COVID-19 UK Social Media Dataset for Public Health Research: Methodology for Collection and Processing

Richard Plant

Edinburgh Napier University

Edinburgh, UK

r.plant@napier.ac.uk

CSO Covidtracker Project Team

Edinburgh Napier University

Edinburgh, UK

covidtracker@napier.ac.uk

March 31, 2021

ABSTRACT

We present a benchmark database of public social media postings from the United Kingdom related to the Covid-19 pandemic for academic research purposes, along with some initial analysis, including a taxonomy of key themes organised by keyword. This release supports the findings of a research study funded by the Scottish Government Chief Scientist Office that aims to investigate social sentiment in order to understand the response to public health measures implemented during the pandemic.

*K*eywords COVID-19 · Social Media · Datasets · NLP

1 Introduction

The SARS-Cov-2 novel coronavirus popularly known as Covid-19 has provoked a worldwide response since its designation as a worldwide pandemic by the World Health Organisation in March 2020. As of November 2020, almost 45 million cases have been confirmed, with more than 1.1 million deaths reported [1]. While the majority of cases involve mild symptoms including cough, fever, diarrhoea and pain, some affected individuals can develop much more acute symptoms, such as pneumonia or kidney failure. Especially vulnerable groups including elderly patients and those suffering multiple co-morbidities have proven more susceptible to severe infection, and have presented a correspondingly higher risk of hospitalisation [2].

The virus has been transmitted between humans primarily through respiratory action, with recent studies predicting the rate of transmission between non-immune carriers at 3.77% [3]. Public health action has concentrated on reducing the spread of the virus through travel travel restrictions, temporary closure of businesses and schools, social distancing guidelines, and the implementation of test-and-trace systems. While there are a large number of ongoing studies into vaccines and drug therapies [4, 5, 6, 7], no widely accessible prophylactic treatment is currently available.

Much current research has responded to the pandemic by urgently striving to understand and communicate aspects of the social impacts to the public as well as combating pervasive myths [8, 9], a key role for researchers especially when the public is faced with urgent choices demanding good access to information and the tools to understand potential trade-offs between public health, security, and other social goals [10, 11].

Public health measures designed to restrict the spread of the virus like social distancing—reducing physical contact between people [12, 13]—have however led to negative social effects such as the closure of many workplaces [14], restrictions on personal mobility [15], and the closure of schools and universities [16, 17]. Under these circumstances, a great deal of public discourse has moved to online social networks [18, 19], presenting an excellent opportunity to gauge the mood of users.

We present a benchmark dataset drawn from online conversations in the United Kingdom about Covid-19-related topics on both the Twitter and Facebook social networks. It is our hope that open access to this data will spur further research into better informing and understanding public sentiment around the pandemic, as well as helping public health professionals to make informed decisions when implementing.

2 Related Work

A number of datasets extracted from social media activity around the Covid-19 pandemic have previously been published. Among those targeting a much wider geographic lens are Chen et al. [20], which adopts 22 keywords to filter worldwide Twitter messages via the streaming API, resulting in a large multi-lingual unlabelled dataset. Lamsal [21] used a similar approach, filtering with a list of 90 keywords and hashtags, as well as annotating the resultant dataset with sentiment markers. Dimitrov et al. [22] extended this approach by adopting a 268 keyword list through which they filtered the existing large-scale TweetsKB dataset [23].

In addition to this, multiple smaller datasets have been produced from Twitter encompassing linked niche topics within the broader ambit of Covid-19, including the effects of Hydroxychloroquine [24], and various sources of treatment misinformation [25]. Two sets that we found particularly of note that were not produced from Twitter are the Weibo-COV dataset [26], extracted from the social network Weibo, and the Instagram dataset compiled by Zarei et al. [27].

We note the current scholarship around the ethics of releasing the data of participants in social media research without direct consent, especially [28, 29, 30]. However, we conducted a thorough assessment of the privacy risk to individuals posed by our research, and along with complying with social network policies and the relevant sections of the General Data Protection Regulation (GDPR), we believe our research is in the legitimate public interest. We have not shared or published direct tweets or posts by individuals, quotes from individuals or names or locations of users who are not public organisations/entities. We have also striven to comply with best practices for user protection [31, 32], as well as ensuring that no non-public material is included in our dataset.

3 Methodology

3.1 Data collection

Our solution demanded that we implement a platform agnostic collection system capable of integrating with multiple data sources. In order to achieve this, our primary data store was determined to be a Google Cloud-hosted BigQuery database, into which we would load all records. We therefore designed our collection modules for individual platforms as independent parts of the architecture, capable of being flexibly swapped in and out as required.

When working with Twitter data, we designed a containerised streaming listener application that could be deployed quickly on any available host, which would connect to the network endpoint, establish a stream connection with a number of possible pre-selected filters, and consume and log incoming messages constantly. This application was connected to the endpoint on the 23rd of June at 09:38 GMT, and so the set contains messages from this point onwards.

