Mobile Computing Practical

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Aim- Design a program on ‘Social Networks combating COVID-19’

Theory-

We analyze engagement and interest in the COVID-19 topic and provide a differential assessment on the evolution of the discourse on a global scale for each platform and their users. We address the diffusion of information about the COVID-19 with a massive data analysis on Twitter, Instagram, YouTube, Reddit and Gab. We fit information spreading with epidemic models characterizing the basic reproduction number for each social media platform. Moreover, we identify information spreading from questionable sources, finding different volumes of misinformation in each platform. However, information from both reliable and questionable sources do not present different spreading patterns. Finally, we provide platform-dependent numerical estimates of rumors’ amplification.

The World Health Organization (WHO) defined the SARS-CoV-2 virus outbreak as a severe global threat[1]. As foreseen in 2017 by the global risk report of the World Economic forum, global risks are interconnected. In particular, the case of the COVID-19 epidemic (the infectious disease caused by the most recently discovered human coronavirus) is showing the critical role of information diffusion in a disintermediated news cycle[2].

The term info emic has been coined to outline the perils of misinformation phenomena during the management of disease outbreaks, since it could even speed up the epidemic process by influencing and fragmenting social response. As an example, CNN has recently anticipated a rumor about the possible lock-down of Lombardy (a region in northern Italy) to prevent pandemics, publishing the news hours before the official communication from the Italian Prime Minister. As a result, people overcrowded trains and airports to escape from Lombardy toward the southern regions before the lock-down was put in place, disrupting the government initiative aimed to contain the epidemics and potentially increasing contagion. Thus, an important research challenge is to determine how people seek or avoid information and how those decisions affect their behavior, particularly when the news cycle—dominated by the disintermediated diffusion of information—alters the way information is consumed and reported on.

The case of the COVID-19 epidemic shows the critical impact of this new information environment. The information spreading can strongly influence people’s behavior and alter the effectiveness of the countermeasures deployed by governments. To this respect, models to forecast virus spreading are starting to account for the behavioral response of the population with respect to public health interventions and the communication dynamics behind content consumption.

Social media platforms such as YouTube and Twitter provide direct access to an unprecedented amount of content and may amplify rumors and questionable information. Taking into account users’ preferences and attitudes, algorithms mediate and facilitate content promotion and thus

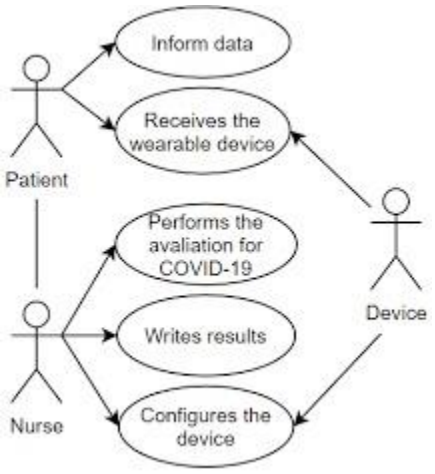
information spreading. This shift from the traditional news paradigm profoundly impacts the construction of social perceptions and the framing of narratives; it influences policy-making, political communication, as well as the evolution of public debate, especially when issues are controversial. Users online tend to acquire information adhering to their worldviews, to ignore dissenting information and to form polarized groups around shared narratives. Furthermore, when polarization is high, misinformation might easily proliferate. Some studies pointed out that fake news and inaccurate information may spread faster and wider than fact-based news. However, this might be platform-specific effect. The definition of "Fake News" may indeed be inadequate since political debate often resorts to labelling opposite news as unreliable or fake. Studying the effect of the social media environment on the perception of polarizing topics is being addressed also in the case of COVID-19. The issues related to the current endemics are indeed being tackled by the scientific literature from multiple perspectives including the dynamics of hate speech and conspiracy theories , the effect of bots and automated accounts, and the threats of misinformation in terms of diffusion and opinions formation

