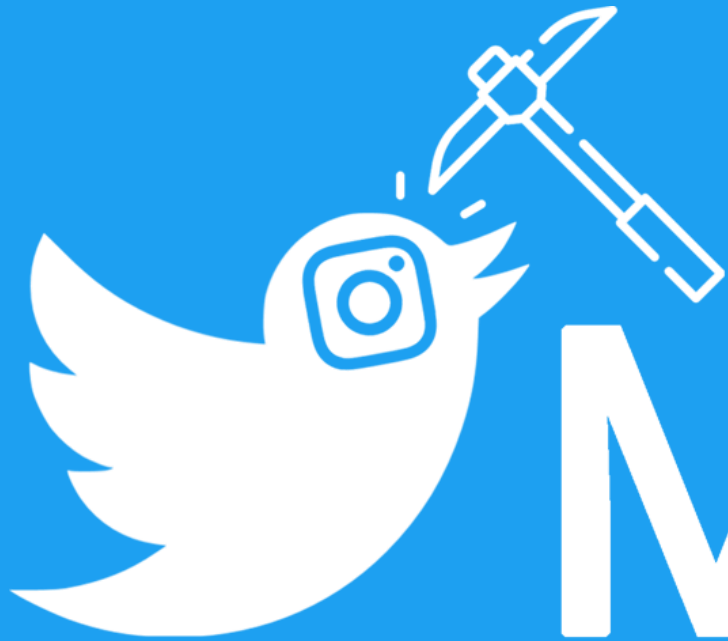


The End



Minerva

Mineração de Redes Sociais

Group 14

Diogo Silva 89348

Pedro Escaleira 88821

Pedro Oliveira 89156

Rafael Simões 88984

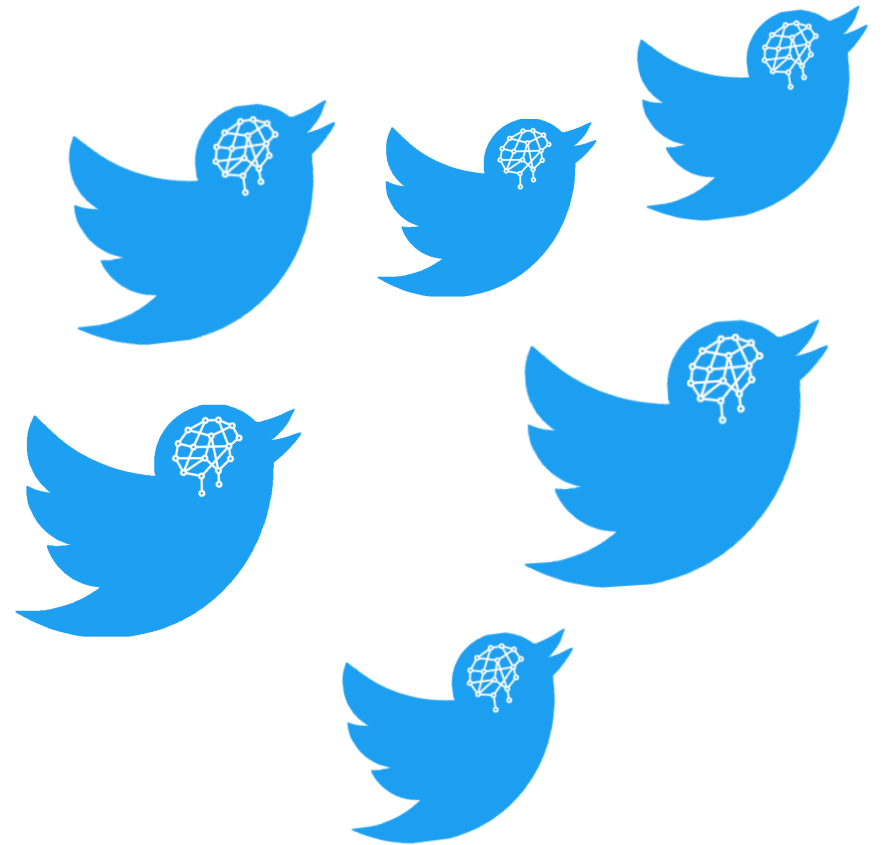
Coordinators

Prof. Diogo Gomes

Prof. José Mendes

index

- **C**ontext and Concept
- **F**eatures and Requirements
- **S**ystem Architecture
- **B**ots
- **R**esults and Data
- **R**est API and Frontend
- **T**eam Workflow
- **C**hallenges Faced
- **F**uture Work



context and concept

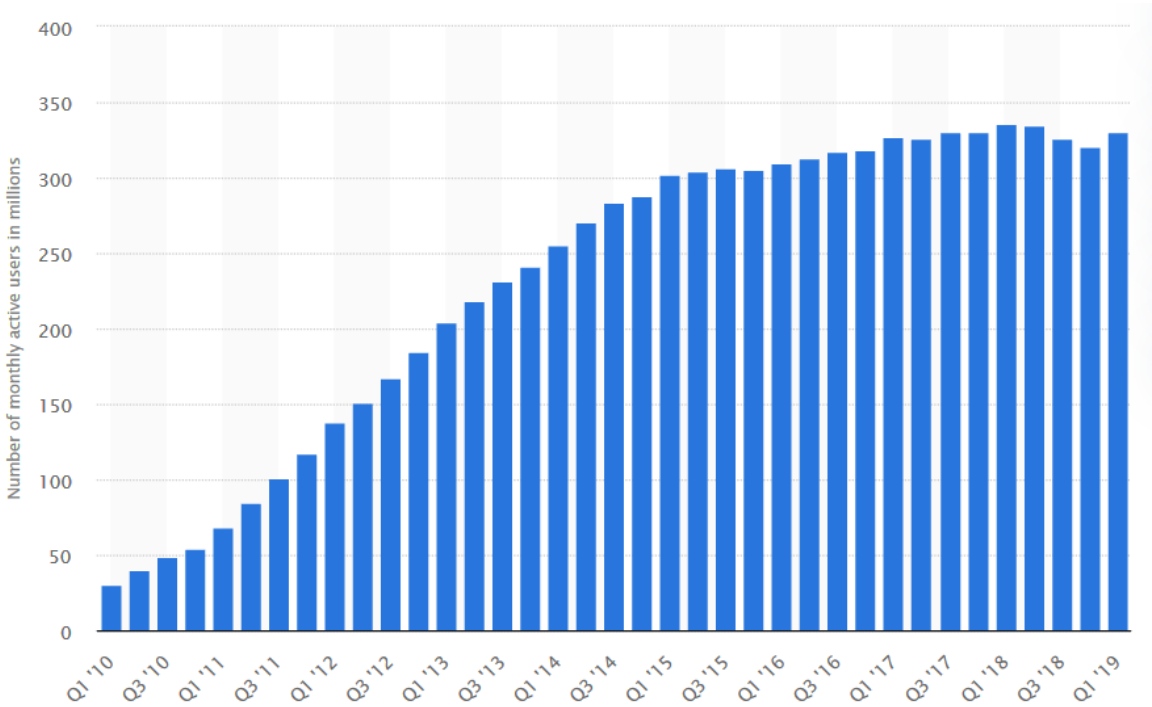
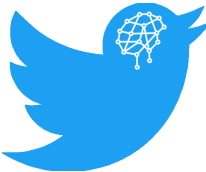
Twitter Statistics