In this study, we harvested messages within our defined regional boundaries, and defined our stream filter parameters to harvest all messages tagged with a geographical location within the United Kingdom [1]. The Twitter 1.1 API specification in use at the time of development [2] allowed the use of bounding box location filters only, and only returns Tweets that have been tagged with Place information derived from the 'fine-grained location' permission enabled by users.

Building on previous work [33, 34, 35], we determined the best solution in order to build a low-latency message queuing and ingestion system was via Google Cloud Pub/Sub, through which we sent the extracted post fields to a Cloud Function written in Python that cleaned and sequenced the data into our preferred format, before inserting it into a BigQuery database. Table 1 for details of the fields included in the imported data.

We gained access to Facebook data through the Crowdtangle platform [3], a Facebook-owned venture which allows access to public post and group data through both visual dashboard tools and an API. In order to harvest Covid-related material, we manually curated lists of important groups, pages and profiles through the web interface. These lists were sorted into both Scotland-only and UK-wide.

---

[1]Exact bounding box parameters [-6.034129, 49.875160, -0.344459, 61.340529]

[2]See https://developer.twitter.com/en/docs/twitter-api/v1/tweets/filter-realtime/api-reference/post-statuses-filter

[3]https://www.crowdtangle.com/

Platform	Field Name	Data Type
Twitter	Message ID	Integer
Twitter	Date Created	Datetime
Twitter	Message Text	String
Twitter	Location (nearest Place)	String
Facebook	Crowdtangle Post ID	String
Facebook	Created Date	Datetime
Facebook	Message Text	String
Facebook	Description Text	String
Facebook	Engagement Stats (likes, reacts, etc.)	Integer

Table 1: Input data formats

A scheduled script was set up to connect to the API, retrieve all lists attached to the project dashboard, retrieve all posts made by lists members during the preceding 24 hours, then directly upload the results to the BigQuery database. Unfortunately, the lack of a streaming interface precludes near-real-time updates, but this frequency of updates was judged to be acceptable by the project team. Since Facebook posts were available for archive retrieval, we collected posts beginning from the 1st of January 2020 at 00:01 GMT.

3.2 Processing

Pre-processing for data was limited to the removal of line ending characters (\n and \r), as well as annotation with a theme ID determined by keyword frequency analysis, drawn from a pre-determined list of themes and keywords. Any messages that could not have a theme label applied to them were tagged with a valence marker that ensured they would not be entered for further analysis, and have not been published in the released dataset.

A set of priority COVID-19 themes and keywords, as displayed in Table 2, was developed in close consultation with public health policy domain experts, led by the Covidtracker project co-Lead, Prof Sheikh at Edinburgh University (member of the Scottish Government's CMO COVID-19 Advisory Group), for potential integration into the Scottish Government framework for decision making[36]. The latter is a policy document setting out the key focus of public health and decision-making bodies when dealing with the pandemic. The COVID-19 themes were also updated in light of public engagement exercises conducted by the government in order to derive priority topics of greatest public interest [37].

A full list of the keywords used to filter for each theme can be found in Appendix A. Note: the themes have a zero-based index for reasons of implementation.

4 Features

4.1 Publication and Hydration

In order to comply with network policies for researchers conducting data collection via the Twitter [38] and Crowdtangle [39] platforms, we are able to share only the IDs of material that we collected. This precludes us from sharing the location or text of our collected posts directly.