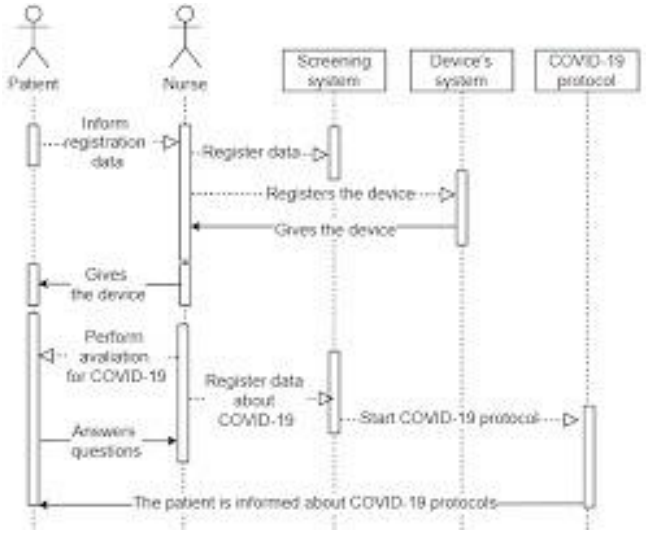
In this work we provide an in-depth analysis of the social dynamics in a time window where narratives and moods in social media related to the COVID-19 have emerged and spread. While most of the studies on misinformation diffusion focus on a single platform, the dynamics behind information consumption might be particular to the environment in which they spread on. Consequently, in this paper we perform a comparative analysis on five social media platforms (Twitter, Instagram, YouTube, Reddit and Gab) during the COVID-19 outbreak. The dataset includes more than 8 million comments and posts over a time span of 45 days. We analyze user engagement and interest about the COVID-19 topic, providing an assessment of the discourse evolution over time on a global scale for each platform. Furthermore, we model the spread of information with epidemic models, characterizing for each platform its basic reproduction number (R0R0), i.e. the average number of secondary cases (users that start posting about COVID-19) an "infectious" individual (an individual already posting on COVID-19) will create. In epidemiology, R0R0 = 1 is a threshold parameter. When R0<1R0<1 the disease will die out in a finite period of time, while the disease will spread for R0>1R0>1. In social media, R0>1R0>1 will indicate the possibility of an info emic.