<https://www.omnicoreagency.com/twitter-statistics/>

>330 million **Monthly Active Users**

>152 million **Daily Active Users**

>500 million **Tweets Sent per Day**



<https://www.statista.com/statistics/282087/number-of-monthly-active-twitter-users/>

context and concept



★ Commentary | Commentary

Commentary: Twitter may have just helped Trump get re-elected

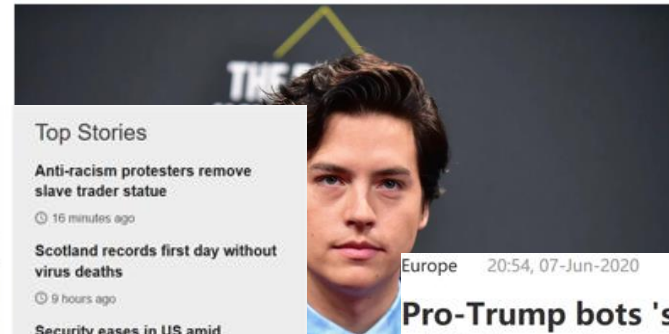
US President Donald Trump may not win his latest battle to change Twitter. But he may succeed in a broader strategy to cast himself as a victim of biased Big Tech, says NTU's Mark Cenite.



World Canada Local Politics Money Health Entertainment Lifestyle Watch Sports Commentary

Cole Sprouse, Lili Reinhart deny anonymous sexual assault accusations on Twitter

By Meaghan Wray · Global News
Posted June 22, 2020 2:46 pm



- Top Stories
- Anti-racism protesters remove slave trader statue (15 minutes ago)
- Scotland records first day without virus deaths (9 hours ago)
- Security eases in US amid peaceful Floyd rallies (11 minutes ago)



Pro-Trump bots 'spread anti-China COVID misinformation online'

by Daniel Harries

Share [Facebook] [Twitter] [Reddit] [WhatsApp] [Email] [Link]

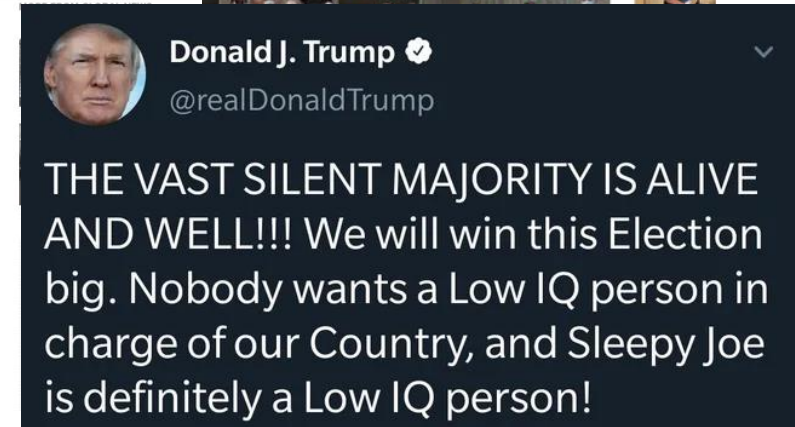


Ice-T takes to Twitter to acknowledge Boise's massive turnout for Tuesday's vigil

BY MICHAEL DEEDS

JUNE 04, 2020 11:05 AM, UPDATED JUNE 04, 2020 06:55 PM

[Twitter] [Facebook] [Email] [Share]



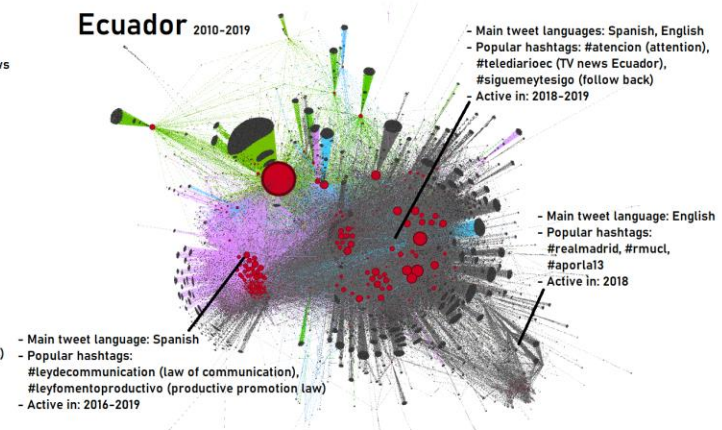
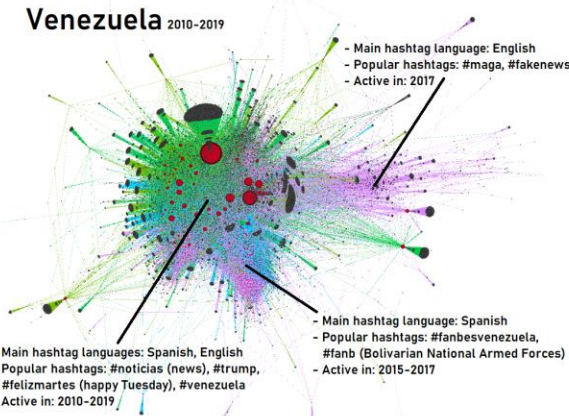
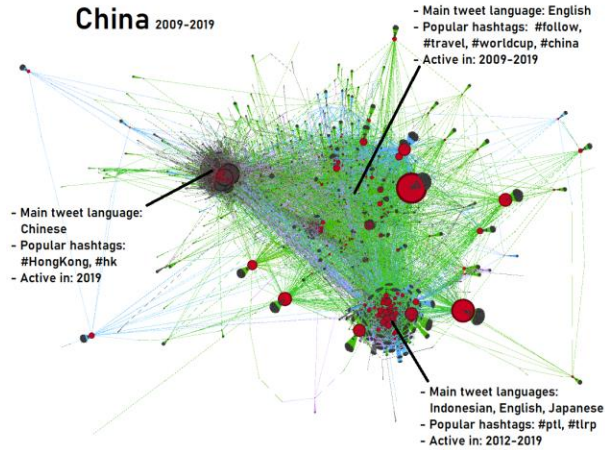
TOP NEWS