There are several tools that will enable researchers to rehydrate this data to return the full content of the post or profile. For Twitter, we note that the DocNow Hydrator [4] and Tweepy Python library [5] can fulfil this function, however the only option for rehydration of Crowdtangle-provided data is to apply for access to the platform and gain access to the official API [6]. Examples of the structure and contents of the data returned from the network endpoints is conatined in Appendices B and C.
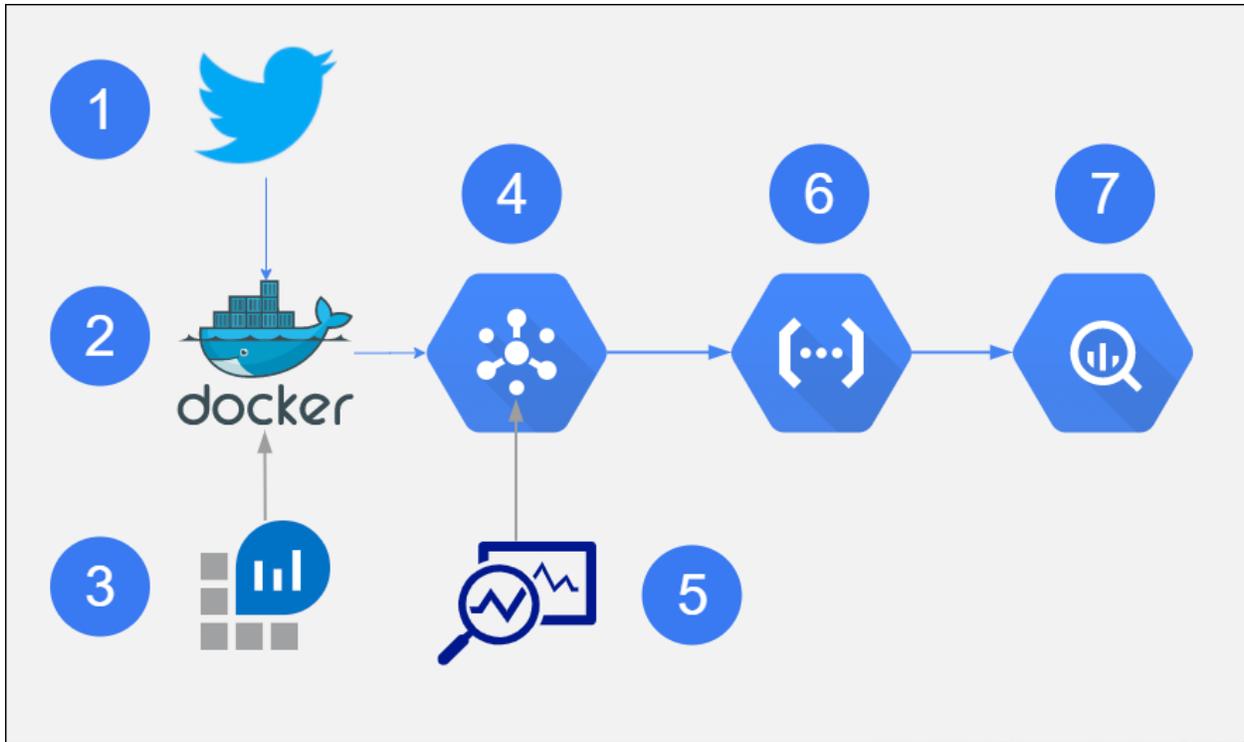
---

[4] https://github.com/DocNow/hydrator
[5] https://www.tweepy.org/
[6] https://github.com/CrowdTangle/API/wiki

Figure 1: Block diagram of Twitter collection pipeline.

1: Twitter streaming API	5: App monitoring and alerting
2: Containerised stream listener app	6: Google Cloud Function
3: Log management	7: BigQuery database
4: Google Pub/Sub subscription	

Note: there are two separate IDs available for Facebook posts via the Crowdtangle API, the platform ID used by Facebook itself, and the Crowdtangle ID, used by the analytics platform. We have provided the Crowdtangle ID in our dataset, and so when hydrating posts the API endpoint `http://api.crowdtangle.com/ctpost/:id` should be used.

4.2 Fields

Table 3 shows the fields included, along with a short description of the contents and the data type.

Number	Theme
0	Test & Protect
1	Shielding
2	Care homes
3	Covid survivors
4	Resumption of health services
5	Mental health & loneliness
6	Trust in Scottish Government
7	Routemap to exit lockdown
8	Impact on BAME population
9	Inequalities
10	Community cohesion/solidarity
11	Education
12	Environment
13	Quality of life
14	Social/Family
15	Leisure/Entertainment
16	Travel
17	Business restrictions
18	Work
19	Hygiene
20	Shopping
21	Unemployment
22	Business growth
23	Other

Table 2: Theme names with associated ID numbers.

References

[1] World Health Organization. Weekly Operational Update on COVID-19 30 October 2020. `https://www.who.int/publications/m/item/weekly-operational-update---30-october-2020`, 2020.

[2] Catrin Sohrabi, Zaid Alsafi, Niamh O'Neill, Mehdi Khan, Ahmed Kerwan, Ahmed Al-Jabir, Christos Iosifidis, and Riaz Agha. World health organization declares global emergency: A review of the 2019 novel coronavirus (covid-19). *International Journal of Surgery*, 2020.

[3] Shuai Wang, Bo Kang, Jinlu Ma, Xianjun Zeng, Mingming Xiao, Jia Guo, Mengjiao Cai, Jingyi Yang, Yaodong Li, Xiangfei Meng, et al. A deep learning algorithm using ct images to screen for corona virus disease (covid-19). *MedRxiv*, 2020.

[4] Allison Bakovic, Kenneth Risner, Nishank Bhalla, Farhang Alem, Theresa L Chang, Warren Weston, Jane A Harness, and Aarthi Narayanan. Brilacidin, a COVID-19 Drug Candidate, Exhibits Potent In Vitro Antiviral Activity Against SARS-CoV-2. *bioRxiv preprint*, page 2020.10.29.352450, oct 2020.