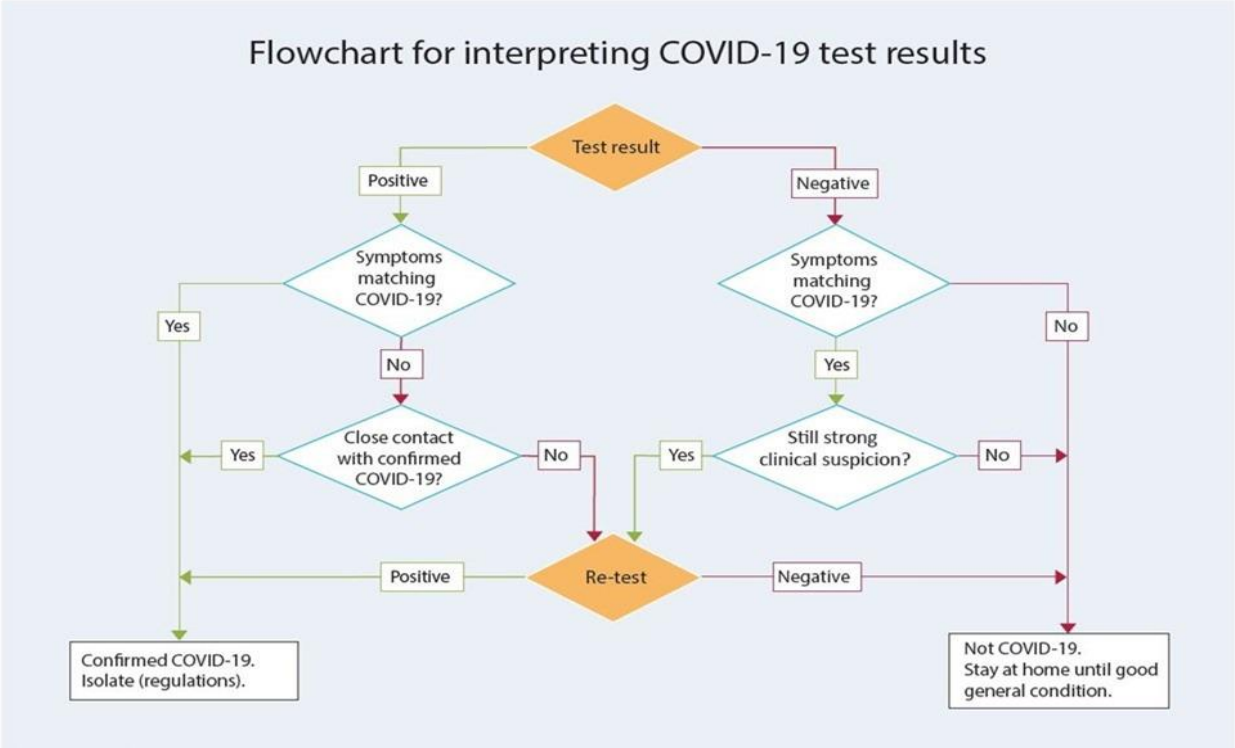
Finally, coherently with the classification provided by the fact-checking organization Media Bias/Fact Check that classifies news sources based on the truthfulness and bias of the information published, we split news outlets into two groups. These groups are either associated to the diffusion of (mostly) reliable or (mostly) questionable contents and we characterize the spreading of information regarding COVID-19 relying on this classification. We find that users in mainstream platforms are less susceptible to the diffusion of information from questionable sources and that information deriving from news outlets marked either as reliable or questionable do not present significant difference in the way it spreads.

Our findings suggest that the interaction patterns of each social media combined with the peculiarity of the audience of each platform play a pivotal role in information and misinformation spreading. We conclude the paper by measuring rumor's amplification parameters for COVID-19 on each social media platform.

Diagram:


Inform data
Receives the wearable device
Patient
Performs the avaliation for COVID-19
Writes results
Configures the device
Nurse
Device


Patient
Nurse
Screening system
Device's system
COVID-19 protocol
Inform registration data
Register data
Registers the device
Gives the device
Gives the device
Perform avaliation for COVID-19
Register data about COVID-19
Start COVID-19 protocol
Answers questions
The patient is informed about COVID-19 protocols



Code-

```
<?xml version="1.0" encoding="utf-8"?>

<resources>

    <color name="colorPrimary">#42C14B</color>

    <color name="colorPrimaryDark">#3BC545</color>

    <color name="colorAccent">#05af9b</color>


    <color name="color_one">#fb7268</color>

    <color name="color_white">#ededf2</color>

</resources>
```

/ Volley library

```
  implementation 'com.android.volley:volley:1.1.1'
```

```
<!--Allow Internet Permission-->
   <uses-permission android:name="android.permission.INTERNET" />
```

