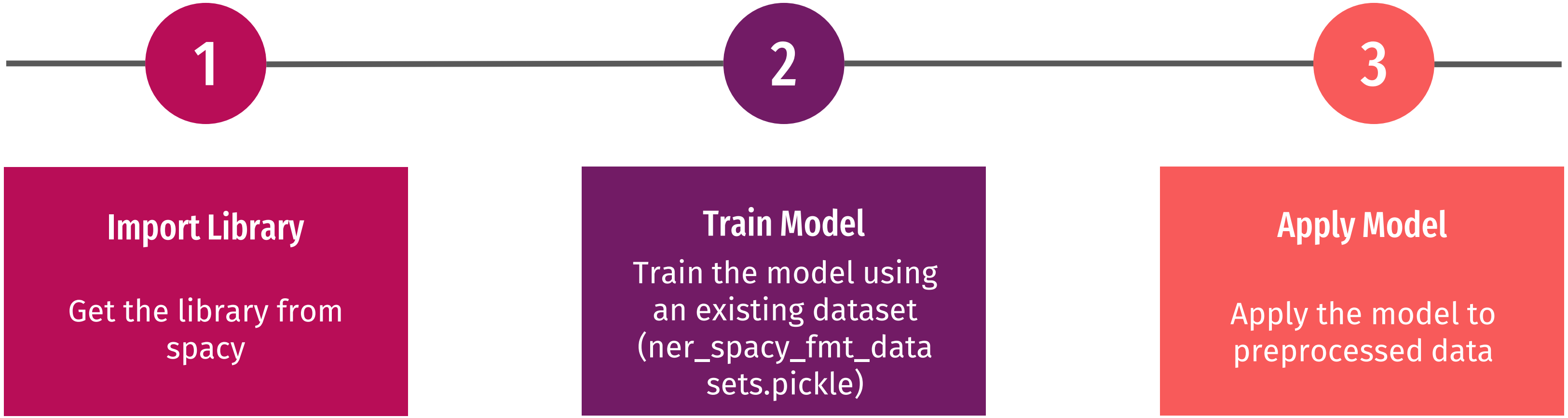
01 Task of identifying and categorizing key information (entities) in text

02 Classify words into its predefined categories, such as person, organizations, locations, expressions of times, quantities, percentages, etc.

03 NER can be used to retrieve data and information faster from a wide variety of textual information.

04 Experimentation with NER using Spacy

# Named Entity Recognition



1

**Import Library**

Get the library from spacy

2

**Train Model**

Train the model using an existing dataset (ner_spacy_fmt_data sets.pickle)

3

**Apply Model**

Apply the model to preprocessed data

**Input:**

```
doc = nlp("arahan menteri Desa dalam penangan Covid")
print(doc.ents)
print("Entities", [(ent.text, ent.label_) for ent in doc.ents])
```

**Result:**

```
(Desa,)
Entities [('Desa', 'ORGANIZATION')]
```

covid
vaksin
covid19
kena covid
pandemi covid19
ppkm darurat
pandemi
ppkm
penyebaran covid19
protokol kesehatan
meninggal
meninggal covid
penanganan covid
warga
indonesia
rumah
kena
semoga
masyarakat
berita
sembuh
penanganan
keluarga
negara
rakyat
sakit
allah
banget
percaya covid
virus covid
masker
membantu
bantuan
langsung
manusia
tau
alhamdulillah
biar
anggaran
susah
masuk
jokowi
cepat
dokter
kebijakan
ekonomi
kematian
demam
oksigen
jenazah covid19
salah
kepala
hoax
hidup
bansos
singapura
akibat
kondisi
selesai
virus
demo
isoman
positif
gejala
terpapar
papua
rs
tuh
patuh
penyakit
presiden
gubernur
data
kalo
sih
desa
dunia
baca
lu
mobilitas masyarakat
nyawa
negatif
polri
takut
karantina

Thank you