[5] Edward E Walsh, Robert Frenck, Ann R Falsey, Nicholas Kitchin, Judith Absalon, Alejandra Gurtman, Stephen Lockhart, Kathleen Neuzil, Mark J Mulligan, Ruth Bailey, Kena A Swanson, Ping Li, Kenneth Koury, Warren

Feature	Data Type	Description
ID	String	Unique identifier provided by platform
Theme	Integer	ID of theme allocated by keyword analysis, see table 2.

Table 3: Dataset features with data type declaration and description.

Kalina, David Cooper, Camila Fontes-Garfias, Pei-Yong Shi, Özlem Türeci, Kristin R Thompkins, Kirsten E Lyke, Vanessa Raabe, Philip R Dormitzer, Kathrin U Jansen, Uğur Sahin, and William C Gruber. RNA-Based COVID-19 Vaccine BNT162b2 Selected for a Pivotal Efficacy Study. *medRxiv preprint*, page 2020.08.17.20176651, aug 2020.

[6] Jerry Sadoff, Mathieu Le Gars, Georgi Shukarev, Dirk Heerwegh, Carla Truyers, Anna Marit de Groot, Jeroen Stoop, Sarah Tete, Wim Van Damme, Isabel Leroux-Roels, Pieter-Jan Berghmans, Murray Kimmel, Pierre Van Damme, Jan De Hoon, Williams Smith, Kathryn Stephenson, Dan Barouch, Stephen De Rosa, Kristen Cohen, Juliana McElrath, Emmanuel Cormier, Gert Scheper, Jenny Hendriks, Frank Struyf, Macaya Douoguih, Johan Van Hoof, and Hanneke Schuitemaker. Safety and immunogenicity of the Ad26.COV2.S COVID-19 vaccine candidate: interim results of a phase 1/2a, double-blind, randomized, placebo-controlled trial. *medRxiv preprint*, 985871:2020.09.23.20199604, sep 2020.

[7] Saumyabrata Mazumder, Ruchir Rastogi, Avinash Undale, Kajal Arora, Mehrotra Arora, Biswa Pratim, Dilip Kumar, Abyson Joseph, Bhupesh Mali, Vidya Bhushan Arya, Sriganesh Kalyanaraman, Abhishek Mukherjee, Aditi Gupta, Swaroop Potdar, Singha Sourav, Deepak Roy, Jeny Parashar, Kumar Paliwal, Aelia Singh, Apoorva Naqvi, Kumar Srivastava, Devanand Singh, Sarthi Kumar, Satabdi Bansal, Indrajeet Rautray, Pankaj Singh, Bibekanand Fengade, Manish Kumar, Kshipra Saini, Reeshu Jain, Prab-Uddha Gupta, and Kundu # Kumar. PRAK-03202: A triple antigen VLP vaccine candidate against SARS CoV-2. *bioRxiv preprint*, page 2020.10.30.360115, oct 2020.

[8] Shuiqiao Yang, Jiaojiao Jiang, Arindam Pal, Kun Yu, Fang Chen, and Shui Yu. Analysis and Insights for Myths Circulating on Twitter during the COVID-19 Pandemic. *IEEE Open Journal of the Computer Society*, pages 1–1, oct 2020.

[9] Nicolò Gozzi, Michele Tizzani, Michele Starnini, Fabio Ciulla, Daniela Paolotti, André Panisson, and Nicola Perra. Collective Response to Media Coverage of the COVID-19 Pandemic on Reddit and Wikipedia: Mixed-Methods Analysis. *Journal of Medical Internet Research*, 22(10):e21597, jun 2020.

[10] Tianshi Li, Jackie, Yang, Cori Faklaris, Jennifer King, Yuvraj Agarwal, Laura Dabbish, and Jason I. Hong. Decentralized is not risk-free: Understanding public perceptions of privacy-utility trade-offs in COVID-19 contact-tracing apps. *arXiv preprint*, may 2020.

[11] Xin Pei and Deval Mehta. #Coronavirus or #Chinesevirus?!: Understanding the negative sentiment reflected in Tweets with racist hashtags across the development of COVID-19. *arXiv preprint*, may 2020.

[12] Hamada S. Badr, Hongru Du, Maximilian Marshall, Ensheng Dong, Marietta M. Squire, and Lauren M. Gardner. Association between mobility patterns and COVID-19 transmission in the USA: a mathematical modelling study. *The Lancet Infectious Diseases*, 20(11):1247–1254, nov 2020.

[13] Trang VoPham, Matthew Weaver, Jaime Hart, Mimi Ton, Emily White, and Polly Newcomb. Effect of social distancing on COVID-19 incidence and mortality in the US. *medRxiv preprint*, page 2020.06.10.20127589, jun 2020.

[14] Asahi Noguchi. The Economic Costs of Containing a Pandemic. *SSRN Electronic Journal*, jun 2020.

