Meet the Team

Bono

Jake

Hans

Nico

Neil

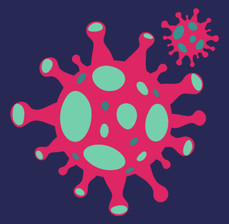
Sprint 2
Final Project

Group 1 - One Direction

Agenda

1. Context of the Problem
2. Proposed DE Solution
3. Description of Features
   Data Structure, Sources
4. DE Design & Results
   ETL, Architecture
5. Discussion & Documentation

Context of the Problem



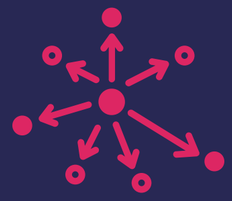
3.6m infected, 60k dead

2.4 million at risk

Need for data-driven decision-making

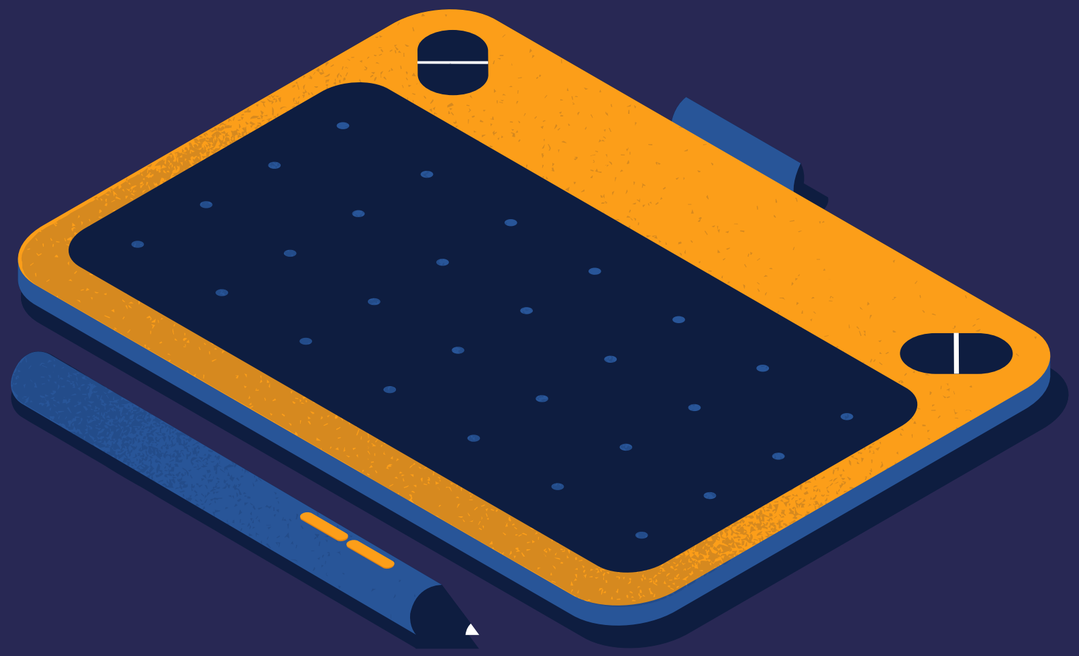
Source: World Health Organization, Philippines ; United Nations Office for Coordinated Humanitarian Affairs

Inaccessible data formats



Raw, unprocessed, and decentralized

Slow, uncertain decision-making



Proposed DE Solution

Centralized data pipeline

- Automates data collection and parsing
- Accessible data mart
- Normalized data for reporting and model-building

Evidence for ML developed solutions

XGBoost to quantify COVID-19 risk for counties

Source: Mehta, Julaiti, Griffin & Kumara (2020)

Ensemble models and multi-objective optimization to forecast disease prevalence

Source: Tiwari et al. (2021) ; Pan et al. (2021)