10AM

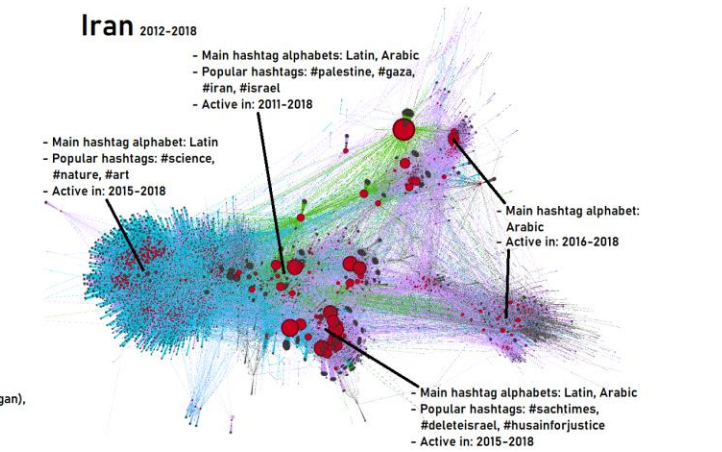
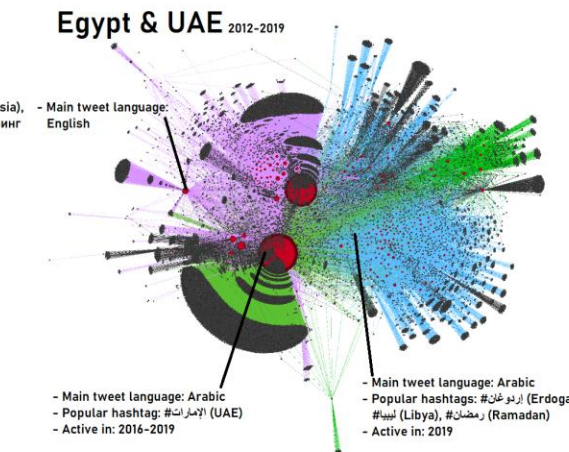


context and concept

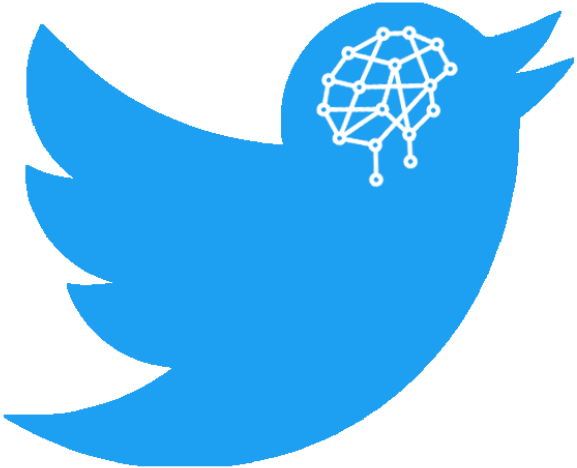
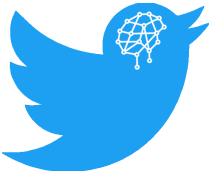


Account Creation Year: 2008 - 2013 (green), 2014 - 2015 (blue), 2016 - 2017 (purple), 2018 - 2019 (grey)

● inauthentic account (red dot) ● hashtag in tweet (black dot)



