

PROJECT REPORT

MIGROS GROUP

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INTRODUCTION

Exploratory Data Analysis

01

ACCURACY

Quick presentation of the accuracy of our submissions

02

DEVELOPMENT

The issues we encountered, how we solved them
An overview of our notebook

03

FUTURE DEVELOPMENT

Extended idea we could work on to improve our model
accuracy

04

01

INTRODUCTION

GitHub Setup, EDA, First submission



Real or **Not**?

NLP with Disaster Tweets: a bit of data exploration

Train Set

5 Rows

X

6471 Columns

Keywords

222 different keywords

But 55 null values

Location

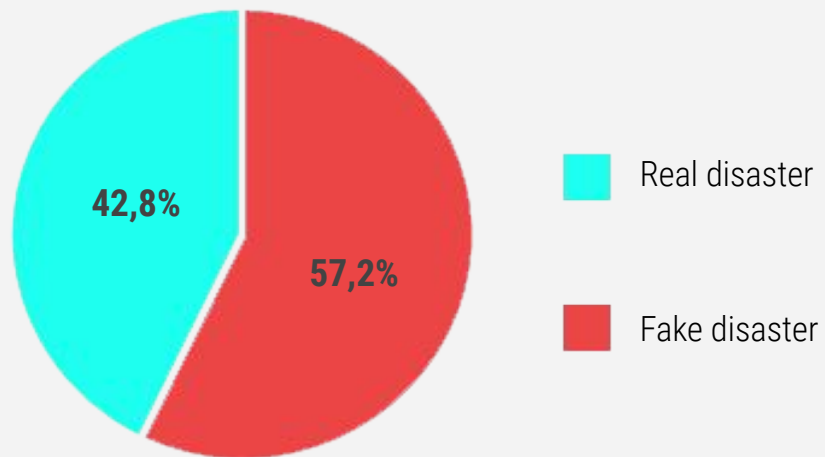
2922 different
locations

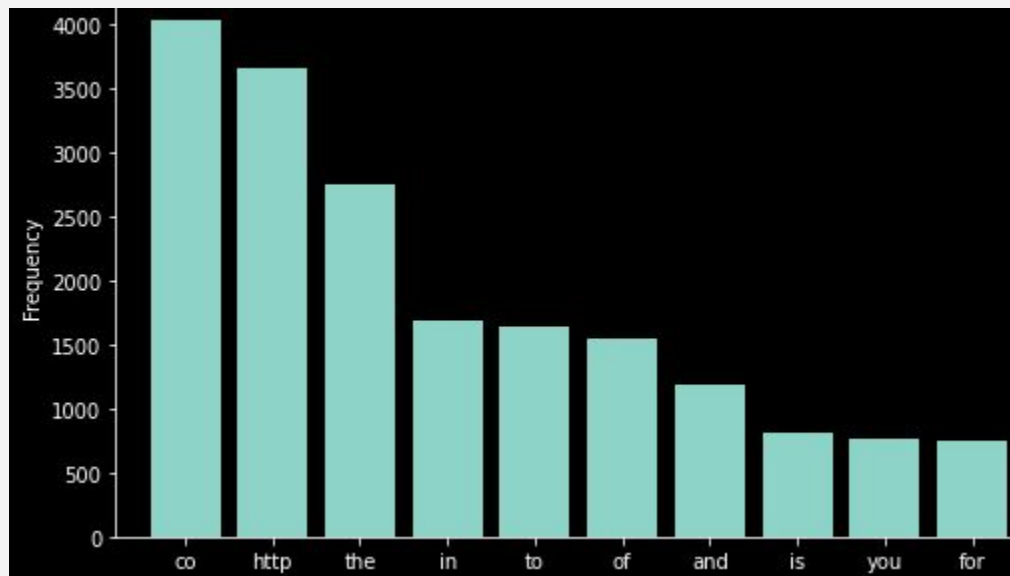
But 2141 null values



Base rate

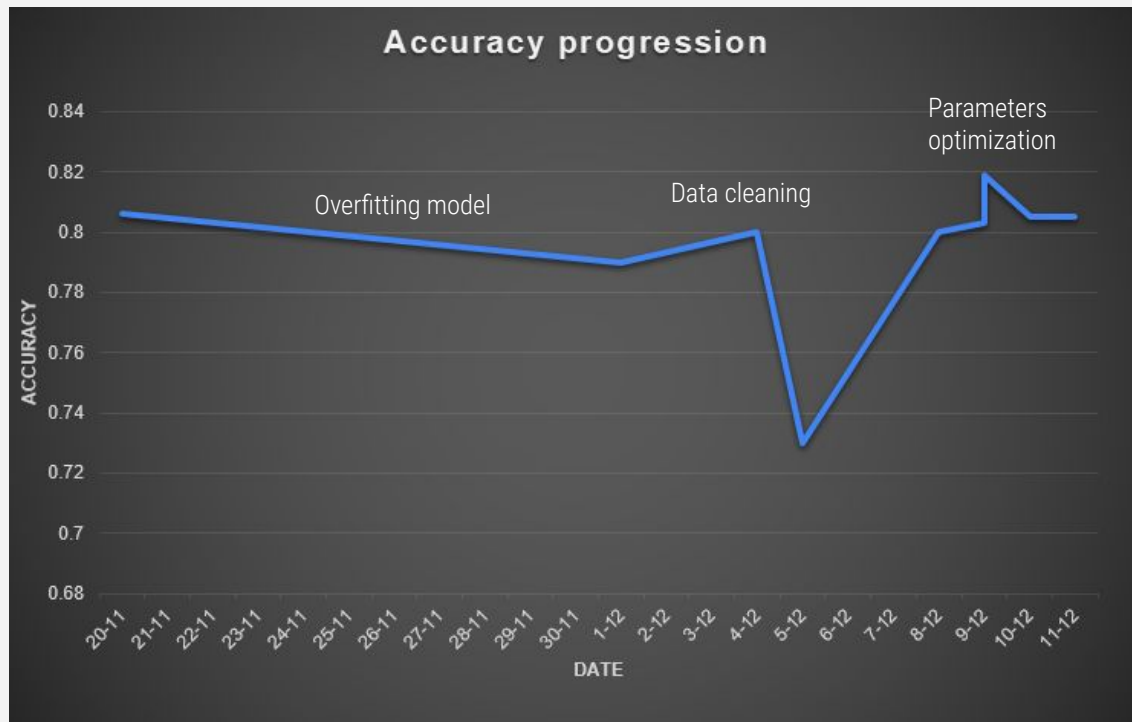
14,4% more fake tweets than real reports





Most common words

Lots of noise! Stopwords and URL makes the data inaccurate



02 ACCURACY

The problem of overfitting

Eye 9: A space battle occurred at Star
involving 3 fleets totaling 3945 ships with
destroyed

d FedEx no longer to transport bioterror
s in wake of anthrax lab mishaps
t.co/5zDbTktwW7

y Training: Train falls off elevated tracks
g windstorm <http://t.co/JIOMnrCygT>
medic #EMS

an Grace: expect that large rocks trees
unstable and/or saturated land may slide
hazardous in hilly/mountain areas...

SIS Video: ISIS Threatens to Behead
ian Hostage Within 48 Hours - TLVFaces -
aces#auspol <http://t.co/a6PPEgeLOX>

besieged: .MartinMJ22 YouGov Which
'landslide' ... you can't POSSIBLY mean
afer-thin majority of #G□Û_
t.co/2q3fuEReY5

naires have a plan to free half a billion
s trapped in Venezuela for two years
keSchmidt reports. <http://t.co/gbqTc7Sp9C>

nesMelville Some old testimony of weapons

A thin black line starts at the top right, extends diagonally down and to the left, then turns diagonally down and to the right.