[15] Giovanni Bonaccorsi, Francesco Pierri, Matteo Cinelli, Andrea Flori, Alessandro Galeazzi, Francesco Porcelli, Ana Lucia Schmidt, Carlo Michele Valensise, Antonio Scala, Walter Quattrociocchi, and Fabio Pammolli. Economic and social consequences of human mobility restrictions under COVID-19. *Proceedings of the National Academy of Sciences of the United States of America*, 117(27):15530–15535, apr 2020.

[16] Riti Bahl, Nicole Eikmeier, Alexandra Fraser, Matthew Junge, Felicia Keesing, Kukai Nakahata, and Lily Z. Wang. Modeling COVID-19 Spread in Small Colleges. *arXiv preprint*, aug 2020.

[17] Helena B. Stage, Joseph Shingleton, Sanmitra Ghosh, Francesca Scarabel, Lorenzo Pellis, and Thomas Finnie. Shut and re-open: the role of schools in the spread of COVID-19 in Europe. *arXiv preprint*, jun 2020.

[18] Philipp Wicke and Marianna M. Bolognesi. Framing COVID-19: How we conceptualize and discuss the pandemic on Twitter. *PLoS ONE*, 15(9 October), apr 2020.

[19] Kayvan Kousha and Mike Thelwall. COVID-19 publications: Database coverage, citations, readers, tweets, news, Facebook walls, Reddit posts. *Quantitative Science Studies*, 1(3):1068–1091, apr 2020.

[20] Emily Chen, Kristina Lerman, and Emilio Ferrara. Tracking Social Media Discourse About the COVID-19 Pandemic: Development of a Public Coronavirus Twitter Data Set. *JMIR Public Health and Surveillance*, 6(2):e19273, 2020.

[21] JNU) Rabindra Lamsal (School of Computer and Systems Sciences. CORONAVIRUS (COVID-19) TWEETS DATASET. `https://ieee-dataport.org/open-access/coronavirus-covid-19-tweets-dataset`, 2020.

[22] Dimitar Dimitrov, Erdal Baran, Pavlos Fafalios, Ran Yu, Xiaofei Zhu, Matthäus Zloch, and Stefan Dietze. TweetsCOV19 – A Knowledge Base of Semantically Annotated Tweets about the COVID-19 Pandemic. *arXiv preprint*, jun 2020.

[23] Pavlos Fafalios, Vasileios Iosifidis, Eirini Ntoutsi, and Stefan Dietze. TweetsKB: A Public and Large-Scale RDF Corpus of Annotated Tweets. In *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, volume 10843 LNCS, pages 177–190. Springer Verlag, jun 2018.

[24] Ece C. Mutlu, Toktam Oghaz, Jasser Jasser, Ege Tutunculer, Amirarsalan Rajabi, Aida Tayebi, Ozlem Ozmen, and Ivan Garibay. A Stance Data Set on Polarized Conversations on Twitter about the Efficacy of Hydroxychloroquine as a Treatment for COVID-19. *Data in Brief*, page 106401, oct 2020.

[25] Arkin Dharawat, Ismini Lourentzou, Alex Morales, and ChengXiang Zhai. Drink bleach or do what now? Covid-HeRA: A dataset for risk-informed health decision making in the presence of COVID19 misinformation. *arXiv preprint*, oct 2020.

[26] Yong Hu, Heyan Huang, Anfan Chen, and Xian-Ling Mao. Weibo-COV: A Large-Scale COVID-19 Social Media Dataset from Weibo. *arXiv preprint*, may 2020.

[27] Koosha Zarei, Reza Farahbakhsh, Noel Crespi, and Gareth Tyson. A First Instagram Dataset on COVID-19. *arXiv preprint*, apr 2020.

[28] Michael Zimmer. "But the data is already public": On the ethics of research in Facebook. *Ethics and Information Technology*, 12(4):313–325, dec 2010.

[29] Jacob Metcalf and Kate Crawford. Where are human subjects in Big Data research? The emerging ethics divide. *Big Data and Society*, 3(1), 2016.

[30] Matthew L Williams, Pete Burnap, and Luke Sloan. Towards an Ethical Framework for Publishing Twitter Data in Social Research: Taking into Account Users' Views, Online Context and Algorithmic Estimation. *Sociology*, 51(6):1149–1168, dec 2017.

[31] aline shakti Franzke, Anja Bechmann, Michael Zimmer, and Charles Ess. Internet Research: Ethical Guidelines 3.0. `https://aoir.org/reports/ethics3.pdf`, 2020.

[32] ESRC. ESRC Research Data Policy. `https://esrc.ukri.org/files/about-us/policies-and-standards/esrc-research-data-policy/`, 2018.

[33] Thomas Dehaene. Game of Thrones Twitter Sentiment with Google Cloud Platform and Keras, 2019.

[34] Gabriel Fajardo. Writing a Pub/Sub Stream to BigQuery, 2018.

[35] 47degrees. Twitter Stream to Google PubSub and Google PubSub to Cassandra, 2018.