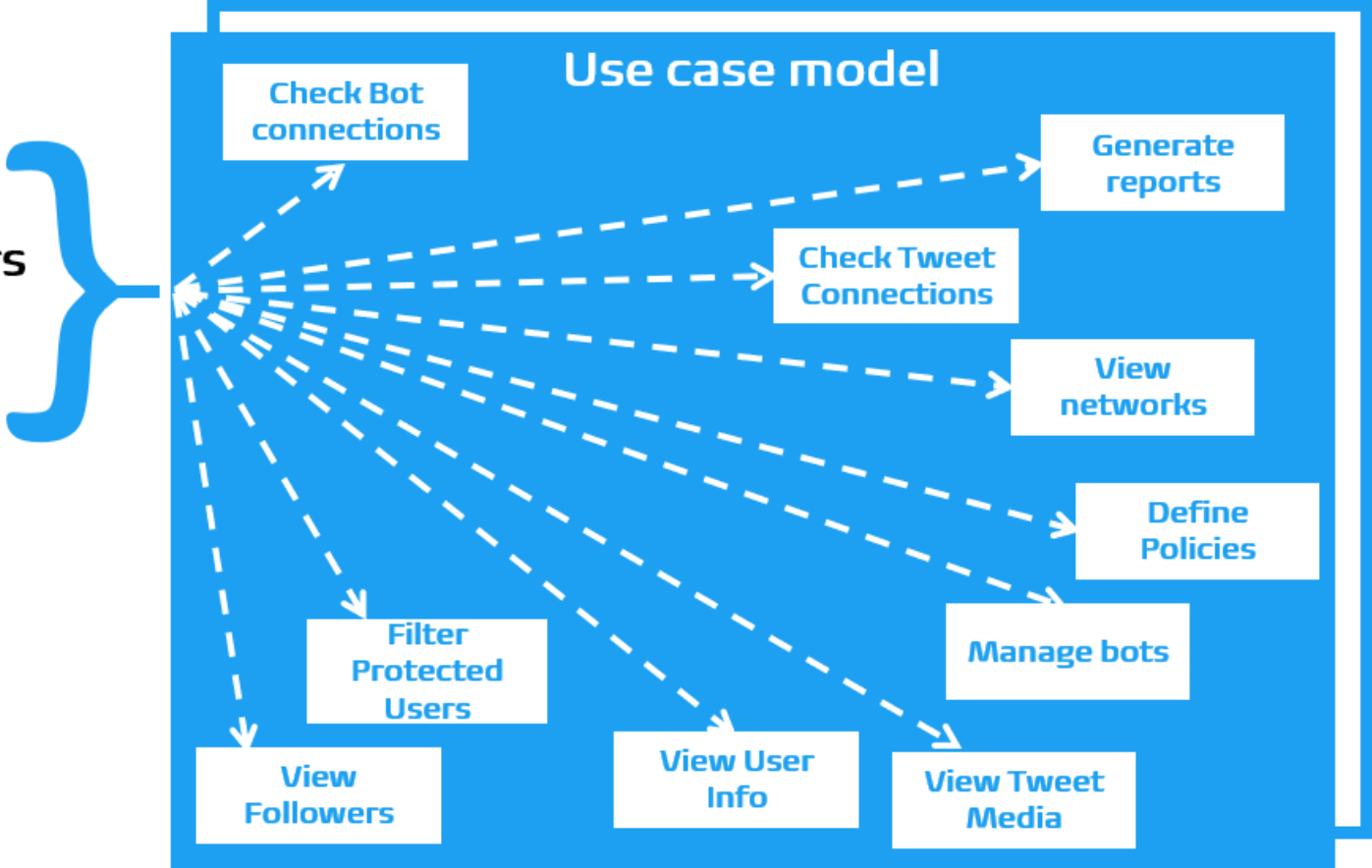
context and concept



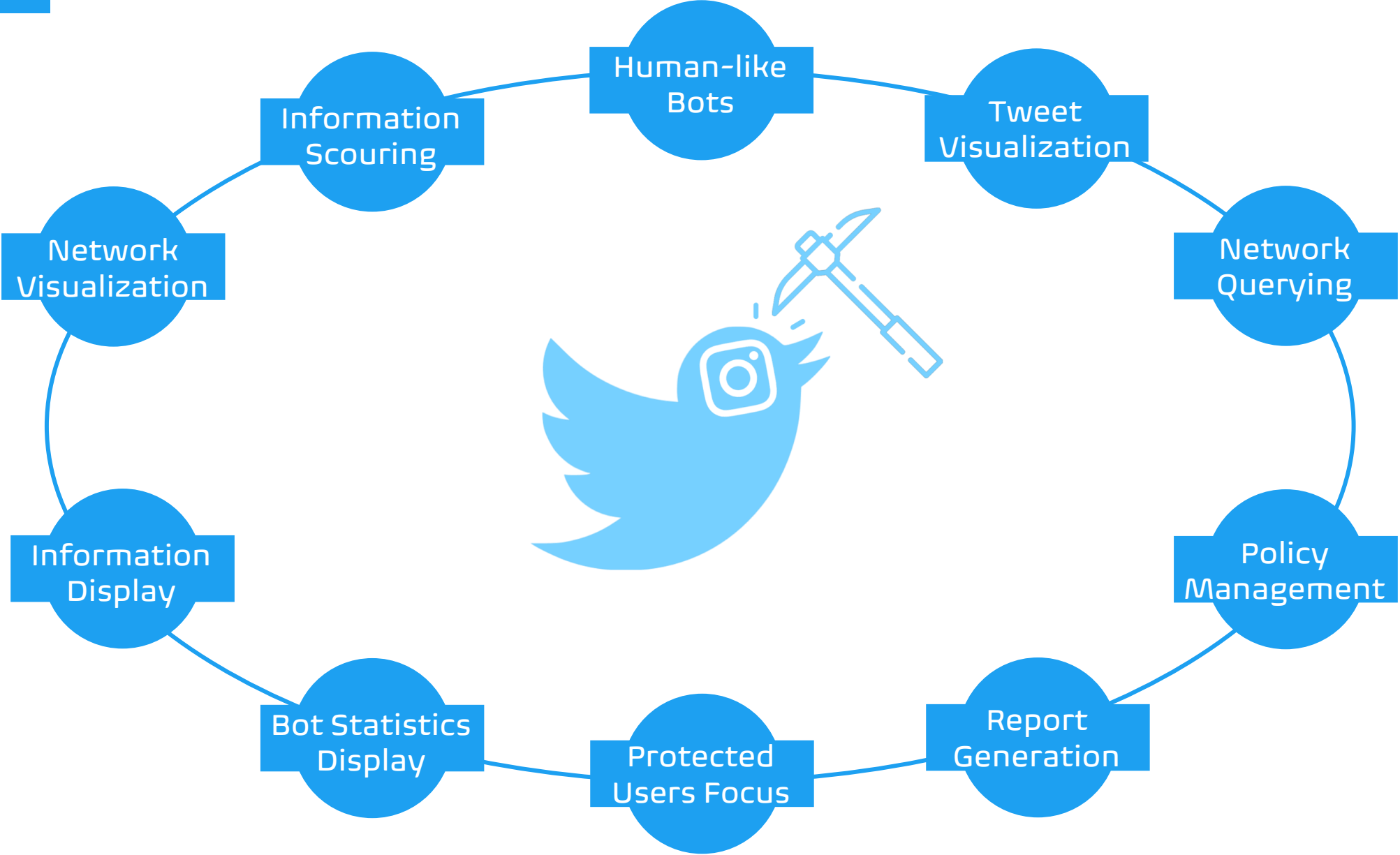
Features and requirements


Network Investigators


Data Analysts



Func. requirements



non FUNC. requirements

Backend

Handle High Loads of Data

Handle High WorkLoads

Bots should fool real users

Handle high amounts of message exchanges and processing

Lowly coupled modules

Use Data Caching

Use Message Batch Processing

Frontend

Easy to Use

Easy to Learn

Layman Terms

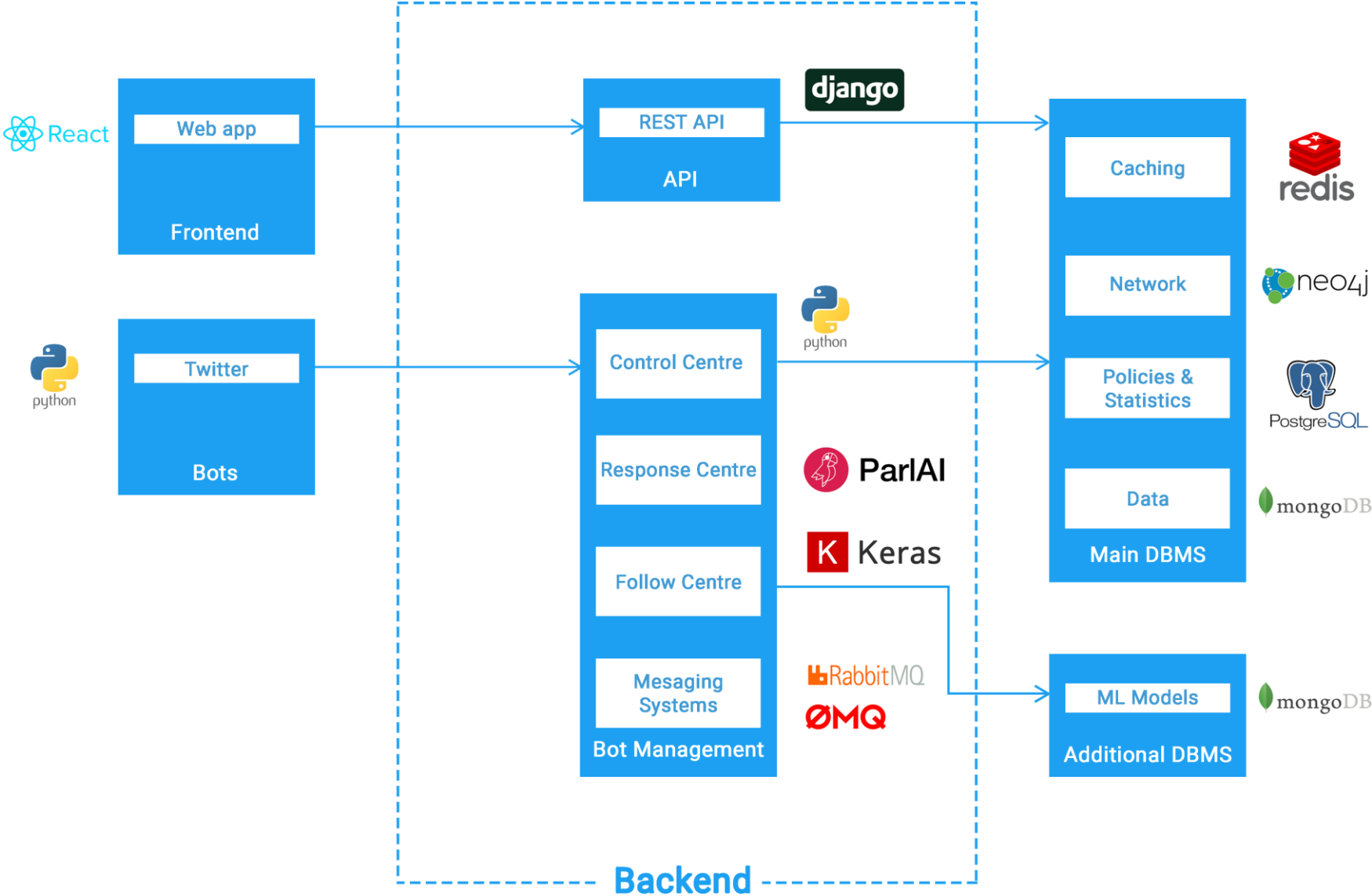
Clean Graphs

High Query Language Abstraction

Minimalist Design

ToolTips

system architecture



- Bots infiltrate Twitter
- Bots scour for information
- Are capable interacting with Twitter and its users through **retweets, likes, follow requests**, and so on



← António Pinto
3.610 Tweets



Editar perfil

António Pinto
@AntnioP88829405

Gestor empresarial
Procurando o sentido da vida



📍 Celorico de Basto 🕒 Nascido(a) em 5 de
📅 Ingressou em março de 2020

seguindo 2.657 403 seguidores

Tweets Tweets e respostas



← Miguel Nunes
189 Tweets



Edit profile

Miguel Nunes
@MiguelN32342011

Benfica olé 1907 📌🏆

"Ser Benfiquista
É ter na alma a chama imensa"🔥🔥🔥

Translate bio

📍 Albufeira 📅 Joined March 2020

329 Following 18 Followers

bot management centres



Control Centre

- Implemented in **Python**
- Proxy between the Bots and the other **Microservices**
- Processes all Bot Data and most Bot Decisions



ParlAI



Keras

Response Centre

- Implemented with **ParlAI**
- Generates a valid and human-like response to a given text

Follow Centre

- Given a user and a Bot's policies, decides whether or not the bot should attempt to follow that user
- Implemented with **ML model using Keras**



bot management centres



Containers Columns Settings

Start Stop Kill Restart Pause Resume Remove + Add container

Search...

Name	State Filter	Quick actions	Stack	Image	Created	Host	Published Ports	Ownership
rest	running		-	docker.pkg.github.com/detiuaveiro/social-network-mining/rest:latest	2020-06-29 18:43:03	cluster	7000:7000	administrators