Description of Features

Data Sources

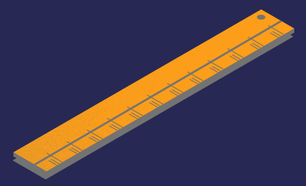


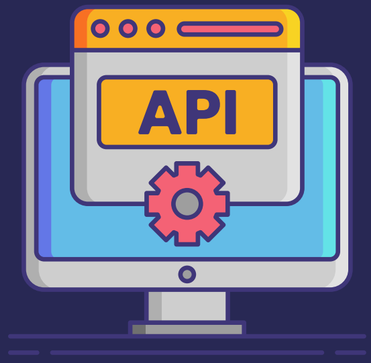
Table Schema

Application

Data Sources

External Data

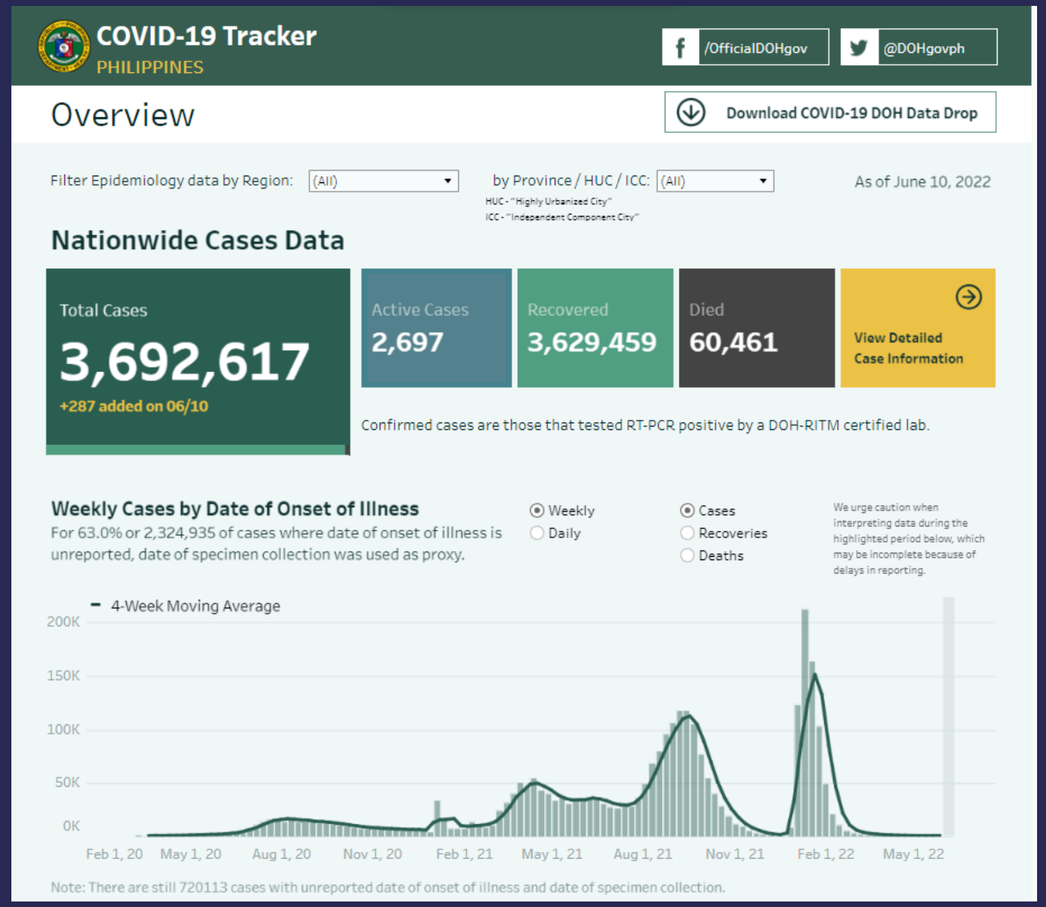
Web Scraping



APIs

External Data

Source: DOH covid19 tracker



Features:

- Regional COVID Case information
- Reported staff counts
- Reported IPC standards implementation

CaseCode	Age	AgeGroup	Sex	DateSpecimen	DateResultRelease	DateRepConf	DateDied	DateRecover	RemovalType
C404174	38	35 to 39	FEMALE		2020-01-30	2020-01-30			RECOVERED
C462688	44	40 to 44	MALE		2020-01-30	2020-02-03	2020-02-01		DIED
C387710	60	60 to 64	FEMALE	2020-01-23	2020-01-30	2020-02-05		2020-01-31	RECOVERED
C377460	49	45 to 49	MALE			2020-03-06			RECOVERED
C498051	63	60 to 64	MALE	2020-03-05		2020-03-06	2020-03-11		DIED
C130591	58	55 to 59	FEMALE	2020-03-06	2020-03-07	2020-03-07	2020-03-12		DIED
C440075	33	30 to 34	MALE	2020-03-06	2020-03-08	2020-03-08		2020-04-05	RECOVERED
C202135	57	55 to 59	MALE	2020-03-06	2020-03-08	2020-03-08		2020-03-23	RECOVERED
C178743	39	35 to 39	MALE	2020-03-06	2020-03-08	2020-03-08		2020-03-21	RECOVERED
C557002	86	80+	MALE	2020-03-06	2020-03-08	2020-03-08	2020-03-14		DIED
C787672	70	70 to 74	MALE	2020-03-07	2020-03-09	2020-03-09		2020-03-27	RECOVERED
C325527	59	55 to 59	FEMALE			2020-03-09			RECOVERED
C777589	31	30 to 34	FEMALE			2020-03-09		2020-03-24	RECOVERED
C557823	41	40 to 44	MALE			2020-03-09		2020-03-24	RECOVERED
C348794	70	70 to 74	MALE	2020-03-06	2020-03-09	2020-03-09		2020-03-19	RECOVERED

External Data

Source: *Philippine Statistics Authority*

- Population & annual growth rate
- Urbanized City Status
- Region, Province, and City/Municipality
- Poverty Incidence Among Families

A. POPULATION AND ANNUAL GROWTH RATE FOR THE PHILIPPINES AND ITS REGIONS, PROVINCES, AND HIGHLY URBANIZED CITIES BASED ON THE 2000, 2010, 2015, AND 2020 CENSUSES

