Your Tech Bootcamp

Group # - Every Second Matters: 🚨an app for timely disaster response🚨

Group members

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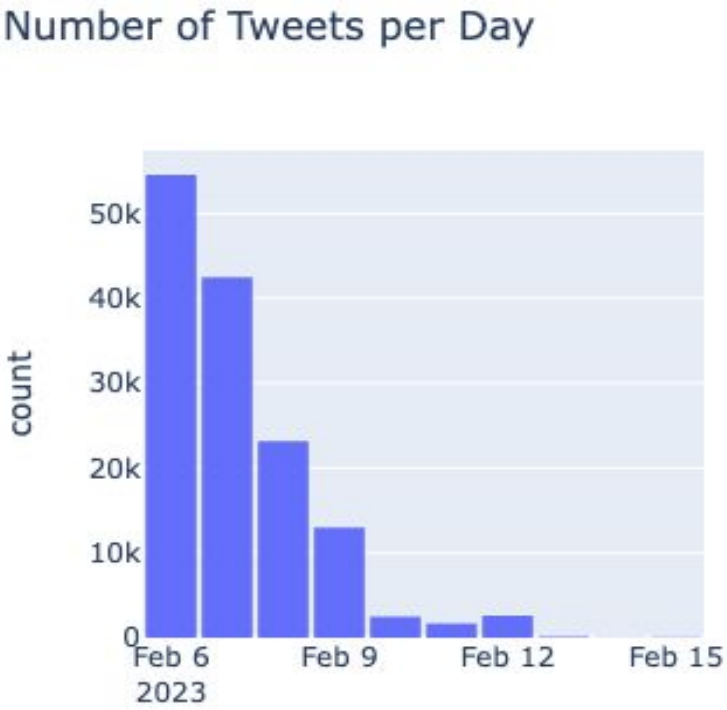
Pitch

Using Turkish twitter data from the earthquake that hits Syria and Turkey on 6 February, this app will perform three task:

- Detection of rescue calls and emergency needs with a binary text classifier
- Extraction of person names, city names and addresses in emergency tweets with a Named Entity Recognition (NER) model
- Geoplotting of those addresses on an interactive map simulating a real-time plot



Text Annotation

Other 0 | Rescue_call 1 | Urgent_need 2

Turunçlu mahallesi samandag yolu uzeri, saray market yanı 95/B Defne-Hatay Enkazda kalanlardan biri Nilay Oltacı İletişim 05161646506 #Turkey #CristianoRonaldo #hatayyardimbekliyor #hatayiskenderun #HalkTV #özgürdemirtaş #fulyaöztürk #EnkazAltında #tahaduymaz

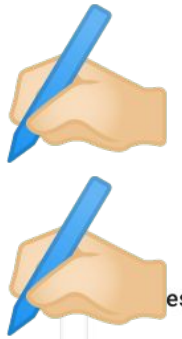
Odabasi Mahallesi. Ali gaffar okan bulvari no:12 dağsu Apartmanı Seda Aksu Mustafa
•ADDR •PER •PER

Aksu Seda hamile acil yardım Antakya/Hatay Mehmet Aksu (Mustafa Aksu'nun
•ADDR •CITY •PER •PER

kardeşi) Tel:05350815624 #Hatay #hatayyardimbekliyor #earthquake @ahbap
•NUM

@BabalaTv @haluklevent @KendineMuzisyen @OguzhanUgur

https://t.co/nKOVykp29E



ess

Total 2304

Complete 1352

59%

Label Types

PER p | ADDR a | CITY c | NUM n

Task 1: Binary Text Classification

❓Text Preprocessing

Manually built processor:

- remove non-alphanumeric characters (incl. emojis)
- recognize special turkish characters (çÇğĞıİöÖşŞüÜ)
- remove all entities that follow tags(@) and hashtags(#)
- lowercasing

Zemberek NLP for preprocesing:

- sentence normalization by fixing typos,
- normalizing tr-en keyboard differences