control_center	running		-	docker.pkg.github.com/detiuaveiro/social-network-mining/control_center:latest	2020-06-29 18:38:59	cluster	-	administrators
control_center2	running		-	docker.pkg.github.com/detiuaveiro/social-network-mining/control_center:latest	2020-06-29 18:38:57	cluster	-	administrators
follow_service	running		docker	docker.pkg.github.com/detiuaveiro/social-network-mining/follow_service:latest	2020-06-29 18:30:38	cluster2	-	administrators
bot	running		-	docker.pkg.github.com/detiuaveiro/social-network-mining/bot:latest	2020-06-29 18:23:44	cluster	-	administrators
bot2	running		-	docker.pkg.github.com/detiuaveiro/social-network-mining/bot:latest	2020-06-29 18:23:42	cluster	-	administrators
web-app	running		-	docker.pkg.github.com/detiuaveiro/social-network-mining/web-app:latest	2020-06-29 18:17:32	cluster	81:80	administrators
mongo_follow_service	running		docker	mongo:3.6.18	2020-06-29 05:32:41	cluster2	27017:27017 27018:27018 27019:27019	administrators
cc_redis	running		redis_cc	redis:latest	2020-06-10 11:07:41	cluster	6380:6379	administrators
bot_redis	running		bots	redis:latest	2020-06-10 11:07:39	cluster	6379:6379	administrators
portainer	running		-	portainer/portainer:latest	2020-06-02 01:44:46	cluster2	8000:8000 9000:9000	administrators
portainer	running		-	portainer/portainer:latest	2020-06-02 01:42:28	cluster	8000:8000 80:9000	administrators
watchtower	running		-	containrrr/watchtower:latest	2020-06-01 20:19:23	cluster2	-	administrators
watchtower	running		-	containrrr/watchtower:latest	2020-06-01 20:17:00	cluster	-	administrators
parlai	running		-	parlai	2020-05-26 15:48:29	cluster	-	administrators
portainer-agent_agent.92ez47s...	running		portainer-agent	portainer/agent:latest	2020-04-27 21:44:08	cluster	9001:9001	administrators
portainer-agent_agent.fvuaik9...	running		portainer-agent	portainer/agent:latest				administrators
rabbitmq_pi	running		rabbitmq	rabbitmq_rabbit				administrators

Containers Columns Settings

Start Stop Kill Restart Pause Resume Remove + Add container

Search...