[36] Gov.scot. Coronavirus (COVID-19): framework for decision making. `https://www.gov.scot/publications/coronavirus-covid-19-framework-decision-making/`, 2020.

[37] Gov.scot. Coronavirus (COVID-19): framework for decision making - overview of public engagement. `https://www.gov.scot/publications/coronavirus-covid-19-framework-decision-making-overview-public-engagement/`, 2020.

[38] Twitter. Developer Policy. `https://developer.twitter.com/en/developer-terms/policy`, 2020.

[39] Naomi Shiffman. Academics & Researchers FAQ. `https://help.crowdtangle.com/en/articles/3323105-academics-researchers-faq`, 2020.

Appendices

A Theme and Keyword Specification

Theme No.	Theme/Class	Keyword/Topic/Idea
0	Test & Protect	TTI, isolate, test trace, test protect, contact tracing, covid testing, self isolation, 14 day isolation, r number
1	Shielding	vulnerable, shielding, high risk, elderly, disability, shielded getting out
2	Care homes	care home, old people home, nursing home, residential care, retirement home
3	Covid survivors	survivor, post-covid lethargy, deaths, long covid, long haulers, recover
4	Resumption of health services	reopen NHS, reopen hospital, reopen GP surgeries, resume dental, reopen dental, non emergency procedure, dentist, health service, routine care, NHS capacity, mammogram, smear test, breast scan, bowel screening, reduction accidents, reduction in viral infections, reduction asthma, blood donations, pregnancy support, non-covid health
5	Mental health & loneliness	depression, anxiety, mood, mental health, wellbeing, lonely, loneliness, social isolation, suicide, self harm, insomnia
6	Trust in Scottish Government	Scotland, Scottish, Scots, Scot Gov, SNP, SG approach, devolved administrations, Nicola Sturgeon, First Minister, Holyrood
7	Routemap to exit lockdown	lockdown, restriction, measures, phase, routemap, mandatory quarantine, guideline, guidance, advice, enforce rules, suppress virus, tackling virus, exit strategy, public compliance, civil liberties, enforcement, freedom, herd immunity, human rights, law, legislation, mass gathering, scientific advice, timeline, circuit breaker
8	Impact on BAME population	racism, ethnicity, minority, ethnicity outcomes, BAME, BME, black, non-white, discrimination, prejudice, disparities, bias, religion, Moslem, Muslim, Islam, Sikh, Hindu, Asian, Indian, Pakistani, Bangladeshi, South Asian, Chinese, Caribbean, Mixed, Multiple, South East Asian, Middle Eastern, Arab, African, Black Caribbean, Black African, Jewish, Jews, ethnic minorities, racial inequality, black ethnic minorities, migrant workforce, xenophobia, hate crime
9	Inequalities	inequalities, rich, well-off, wealthy, working class, homeless, homelessness, poverty, less fortunate, healthy over 70s, older adults, equality, rural communities, digital equality, universal broadband, broadband access, broadband connectivity, vulnerable children, vulnerable families, vulnerable households, vulnerable communities, fair ethical, gender
10	Community cohesion/solidarity	increase xenophobia, crime rate, social stigma, increase racism, community support, increase volunteering, collective solidarity, togetherness, help neighbour, community spirit, rainbows in windows
11	Education	education, school, home schooling, teaching, blended learning, remote learning, online learning, student, pupil, teachers, virtual classes, class size, nursery, university, additional needs children, special needs child, exam
12	Environment	pollution, reduction traffic, green economy, green recovery, waste management, climate impact, environment impact, environment effect, nature impact, nature effect, sustainability, plastic waste, wildlife
13	Quality of life	outdoor exercise, family time, quality of life, life balance, new normal, long term impact, social distancing, stay home

14	Social/Family	visit household, meet household, extended household, gathering, bubble, family visit, family life, social life, social contact, meet friend, see friend, see loved ones, wedding, marriage ceremony, civil partnership, divorce, childcare, places of worship, child adoption, child fostering, domestic abuse, funeral, pets
15	Leisure/Entertainment	gym, golf, tennis, camping, swimming pool, motorcycling, hill-walking, outdoor activities, indoor activities, running, eating out, exercise, fishing, hospitality, horse riding, personal services, haircut, beauty treatment, facial, massage, cinema
16	Travel	drive to exercise, car journeys, holiday plans, holiday abroad, caravan site, visit second home, self-catering, camping, hotel, public transport, travel, tourism, border control, border check, plane, airport, bus, tram, train, air bridge
17	Business restrictions	garden centre, barber, hairdresser, beauty salon, recycling centre, property market, construction work, construction site, pub, business damage, cafe, restaurant, shop, retail, shopping centers, nightclub, music venue, theater, concert, business re-opening, body piercing, dog grooming, soft play centre, small business, business restriction, curfew
18	Work	home working, work from home, remote work, office work, key worker, healthcare worker, workplace, employees, early retirement, self employed
19	Hygiene	handwashing, sanitiser, mask, face covering, facial covering, PPE, public hygiene, hygiene standards, hand hygiene
20	Shopping	cashless, contactless, online shopping, home delivery, supermarkets, shopping trip, shopping habits, high street shops
21	Unemployment	job loss, unemployed, unemployment, made redundant, jobseeker, benefits, furlough, social security, dole, economic uncertainty, basic income, universal credit, deprivation, low income
22	Business growth	economic recovery, business support, economy, economic impact, business recovery, sector, industry
23	Other	points system, renew, security risk, service return, statistics, transition, transition arrangements