REGION, PROVINCE, AND HIGHLY URBANIZED CITY	TOTAL POPULATION				POPULATION GROWTH RATE (in percent)			
	01-May-00	01-May-10	01-Aug-15	01-May-20	2000-2010	2010-2015	2015-2020	2010-2020
PHILIPPINES	76,506,928 [a]	92,337,852 [b]	100,981,437 [c]	109,035,343 [d]	1.90	1.72	1.63	1.67
NATIONAL CAPITAL REGION (NCR)	9,932,560	11,855,975	12,877,253	13,484,462	1.78	1.58	0.97	1.29
CITY OF MANILA	1,581,082	1,652,171	1,780,148	1,846,513	0.44	1.43	0.77	1.12
CITY OF MANDALUYONG	278,474	328,699	386,276	425,758	1.67	3.12	2.07	2.62
CITY OF MARIKINA	391,170	424,150	450,741	456,059	0.81	1.16	0.25	0.73

REGION, PROVINCE, AND CITY/MUNICIPALITY	TOTAL POPULATION				POPULATION G (in per	
	01-May-00	01-May-10	01-Aug-15	01-May-20	2000-2010	2010-2015
REGION VIII (EASTERN VISAYAS)	3,610,355	4,101,322	4,440,150	4,547,150	1.28	1.52
BILIRAN	140,274	161,760	171,612	179,312	1.43	1.13
ALMERIA	13,854	16,495	16,951	17,954	1.76	0.52
BILIRAN	13,817	16,183	16,882	17,662	1.59	0.81
CABUCGAYAN	17,691	19,621	20,788	21,542	1.04	1.11
CAIBIRAN	19,606	21,473	22,524	24,167	0.91	0.91
CULABA	11,506	12,252	12,325	12,972	0.63	0.11
KAWAYAN	17,507	20,238	20,291	20,455	1.46	0.05

External Data

Source: *Our World In Data*

Features:

- Dates
- Vaccine Used
- Source of Information
- Total Vaccinations
- People Vaccinated
- People Fully Vaccinated
- Total Booster Shots

location	date	vaccine	source_url	total_vacc	people_v	people_fu	total_boos
Philippine	14/10/2021	Johnson&	https://news.abs-cbn.com/spotli	51482063		23981240	
Philippine	17/10/2021	Johnson&	https://news.abs-cbn.com/spotli	52303905		24307903	
Philippine	18/10/2021	Johnson&	https://news.abs-cbn.com/spotli	52783354		24498753	
Philippine	19/10/2021	Johnson&	https://news.abs-cbn.com/spotli	53315069		24694717	
Philippine	20/10/2021	Johnson&	https://news.abs-cbn.com/spotli	53838248		24876889	
Philippine	21/10/2021	Johnson&	https://covid19.who.int	54444161	32954936	25101222	
Philippine	24/10/2021	Johnson&	https://news.abs-cbn.com/spotli	55715693		25711980	
Philippine	25/10/2021	Johnson&	https://news.abs-cbn.com/spotli	56254529		25955669	
Philippine	26/10/2021	Johnson&	https://news.abs-cbn.com/spotli	56774753		26180669	
Philippine	27/10/2021	Johnson&	https://news.abs-cbn.com/spotli	57494154		26479028	
Philippine	28/10/2021	Johnson&	https://news.abs-cbn.com/spotli	58212187		26803677	
Philippine	31/10/2021	Johnson&	https://news.abs-cbn.com/spotli	59316764		27360873	
Philippine	01/11/2021	Johnson&	https://news.abs-cbn.com/spotli	59473662		27442969	
Philippine	02/11/2021	Johnson&	https://news.abs-cbn.com/spotli	60406424		27749809	
Philippine	03/11/2021	Johnson&	https://news.abs-cbn.com/spotli	61354945		28198294	
Philippine	04/11/2021	Johnson&	https://news.abs-cbn.com/spotli	62474334			
Philippine	07/11/2021	Johnson&	https://news.abs-cbn.com/spotli	64195936			
Philippine	08/11/2021	Johnson&	https://news.abs-cbn.com/spotli	64947366			
Philippine	09/11/2021	Johnson&	https://news.abs-cbn.com/spotli	65764376			
Philippine	10/11/2021	Johnson&	https://news.abs-cbn.com/spotli	66816976			
Philippine	11/11/2021	Johnson&	https://covid19.who.int	67716205	40517967	30804594	
Philippine	14/11/2021	Johnson&	https://news.abs-cbn.com/spotli	69713994			
Philippine	15/11/2021	Johnson&	https://news.abs-cbn.com/spotli	70677771			
Philippine	16/11/2021	Johnson&	https://news.abs-cbn.com/spotli	71680132			
Philippine	17/11/2021	Johnson&	https://news.abs-cbn.com/spotli	72763442			
Philippine	18/11/2021	Johnson&	https://news.abs-cbn.com/spotli	73917573		32993083	
Philippine	21/11/2021	Johnson&	https://news.abs-cbn.com/spotli	75600808		33579181	
Philippine	28/11/2021	Johnson&	https://news.abs-cbn.com/spotli	81296947		35678774	188084
Philippine	30/11/2021	Johnson&	https://news.abs-cbn.com/spotli	86421420		36365357	313836
Philippine	01/12/2021	Johnson&	https://news.abs-cbn.com/spotli	89070292		36869419	389451

Web Scraping

Scraping COVID disinformation

- Factraker
- Rappler.com

Features:

- Description
- Date and time posted
- URL source

	post_id	text	post_text	shared_text	original_text	time	timestamp	image	image_lowquality	images	...	reaction_count	with	page_id
32	5293592450732983	Marcos Gold, totoo raw ayon sa BSP? \n\nHINDI T...	Marcos Gold, totoo raw ayon sa BSP? \n\nHINDI T...		None	2022-05-05 14:43:02	1651732982	None	https://scontent.fmnl6-1.fna.fbcdn.net/v/t39.3...	[None]	...	None	None	1624618274297104
82	5268013669957528	Diktador na si Marcos, nag-imbak daw ng ginto ...	Diktador na si Marcos, nag-imbak daw ng ginto ...		None	2022-04-26 07:00:04	1650927604	None	https://scontent.fmnl6-2.fna.fbcdn.net/v/t39.3...	[None, None]	...	None	None	1624618274297104
110	5255752397850322	BSP Governor Diokno, pinatunayang totoo ang Ma...	BSP Governor Diokno, pinatunayang totoo ang Ma...		None	2022-04-21 17:00:04	1650531604	None	https://scontent.fmnl6-1.fna.fbcdn.net/v/t39.3...	[None]	...	None	None	1624618274297104
135	5250328508392711	Leni, tumakbo lang para sa pagkapangulo para k...	Leni, tumakbo lang para sa pagkapangulo para k...		None	2022-04-19 16:00:02	1650355202	None	https://scontent.fmnl6-2.fna.fbcdn.net/v/t39.3...	[None]	...	None	None	1624618274297104

APIs

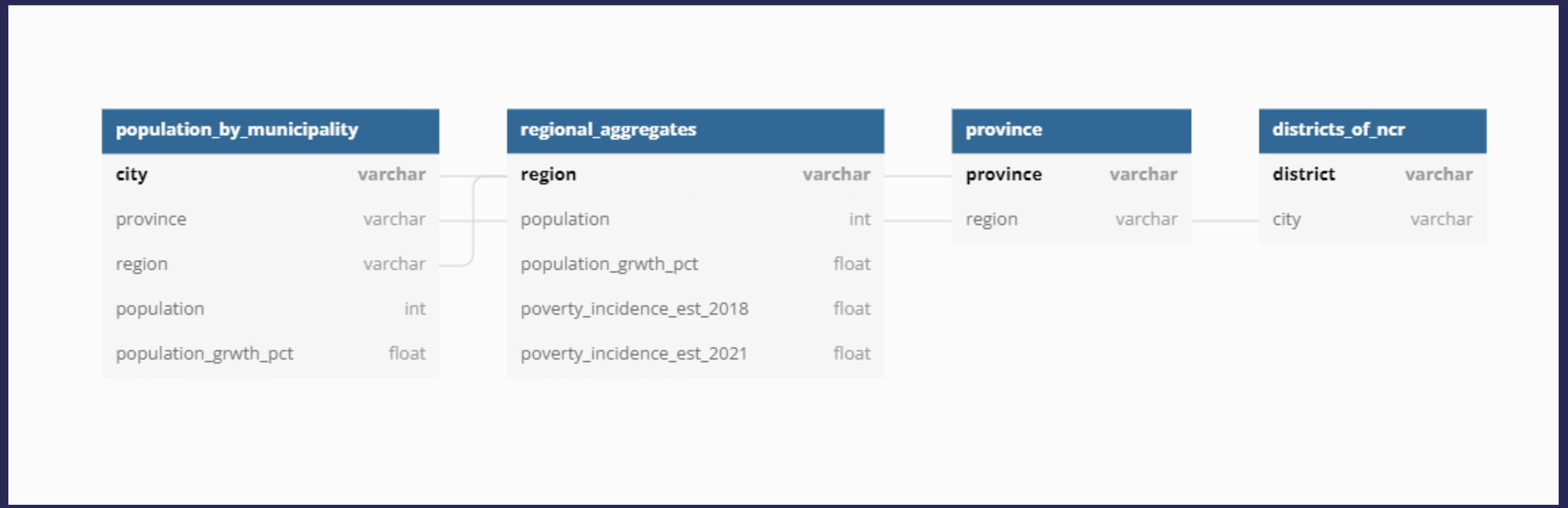
COVID-19 statistics based on public data by John Hopkins CSSE