Name	State Filter	Quick actions	Stack	Image	Created	Published Ports	Ownership
neo4j_pi	running		neo4j	neo4j_neo4j	2020-04-22 04:24:12	7687:7687 7474:7474	administrators
postgres_pi	running		postgres	postgres_postgres	2020-03-20 22:41:02	5432:5432	administrators
mongo_pi	running		mongo	mongo_mongo	2020-03-20 22:33:28	27017:27017	administrators

Items per page 100

real interactions

Alexandre Putti @puttialexandre · 8 de jun
Cuide de uma pandemia como uma mulher. Sob o comando de @jacindaardern, a Nova Zelândia zerou os casos de coronavírus no país 🇳🇿



23 381 1,6 mil

António Pinto @AntnioP88829405 · 23 h
QUE VERGONHA DO POVO BRASILEIRO QUE APOIA BOLSONARO, POR ISSO QUE OS PORTUGUESES TIRAM ONDA COM A NOSSA CARA, E COM RAZÃO

1 1 1

Amarela Nave @AmarelaNave · 10 de jun
Ela está na boa. Deixem-na continuar assim. Fazem dela acéfala

1 1 1

António Pinto @AntnioP88829405 · 10 de jun
As melhores amizades que tenho são com rapazes, meninas querem-te bem mas nnc melhor que elas

1 1 1

PS: JOANA @PS_ju_ · 10 de jun
Também é verdade. Muitas são assim!!

12:58 PM · 10 de jun de 2020 · Twitter for Android

Ines Carvalho @ineescarvalho_ · 1 h
A Isabel tem estado sempre em minha casa que até já anda com sacos com mudas de roupa no carro 😂😂😂😂

1 1 2 1

António Pinto @AntnioP88829405 · 6 min
A que agora anda a caça de peregrinos que viajam sozinhos ou em pequenos grupos, é a mesma que não conseguiu encontrar autocarros da a serviço da a passear pela região da grande Lisboa no 1.º de Maio.

2 1 1 1 1

Madjer @Isabelgomes99
Em resposta a @AntnioP88829405 e @ineescarvalho_
Eu não sou peregrina, só passo mais tempo em casa da ines do que em minha casa 😂

PS: JOANA @PS_ju_ · 10 de jun
I. Ela não leva de todo a peito o que dizem. A Sandrina acaba por isto porcaria mas o que acontece é que depois é ela a queixar-se só rio corpo. Pq quando apontamos o dedo a alguém temos mais a para nós. A Soraia tá numa boa e valoriza-se!

1 1 1

Andre Rodrigues @AndreTripeiro · 10 de jun
Reconstrução da far o vínculo legal, de to religioso.

10:40 PM · 26 de jun de 2020 · Twitter for Android

Expropriação dos detentores do solo e do capital em vantagem de todos e abolição do governo.

1 2 1

António Pinto @AntnioP88829405 · 20 h
O cara é médico há trezentos anos e não sabe colocar uma máscara? Que diabo de médico é esse, pelo amor de Santo Agostinho

1 1 1 1 1

Andre Rodrigues @AndreTripeiro
Em resposta a @AntnioP88829405
Amo te

Expresso @expresso · 6 h
Argentina à beira da tragédia social e económica após 100 dias de quarentena



O êxito da Argentina ao conter a quantidade de vítimas do coronavírus é proporcional ao seu fracasso ...
expresso.pt

2 2 1

António Pinto @AntnioP88829405 · 50 min
Em busca do caos, Doria prorroga quarentena e caminhoneiros iniciam paralisação (veja o vídeo)

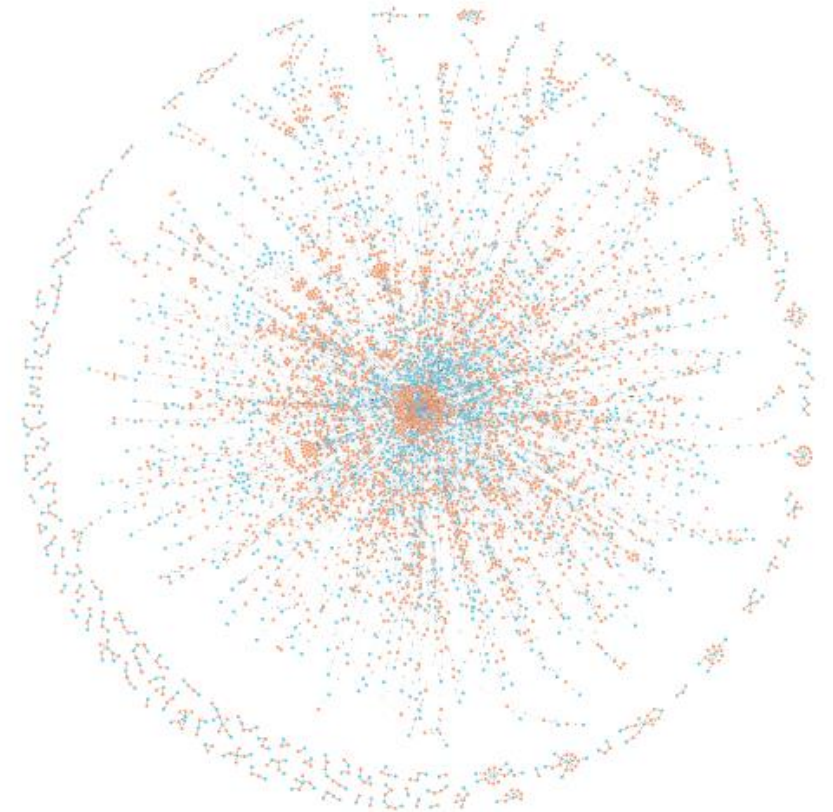
1 1 1 1 1

O Templário @oTemplario1119
Em resposta a @AntnioP88829405 e @expresso
Onde está o vídeo?