…or None? 😈

Model Comparison : Choosing right metrics

K-fold cross-validation results:

processor	model	accuracy	f1
Manual	Logistic Regression	0.93	0.85
	Naive Bayes	0.92	0.84
	Linear SVM	0.92	0.84
	Kernel SVM	0.93	0.84
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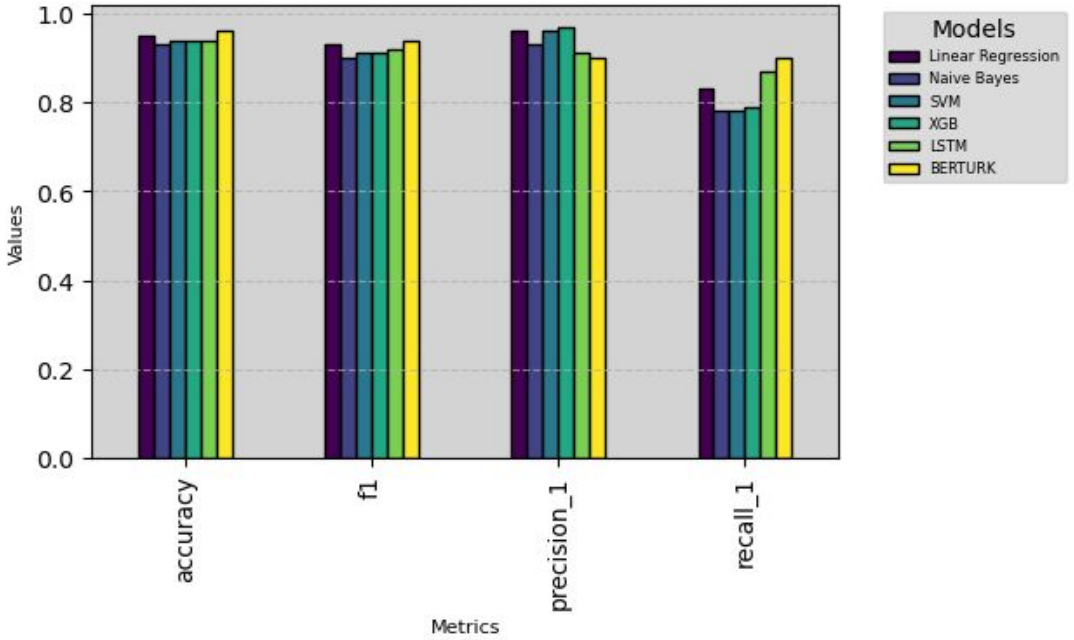
	Linear SVM	0.93	0.85
	Kernel SVM	0.93	0.84

Performance metrics:



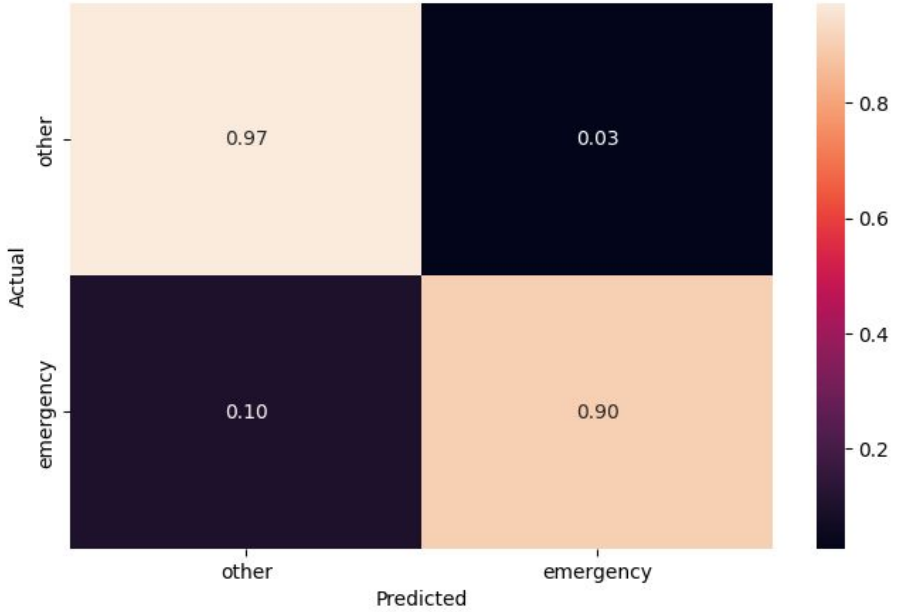
BERT-based: Transfer learning and Fine-tuning

Check this out:

- LABEL_1 : emergency
- LABEL_0 : other

Arkadaşım Emine DİLKEN ve ailesine ulaşamıyoruz lütfen yardım edin. Bulundukları konuma yardım ulaşmamış. Çalışmaları bırakmışlar Hamidiye sitesi, Şehit Abdullah Çavuş, 46050 Onikişubat/Kahramanmaraş #hamidiyesitesiyardım #deprem #YARDIM #Turkey @ahbap'