	date	confirmed	deaths	recovered	confirmed_diff	deaths_diff	recovered_diff	last_update	active	active_diff	fatality_rate
0	2020-04-12	4648	297	197	220	50	40	2020-04-12 23:17:00	4154	130	0.0639
1	2020-04-13	4932	315	242	284	18	45	2020-04-13 23:07:34	4375	221	0.0639
2	2020-04-14	5223	335	295	291	20	53	2020-04-14 23:33:12	4593	218	0.0641
3	2020-04-15	5453	349	353	230	14	58	2020-04-15 22:56:32	4751	158	0.0640
4	2020-04-16	5660	362	435	207	13	82	2020-04-16 23:30:31	4863	112	0.0640
5	2020-04-17	5878	387	487	218	25	52	2020-04-17 23:30:32	5004	141	0.0658
6	2020-04-18	6087	397	516	209	10	29	2020-04-18 22:32:28	5174	170	0.0652
7	2020-04-19	6259	409	572	172	12	56	2020-04-19 23:40:41	5278	104	0.0653
8	2020-04-20	6459	428	613	200	19	41	2020-04-20 23:36:27	5418	140	0.0663
9	2020-04-21	6599	437	654	140	9	41	2020-04-21 23:30:30	5508	90	0.0662
10	2020-04-22	6710	446	693	111	9	39	2020-04-22 23:30:32	5571	63	0.0665
11	2020-04-23	6981	462	722	271	16	29	2020-04-24 03:30:31	5797	226	0.0662
12	2020-04-24	7192	477	762	211	15	40	2020-04-25 06:30:33	5953	156	0.0663
13	2020-04-25	7294	494	792	102	17	30	2020-04-26 02:30:31	6008	55	0.0677
14	2020-04-26	7579	501	862	285	7	70	2020-04-27 02:30:33	6216	208	0.0661
15	2020-04-27	7777	511	932	198	10	70	2020-04-28 02:30:32	6334	118	0.0657
16	2020-04-28	7958	530	975	181	19	43	2020-04-29 02:32:29	6453	119	0.0666
17	2020-04-29	8212	558	1023	254	28	48	2020-04-30 02:32:27	6631	178	0.0679
18	2020-04-30	8488	568	1043	276	10	20	2020-05-01 02:32:28	6877	246	0.0669

Features:

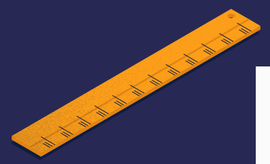
1. Date
2. Confirmed Cases
3. Deaths
4. Recovered
5. Confirmed diff
6. Deaths diff
7. Recovered diff
8. Last update
9. Active cases
10. Active diff
11. Fatality rate