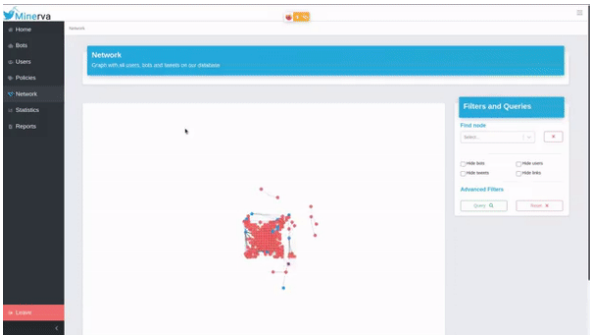
results and data

Data scoured... so far

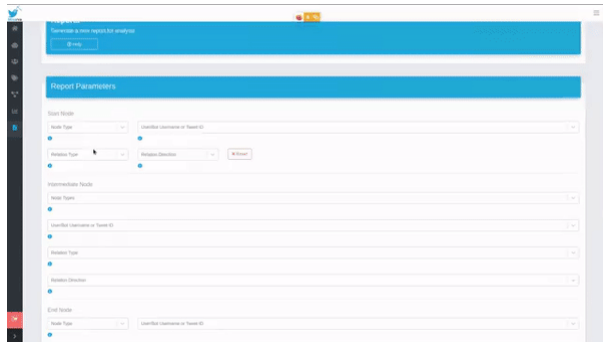
- 2 Bots
- 369027 Users (15161 Private)
- 784118 Tweets
- 395191 FOLLOWS Relations
- 59044 QUOTED Relations
- 132241 REPLIED Relations
- 255363 RETWEETED Relations
- 781588 WROTE Relations
- 45.7% Protected Account Follow Acceptance Rate