03

DEVELOPMENT

Mainly an issue of data cleaning and parameters optimization



Simple logistic regression

Without data cleaning and only text column

Extensive Text cleaning

Different variation of removing noise

Different Classifier

Logistic Regression, Random Forest, kkn model
after data cleaning

Optimization of parameters

Optimization of LR Hyperparameters with GridsearchCV

Black Eye 9: A space battle
O784 involving 3 fleets tota
17 destroyed

#world FedEx no longer to
germs in wake of anthrax l
<http://t.co/5zDbTktwW7>

Reality Training: Train falls
during windstorm <http://t.co>
#Paramedic #EMS

#Taiwan Grace: expect tha
mud unstable and/or satur
..very hazardous in hilly/m

New ISIS Video: ISIS Thre
Croatian Hostage Within 4
TLVFaces#auspol <http://t.c>

FreeBesieged: .MartinMJ2
'#Tory landslide' ... you can
the wafer-thin majority of #
<http://t.co/2q3fuEReY5>

Billionaires have a plan to
dollars trapped in Venezue
@BlakeSchmidt reports. h

@.JamesMelville Some ol



Simple logistic regression

Without data cleaning and using only text column

```
TRAIN ACCURACY SCORE:  
0.8937  
CONFUSION MATRIX:  
[[2882   79]  
 [ 471 1744]]
```

```
TEST ACCURACY SCORE:  
0.7884  
CONFUSION MATRIX:  
[[656   84]  
 [190  365]]
```

Different Classifier

With basic data cleaning and using only text column

Random Forest Classifier

- Train accuracy score:
0.8374
- Test accuracy score:
0.7409

Doc2Vec

- Train accuracy:
0.5939
- Test accuracy score:
0.5876



Extensive Text Cleaning

Accuracy improved

- Cleaning duplicates
- Replacing %20
- Removing Twitter tags
- Removing hashtags
- Removing “amp”
- Removing URL
- Removing noise (RT, co, û_, □©, û^as)

Accuracy decreased

- Removing digits
- Removing punctuations
- Removing specific noise (rt, û)



Optimal TF-IDF vectorizer

```
[ ] # Improved TF-IDF tokenizer  
tfidf_vector = TfidfVectorizer(tokenizer=spacy_tokenizer, ngram_range=(3, 4), min_df=1, max_df=1.0, analyzer='char')
```

Comparing different classifier after text cleaning using cross-validation

Logistic Regression

- Mean accuracy score on test set: **0.8008**
- Standard deviation: **0.0164**

Knn model

- Mean accuracy score on test set: **0.7828**
- Standard deviation: **0.0260**

Random Forest Classifier

- Mean accuracy score on test set: **0.7806**
- Standard deviation: **0.0198**



Optimization of Logistic regression Hyperparameters using GridsearchCV

```
# Gridsearch Logistic regression
parameters = dict({'solver': ['lbfgs', 'saga', 'liblinear'], 'C':[1, 10]})
LR =linear_model.LogisticRegression(max_iter=1000, random_state=72)

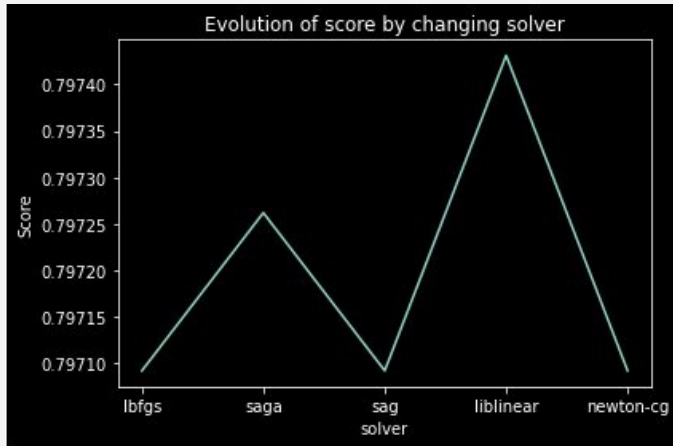
clf = GridSearchCV(
    LR, parameters, scoring='accuracy'
)
best_model = clf.fit(X_train_vec, y_train)
```

Train accuracy: **0.8892**

Test Accuracy : **0.8122**



How the optimization looks like in plots





Solution

Effective cleaning

Optimized parameter for TF-IDF

Logistic Regression with
GridSearchCV

Result

Accuracy: 0.819

AlCrowd best Rank: 6





Future Development

04

1. We actually used the column **Keywords** in our model but only after the Challenge closed
2. It would be interesting to use the **Location** of the tweets as one of the features
3. Further optimize some **hyperparameters**
4. Expand the train dataframe so we can use **other classifiers** such as Random Forest



THANKS!

For your attention and your time

MIGROS GROUP

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