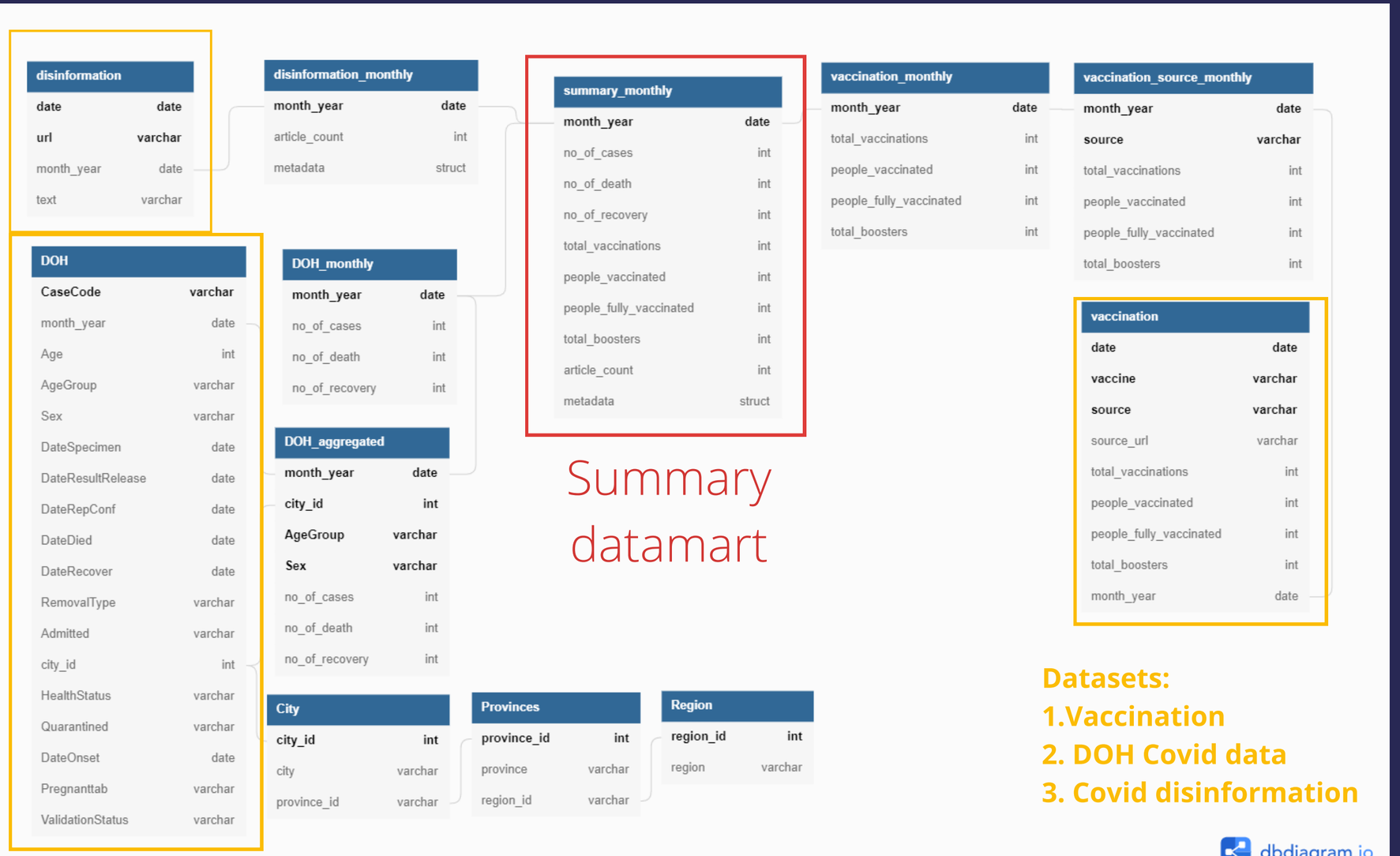
Table Schema - Socio-demo



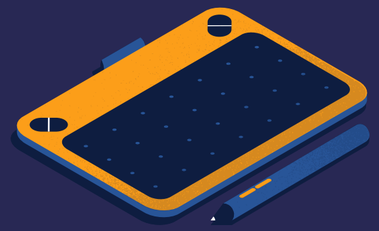
https://dbdiagram.io/d/62a2245592b33b4f51345b02

Table Schema - health and disinformation





https://dbdiagram.io/d/62a417519921fe2a96e1f7b3



Application

GCE

GCS

GBQ

Reporting & Analytics

ML & Model Training

DE Design & Results

Data Ingestion

Data Transformation

ERD

Loading Data

Data Ingestion

External Data

Web Scraping

APIs

GCE

GCS

Data Flow

External Data

google drive API

pdf parsing

VM

Web Scraping

bs4

pandas

GCS

BiqQuery

APIs

Data Transformation

Query results

SAVE RESULTS ▾ EXPLORE DATA ▾

JOB INFORMATION | RESULTS | JSON | EXECUTION DETAILS

⚠ Showing the first 500 columns for performance reasons.
Consider modifying your query to show fewer columns.

DISMISS

Row	ı_3	aggregation_level	new_confirmed	new_deceased	cumulative_confirmed	cumulative_deceased	cumulative_tested	new_persons_vaccinated	cumulative_persons_vaccinate
1		0	211	2	2838901	51213	23690229	0	*null*
2		0	24851	47	3441969	53519	25377563	*null*	*null*
3		0	0	0	3	1	*null*	*null*	*null*
4		0	0	0	0	0	*null*	*null*	*null*
5		0	9868	0	2622917	38828	20371132	0	*null*
6		0	2718	164	3639930	55094	26210790	0	*null*
7		0	4352	135	2765631	42077	21435114	0	*null*
8		0	173	0	3686475	60439	*null*	*null*	*null*
9		0	18101	72	2402447	52726	25561255	*null*	*null*

Data Transformation

C: > Users > hxwwo > Desktop > sprint2-covid-project > socio-dem-data > augmented_data > add_urbanicity.py

```python
import pandas as pd
import numpy as np

pop = pd.read_csv('population_by_municipality.csv')

pop['highly_urbanized'] = pop['province'].apply(lambda x: 1 if x =='high' else 0)
pop['province'] = pop['province'].apply(lambda prov: 'NA' if prov == 'high' else prov)

pop.to_csv('population_by_municipality_final.csv', index=False)
```