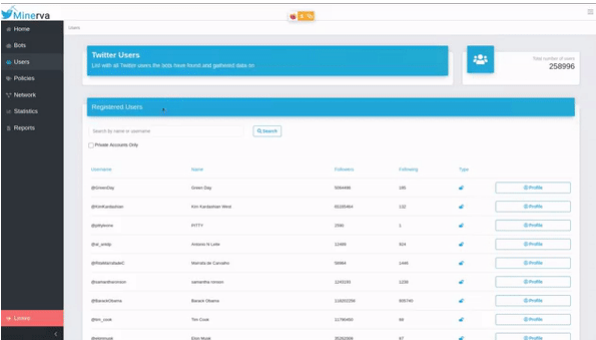
rest api & Frontend



Network



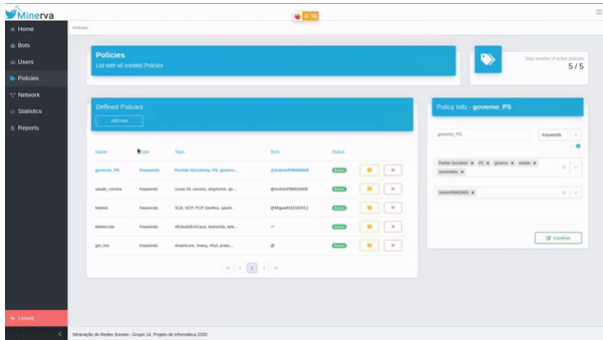
Reports



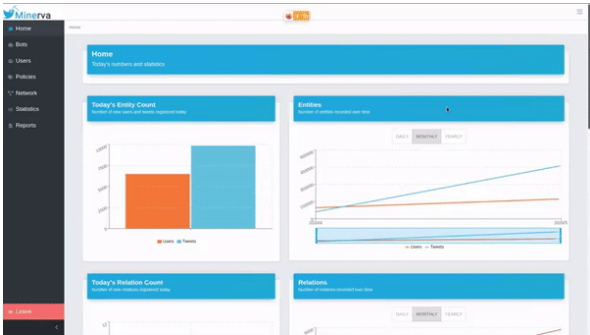
Users



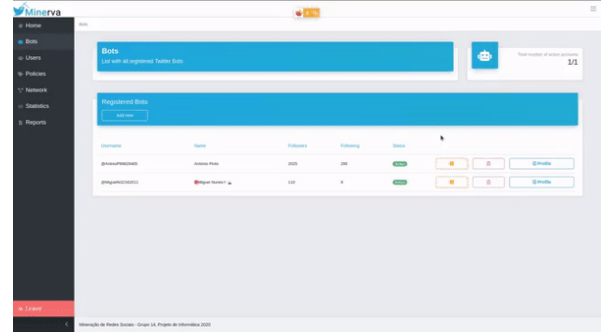
Profiles



Statistics



Bots



Statistics

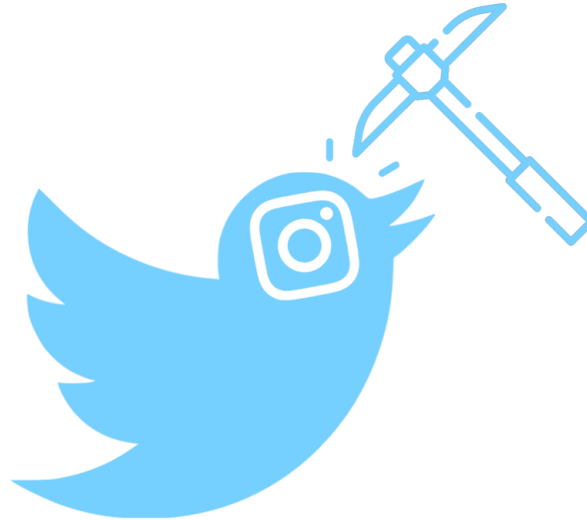
rest api & Frontend



team workflow



- Source Code
- Code Distribution
- Private Repo
- Versions Control



- Presentations
- Meeting Records
- General Documents and Resources



- Milestones
- Goals
- Roadmap
- Backlog
- Tasks distribution



- Voice Communication
- Synchronous Collaboration



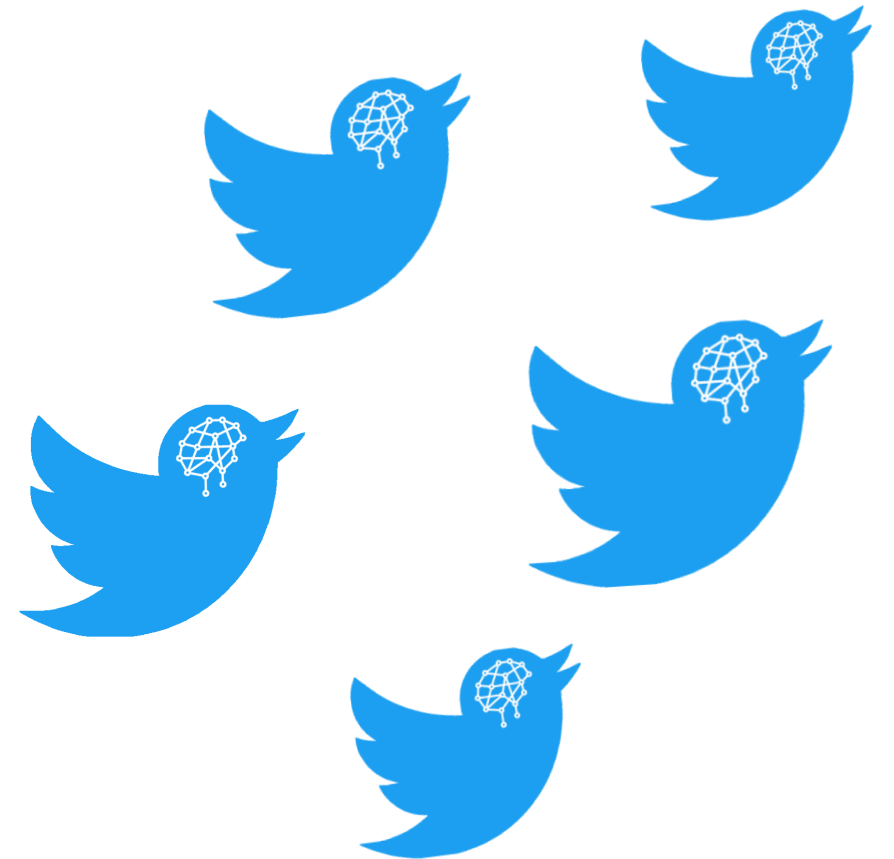
- General Communication
- General Announcements

challenges Faced

- **Twitter Developer Accounts due to Covid-19**
- **Big Data and high querying times**
- **Integrity between the several DBMS**
- **Not Starting the project from scratch**
- **Communication using RabbitMQ**
- **Tweepy Nuances**
- **Network Visualization performance**

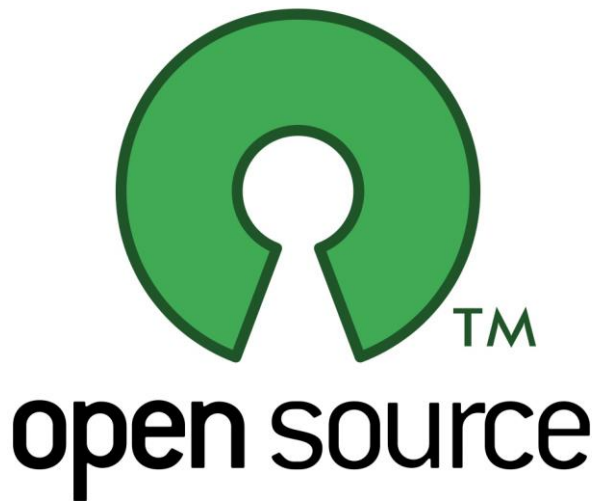
Future work

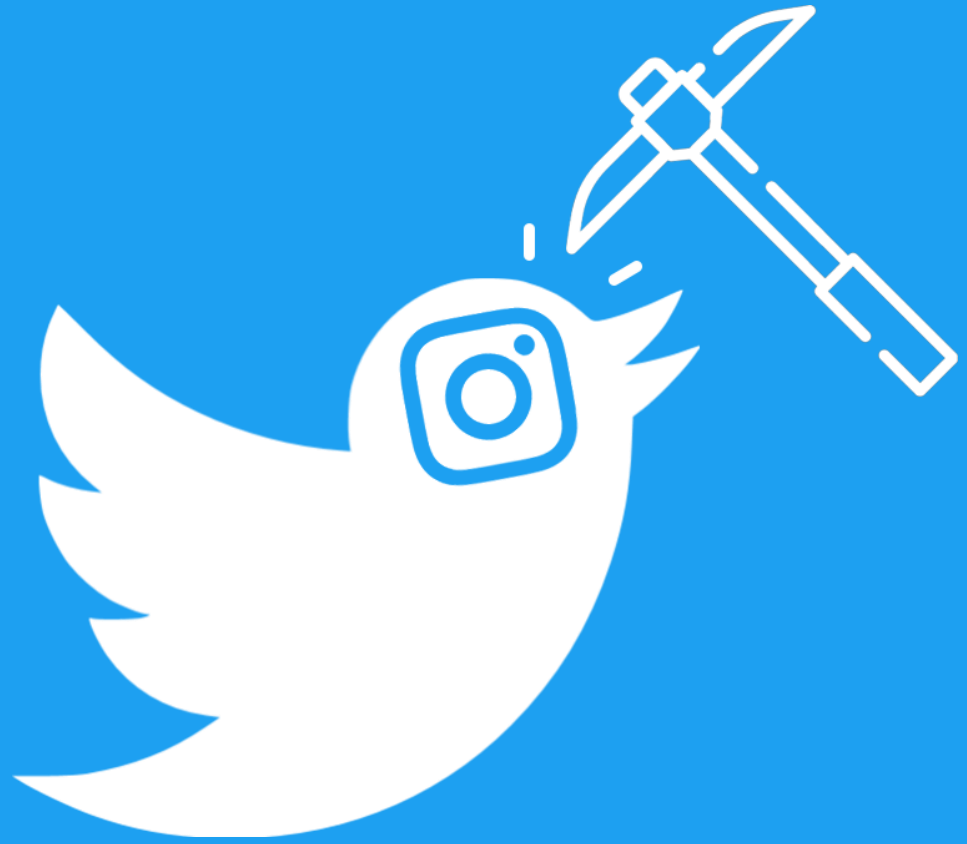
- Ability to add and deploy Bots
- Intelligence Improvements
- Migrate from PostgreSQL
- Visual Query construction tool
- Mobile Companion App



open source

- **W**ork well documented for possible future iterations
- **O**pen Source





the end