('We cannot reach my friend Emine DİLKEN and her family, please help. No help has reached their location. They left the works Hamidiye site, Şehit Abdullah Çavuş, 46050 Onikişubat/Kahramanmaraş #hamidiyesitesiyardım #deprem #earthquake #YARD #Turkey @ahbap')



Task 2: Named Entity Recognition

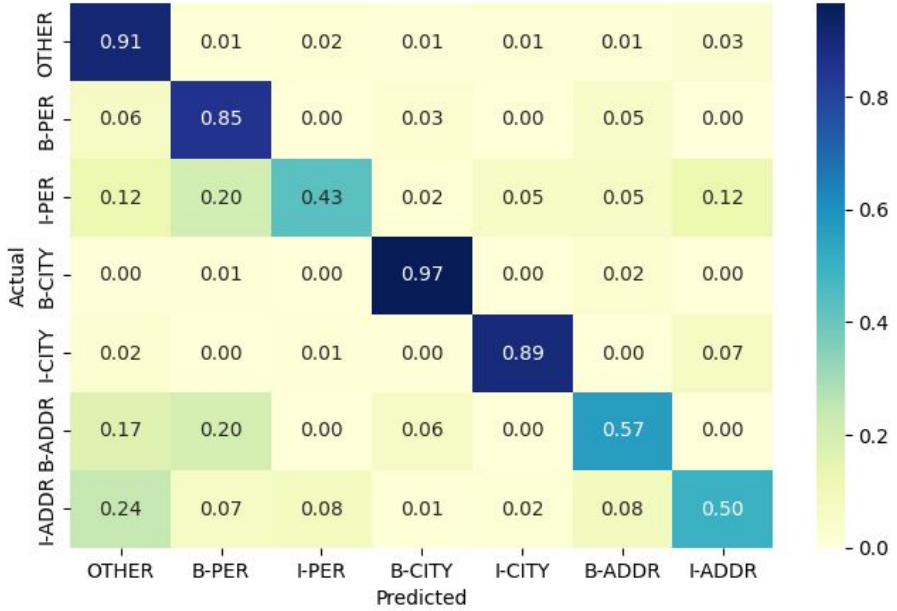
['O', 'B-PER', 'I-PER', 'B-ORG', 'I-ORG', 'B-LOC', 'I-LOC'] ➡️ *["O", 'B-PER', 'I-PER', 'B-CITY', 'I-CITY', 'B-ADDR', 'I-ADDR']*

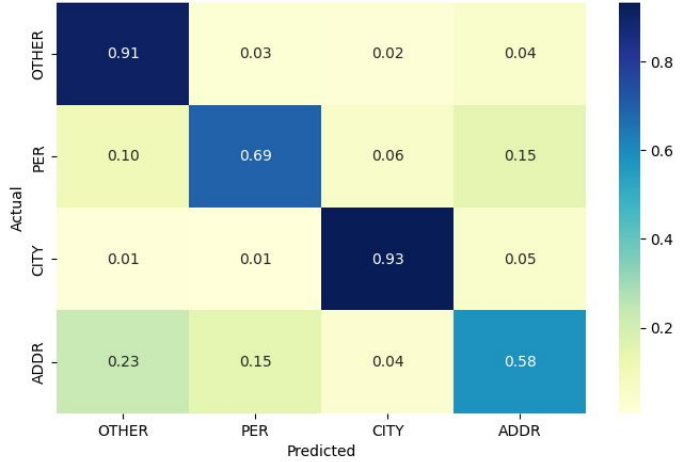
❓❓❓ **Text Preprocessing :**

- tons of abbreviations (*apt, sk /sok, cd /cad, mah /mh…*)
- variations in city names

‘Kahramanmaraş’:
KMaraş, K.Maraş,
Maraş, k.maras, Maras,
Kahramanmaras,
K.maraş, maraş, …

Metrics Evaluation





Check it out with an example tweet :

“Turgut Reis mahallesi Zey Caddesi No - 40 Adıyaman Merkez Zombaba Cami Karşısı Polis Memuru Fatih Sarıgül Saatlerdir haber alınamıyor, gören duyan bilen Lütfen Yardımcı olsun #deprem #turkey”

Task 3: Geocoding and Plotting

- Google Maps API to geocode addresses in latitudes and longtitudes
- pyplot scatter_mapbox to visualize on a map

What’s next?

- **Caveats and challenges:** Twitter API, GPU limits, GPU reliance
- **Deployment**
- **Improvement and ideas:**
  - clarifying better the app’s purpose (extracting and mapping exact locations vs catching any emergency help call),
  - a less memory consuming and accelerated model
  - detecting status (missing person, under the rubbles, etc),

Jedha

Any questions ?