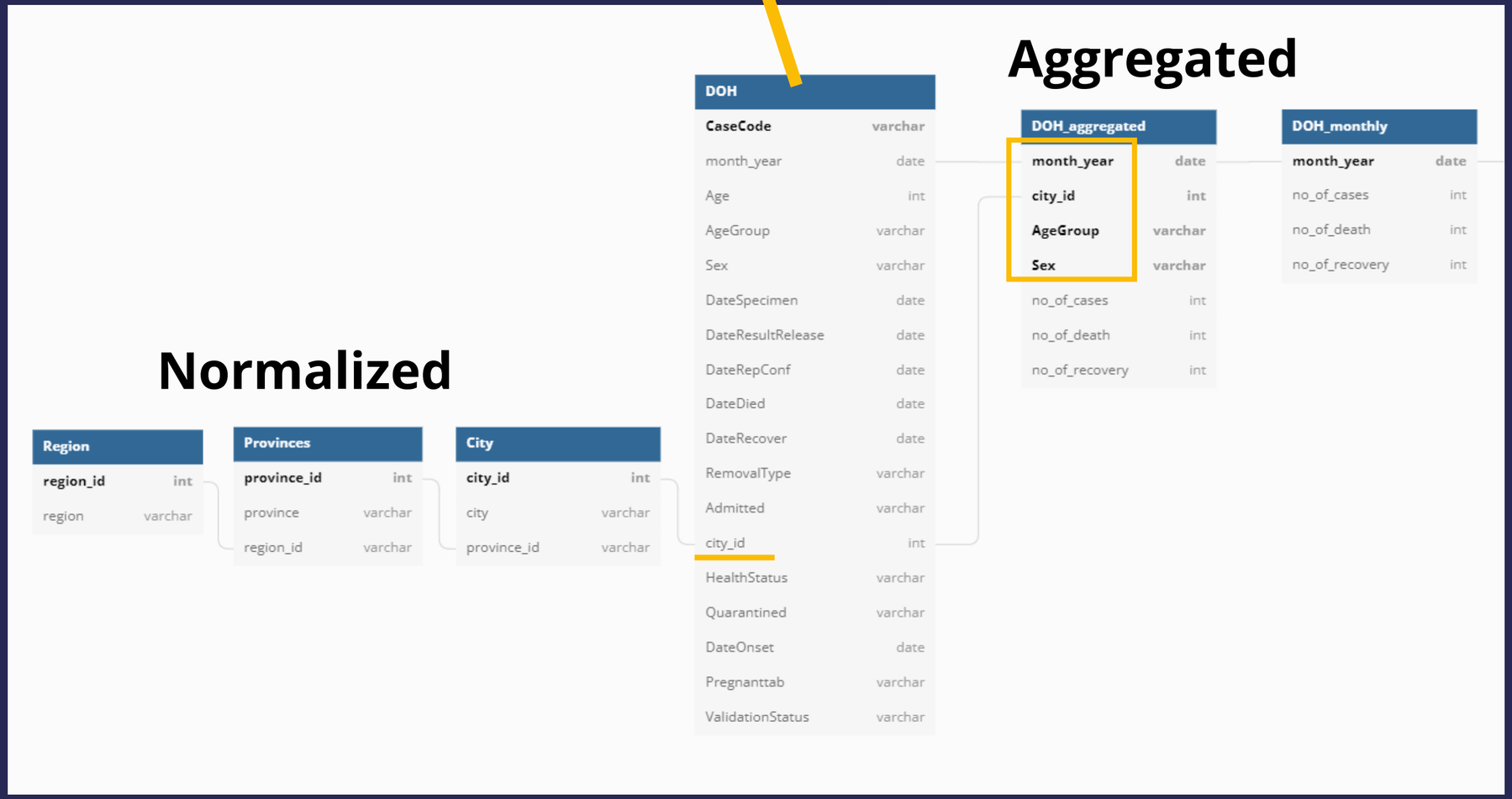
	A	B	C	D	E	F	G	H
1	city	province	region	populatio	populatio	highly_urbanized		
2	CITY OF MANILA	NA	NATIONAI	1846513	1.12	1		
3	CITY OF MANDALUYONG	NA	NATIONAI	425758	2.62	1		
4	CITY OF MARIKINA	NA	NATIONAI	456059	0.73	1		
5	CITY OF PASIG	NA	NATIONAI	803159	1.83	1		
6	QUEZON CITY	NA	NATIONAI	2960048	0.7	1		
7	CITY OF SAN JUAN	NA	NATIONAI	126347	0.4	1		
8	CITY OF CALOOCAN	NA	NATIONAI	1661584	1.1	1		
9	CITY OF MALABON	NA	NATIONAI	380522	0.74	1		
10	CITY OF NAVOTAS	NA	NATIONAI	247543	-0.06	1		
11	CITY OF VALENZUELA	NA	NATIONAI	714978	2.19	1		
12	CITY OF LAS PIÃ‘AS	NA	NATIONAI	606293	0.93	1		
13	CITY OF MAKATI	NA	NATIONAI	629616	1.75	1		