B   Twitter Data Format

The following is an example of the JSON-formatted response data returned by a request to hydrate an ID via the Twitter API [7].

```
 1       {
 2         "created_at": "Wed Oct 10 20:19:24 +0000 2018",
 3         "id": 1050118621198921728,
 4         "id_str": "1050118621198921728",
 5         "text": "To make room for more expression, we will now count all
               emojis as equal-including those with gender and skin t... https:
               //t.co/MkGjXf9aXm",
 6         "truncated": true,
 7         "entities": {
 8           "hashtags": [],
 9           "symbols": [],
10           "user_mentions": [],
11           "urls": [
12             {
13               "url": "https://t.co/MkGjXf9aXm",
14               "expanded_url": "https://twitter.com/i/web/status/105011862119
                   8921728",
15               "display_url": "twitter.com/i/web/status/1...",
16               "indices": [
17                 117,
18                 140
19               ]
20             }
21           ]
22         },
23         "source": "<a href=\"http://twitter.com\" rel=\"nofollow\">Twitter Web
               Client</a>",
24         "in_reply_to_status_id": null,
25         "in_reply_to_status_id_str": null,
26         "in_reply_to_user_id": null,
27         "in_reply_to_user_id_str": null,
28         "in_reply_to_screen_name": null,
29         "user": {
30           "id": 6253282,
31           "id_str": "6253282",
32           "name": "Twitter API",
33           "screen_name": "TwitterAPI",
34           "location": "San Francisco, CA",
35           "description": "The Real Twitter API. Tweets about API changes,
               service issues and our Developer Platform. Don't get an answer?
               It's on my website.",
36           "url": "https://t.co/8IkCzCDr19",
37           "entities": {
38             "url": {
39               "urls": [
40                 {
41                   "url": "https://t.co/8IkCzCDr19",
42                   "expanded_url": "https://developer.twitter.com",
43                   "display_url": "developer.twitter.com",
44                   "indices": [
45                     0,
46                     23
47                   ]
```

---

[7]Obtained in response to GET https://api.twitter.com/1.1/statuses/show.json?id=210462857140252672

```
48                    }
49                  ]
50                },
51                "description": {
52                  "urls": []
53                }
54              },
55              "protected": false,
56              "followers_count": 6128663,
57              "friends_count": 12,
58              "listed_count": 12900,
59              "created_at": "Wed May 23 06:01:13 +0000 2007",
60              "favourites_count": 32,
61              "utc_offset": null,
62              "time_zone": null,
63              "geo_enabled": null,
64              "verified": true,
65              "statuses_count": 3659,
66              "lang": "null",
67              "contributors_enabled": null,
68              "is_translator": null,
69              "is_translation_enabled": null,
70              "profile_background_color": "null",
71              "profile_background_image_url": "null",
72              "profile_background_image_url_https": "null",
73              "profile_background_tile": nulll,
74              "profile_image_url": "null",
75              "profile_image_url_https": "https://pbs.twimg.com/profile_images/9
                  42858479592554497/BbazLO9L_normal.jpg",
76              "profile_banner_url": "https://pbs.twimg.com/profile_banners/62532
                  82/1497491515",
77              "profile_link_color": "null",
78              "profile_sidebar_border_color": "null",
79              "profile_sidebar_fill_color": "null",
80              "profile_text_color": "null",
81              "profile_use_background_image": null,
82              "has_extended_profile": null,
83              "default_profile": false,
84              "default_profile_image": false,
85              "following": nul,
86              "follow_request_sent": null,
87              "notifications": null,
88              "translator_type": "null"
89            },
90            "geo": null,
91            "coordinates": null,
92            "place": null,
93            "contributors": null,
94            "is_quote_status": false,
95            "retweet_count": 161,
96            "favorite_count": 296,
97            "favorited": false,
98            "retweeted": false,
99            "possibly_sensitive": false,
100           "possibly_sensitive_appealable": false,
101           "lang": "en"
102       }
```