ERD

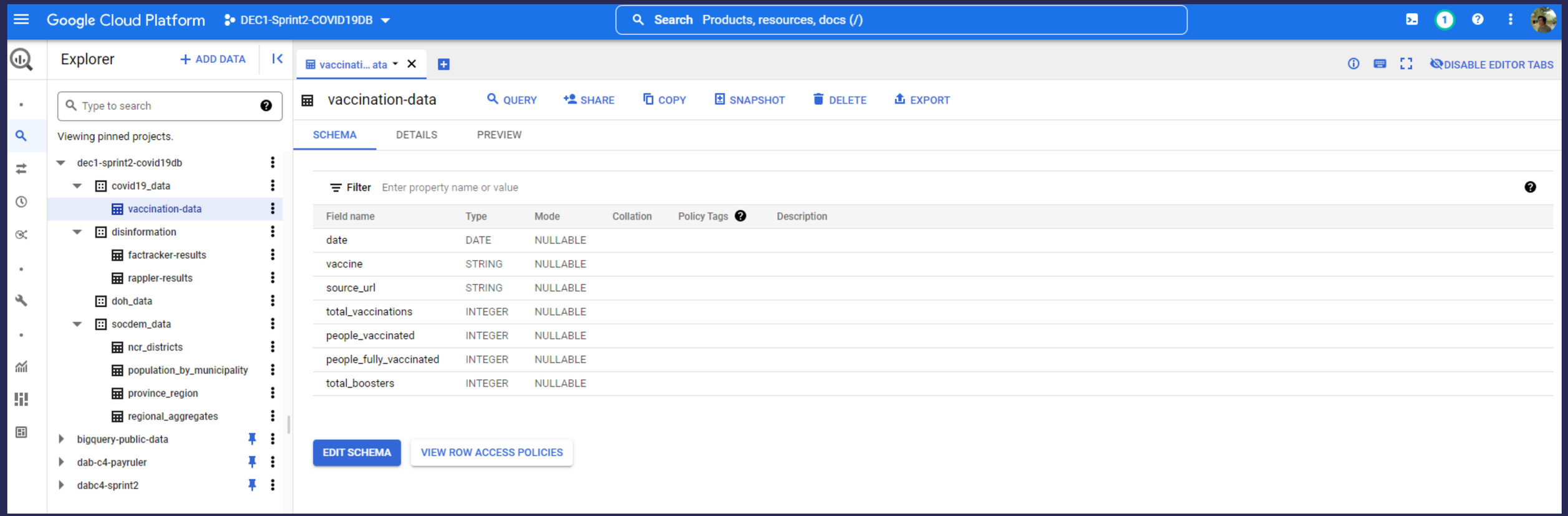
DOH covid cases

CaseCode	AgeGroup	Sex	RegionRes	ProvRes	CityMunRes
C8670306	20 to 24	MALE	NCR	NCR	CITY OF MUNTI
C19941380	10 to 14	FEMALE	NCR	NCR	CITY OF PASIG
C31856703	40 to 44	FEMALE	NCR	NCR	QUEZON CITY
C77491017	20 to 24	FEMALE	NCR	NCR	QUEZON CITY
C36094560	5 to 9	MALE	Region II: Cagay	ISABELA	CABATUAN

Sample data

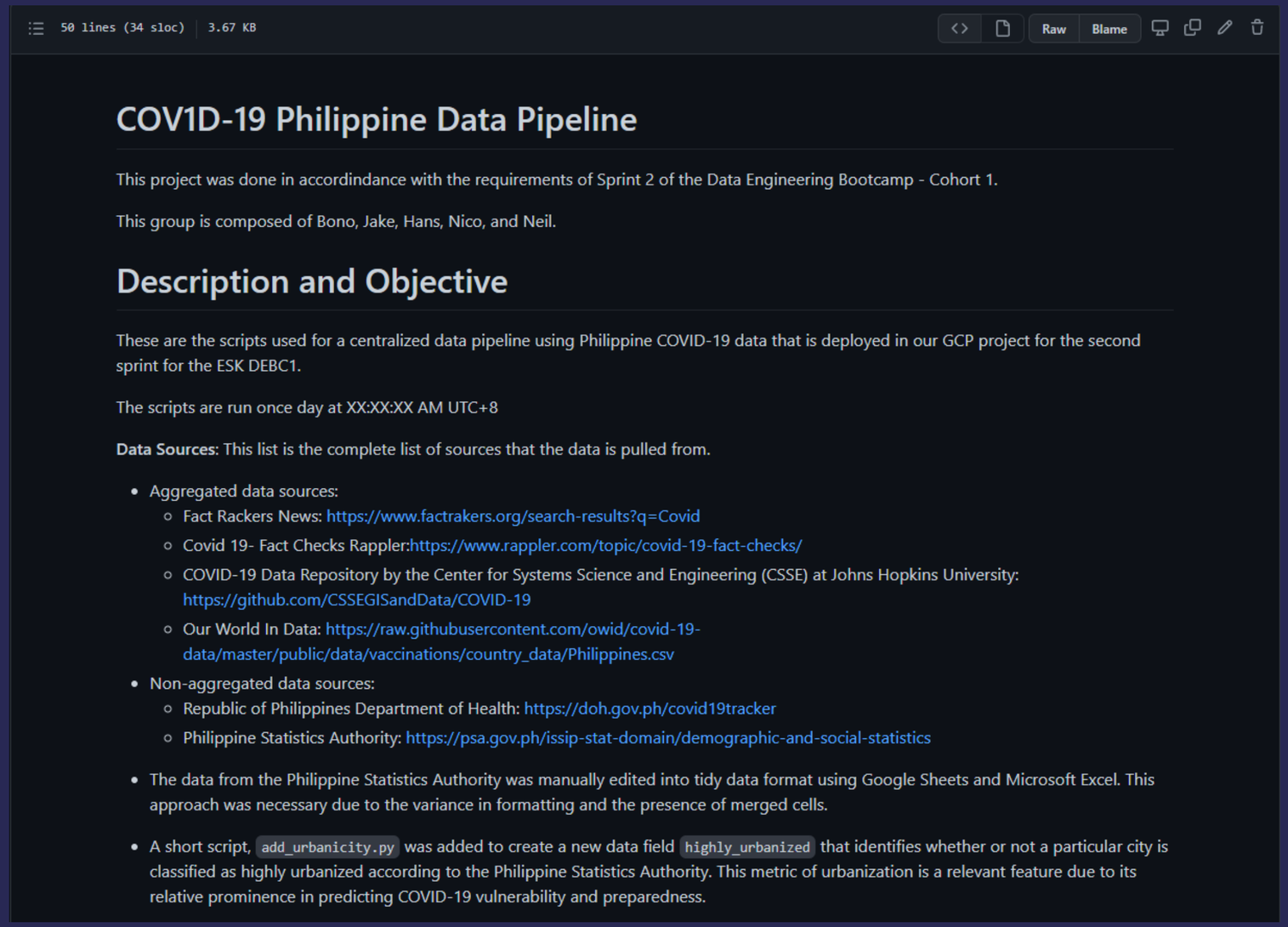


Loading Data



Discussion & Documentation

Demo of Application



https://github.com/hxwwong/sprint2-covid-project/blob/main/README.md

Thank you for listening!