C   Facebook Data Format

The following is an example of the JSON-formatted response returned to a query against the Crowdtangle /posts/:id API endpoint[8].

```
1      {
2      "status": 200,
3      "result": {
4          "posts": [
5              {
6                  "platformId": "47657117525_10154014482272526",
7                  "platform": "Facebook",
8                  "date": "2016-02-12 23:38:14",
9                  "updated": "2020-08-23 05:48:22",
10                 "type": "live_video_complete",
11                 "message": "Draymond at Foot Locker for #NBAAllStarTO with
                       a special shoutout to #DubNation.",
12                 "expandedLinks": [
13                     {
14                         "original": "https://www.facebook.com/warriors/
                               videos/10154014482272526/",
15                         "expanded": "https://www.facebook.com/warriors/
                               videos/10154014482272526/"
16                     }
17                 ],
18                 "link": "https://www.facebook.com/warriors/videos/10154014
                       482272526/",
19                 "postUrl": "https://www.facebook.com/warriors/posts/101540
                       14482272526",
20                 "subscriberCount": 6041837,
21                 "score": 4.750579867017164,
22                 "media": [
23                     {
24                         "type": "video",
25                         "url": "https://video-sea1-1.xx.fbcdn.net/v/t42.17
                               90-29/12718926_1213464465334694_1083747983_n.mp
                               4?_nc_cat=109&_nc_sid=985c63&efg=eyJybHIiOjQ0
                               MiwicmxhIjoxNDIwLCJ2ZW5jb2RlX3RhZyI6InYyXzQwMF9
                               jcmZfMjdfbWFpbl8zLjBfc2QifQ%3D%3D&_nc_ohc=e7Ygz
                               2qv-24AX-wSWX2&rl=442&vabr=246&_nc_ht=video-sea
                               1-1.xx&oh=889e0d776d92a84bb57099cad3d28d55&oe=5
                               F43C879",
26                         "height": 0,
27                         "width": 0
28                     },
29                     {
30                         "type": "photo",
31                         "url": "https://scontent-sea1-1.xx.fbcdn.net/v/t15
                               .5256-10/12526285_831341603658336_1493677499_n.
                               jpg?_nc_cat=101&_nc_sid=1055be&_nc_ohc=DH0
                               vfblGwtIAX_x8SBs&_nc_ht=scontent-sea1-1.xx&oh=b
                               09d6378fa261fd45345e79c50c254cb&oe=5F696BE1",
32                         "height": 400,
33                         "width": 400,
34                         "full": "https://scontent-sea1-1.xx.fbcdn.net/v/t1
                               5.5256-10/12526285_831341603658336_1493677499_n
                               .jpg?_nc_cat=101&_nc_sid=1055be&_nc_ohc=DH0
```

---

[8]Response to GET https://api.crowdtangle.com/post/47657117525_10154014482272526?token=TOKEN

```
                                        vfblGwtIAX_x8SBs&_nc_ht=scontent-sea1-1.xx&oh=b
                                        09d6378fa261fd45345e79c50c254cb&oe=5F696BE1"
35                          }
36                      ],
37                  "statistics": {
38                      "actual": {
39                          "likeCount": 24235,
40                          "shareCount": 753,
41                          "commentCount": 5675,
42                          "videoPostViewCount": 0,
43                          "videoTotalViewCount": 244885,
44                          "videoAllCrosspostsViewCount": 0,
45                          "loveCount": 33,
46                          "wowCount": 18,
47                          "hahaCount": 3,
48                          "sadCount": 0,
49                          "angryCount": 5,
50                          "thankfulCount": 0,
51                          "careCount": 0
52                      },
53                      "expected": {
54                          "likeCount": 3927,
55                          "shareCount": 279,
56                          "commentCount": 1041,
57                          "videoPostViewCount": 113445,
58                          "videoTotalViewCount": 118592,
59                          "loveCount": 1046,
60                          "wowCount": 94,
61                          "hahaCount": 45,
62                          "sadCount": 14,
63                          "angryCount": 19,
64                          "thankfulCount": 0,
65                          "careCount": 2
66                      }
67                  },
68                  "account": {
69                      "id": 19889,
70                      "name": "Golden State Warriors",
71                      "handle": "warriors",
72                      "profileImage": "https://scontent-sea1-1.xx.fbcdn.net/
                            v/t1.0-1/p200x200/74788912_10158146665972526_354522
                            0405897723904_n.jpg?_nc_cat=1&ccb=2&_nc_sid=dbb9e7&
                            _nc_ohc=9snUpG_pdlQAX90IhWM&_nc_ht=scontent-sea1-1.
                            xx&tp=6&oh=f8a3d3b62b507966ecc68de3b557fe84&oe=5FBF
                            1185",
73                      "subscriberCount": 11580228,
74                      "url": "https://www.facebook.com/47657117525",
75                      "platform": "Facebook",
76                      "platformId": "47657117525",
77                      "accountType": "facebook_page",
78                      "pageAdminTopCountry": "US",
79                      "verified": true
80                  },
81                  "videoLengthMS": 307968,
82                  "liveVideoStatus": "completed",
83                  "newId": "19889|10154014482272526",
84                  "id": 1686762829
85              }
86          ]
```

```
87        }
88 }
```