maincovid.xml

```
<?xml version="1.0" encoding="utf-8"?>
<ScrollView
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:background="@color/color_white"
    android:orientation="vertical"
    tools:context=".MainActivity">



    <!--Linear Layout to display all the details-->
    <LinearLayout
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:padding="20dp"
        android:orientation="vertical">
```

```
<!--Text view to display Global stats-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="Global Stats"
    android:textColor="#050505"
    android:textAllCaps="true"
    android:textAlignment="center"
    android:textSize="35sp"
    android:textStyle="bold"/>

    <!--Text view to display Total Cases-->
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:fontFamily="sans-serif-light"
        android:layout_marginTop="20dp"
        android:text="Total Cases"
        android:textAlignment="center"
        android:textStyle="bold"
        android:textSize="30sp"/>

    <!--Text view to display the updated number when data
     will fetch from the API. For now default set to 0 -->
    <TextView
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:text="0"
```

```
        android:id="@+id/tvCases"
        android:textAlignment="center"
        android:textSize="25sp"
        android:textColor="@color/color_one"
        android:textStyle="bold"
        android:fontFamily="sans-serif-light" />

<!--Text view to display Recovered Cases-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Recovered"
    android:textAlignment="center"
    android:textStyle="bold"
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvRecovered"
    android:textAlignment="center"
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
```

```
    android:fontFamily="sans-serif-light" />

<!--Text view to display Critical Cases-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Critical"
    android:textAlignment="center"
    android:textStyle="bold"
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvCritical"
    android:textAlignment="center"
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
    android:fontFamily="sans-serif-light" />

<!--Text view to display Active Cases-->
<TextView
    android:layout_width="match_parent"
```

```
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Active"
    android:textAlignment="center"
    android:textStyle="bold"
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvActive"
    android:textAlignment="center"
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
    android:fontFamily="sans-serif-light" />

<!--Text view to display Today Cases-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Today Cases"
    android:textAlignment="center"
    android:textStyle="bold"
```

```
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvTodayCases"
    android:textAlignment="center"
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
    android:fontFamily="sans-serif-light" />

<!--Text view to display Total Deaths-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Total Deaths"
    android:textAlignment="center"
    android:textStyle="bold"
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
```

```
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvTotalDeaths"
    android:textAlignment="center"
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
    android:fontFamily="sans-serif-light" />

<!--Text view to display Today Deaths-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Today Deaths"
    android:textAlignment="center"
    android:textStyle="bold"
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvTodayDeaths"
    android:textAlignment="center"
```

```
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
    android:fontFamily="sans-serif-light" />

<!--Text view to display Affected Countries-->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:fontFamily="sans-serif-light"
    android:text="Affected Countries"
    android:textAlignment="center"
    android:textStyle="bold"
    android:textSize="30sp"/>

<!--Text view to display the updated number when data
 will fetch from the API. For now default set to 0 -->
<TextView
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:text="0"
    android:id="@+id/tvAffectedCountries"
    android:textAlignment="center"
    android:textSize="25sp"
    android:textColor="@color/color_one"
    android:textStyle="bold"
    android:fontFamily="sans-serif-light" />
```

```
        </LinearLayout>


</ScrollView>
```

Java File

```
/ Create a String request using Volley Library


String url = "https:// corona.lmao.ninja/v2/all";


StringRequest request
    = new StringRequest(
        Request.Method.GET,
        url,
        new Response.Listener() {
            @Override
            public void onResponse(
                String response)
            {
            }
        },
        new Response.ErrorListener() {
            @Override
            public void onErrorResponse(
                VolleyError error)
            {
            }
        });


RequestQueue requestQueue
```

```
    = Volley.newRequestQueue(this);
requestQueue.add(request);
try {
    // Creating object of JSONObject
    JSONObject jsonObject
        = new JSONObject(
            response.toString());

    // Set the data in text view
    // which are available in JSON format
    // Note that the parameter
    // inside the getString() must match
    // with the name given in JSON format
    tvCases.setText(
        jsonObject.getString("cases"));
    tvRecovered.setText(
        jsonObject.getString("recovered"));
    tvCritical.setText(
        jsonObject.getString("critical"));
    tvActive.setText(
        jsonObject.getString("active"));
    tvTodayCases.setText(
        jsonObject.getString("todayCases"));
    tvTotalDeaths.setText(
        jsonObject.getString("deaths"));
    tvTodayDeaths.setText(
        jsonObject.getString("todayDeaths"));
    tvAffectedCountries.setText(
```

```
        jsonObject.getString("affectedCountries"));
}
catch (JSONException e) {
    e.printStackTrace();
Toast.makeText(MainActivity.this,
            error.getMessage(),
            Toast.LENGTH_SHORT)
    .show();
```

Results

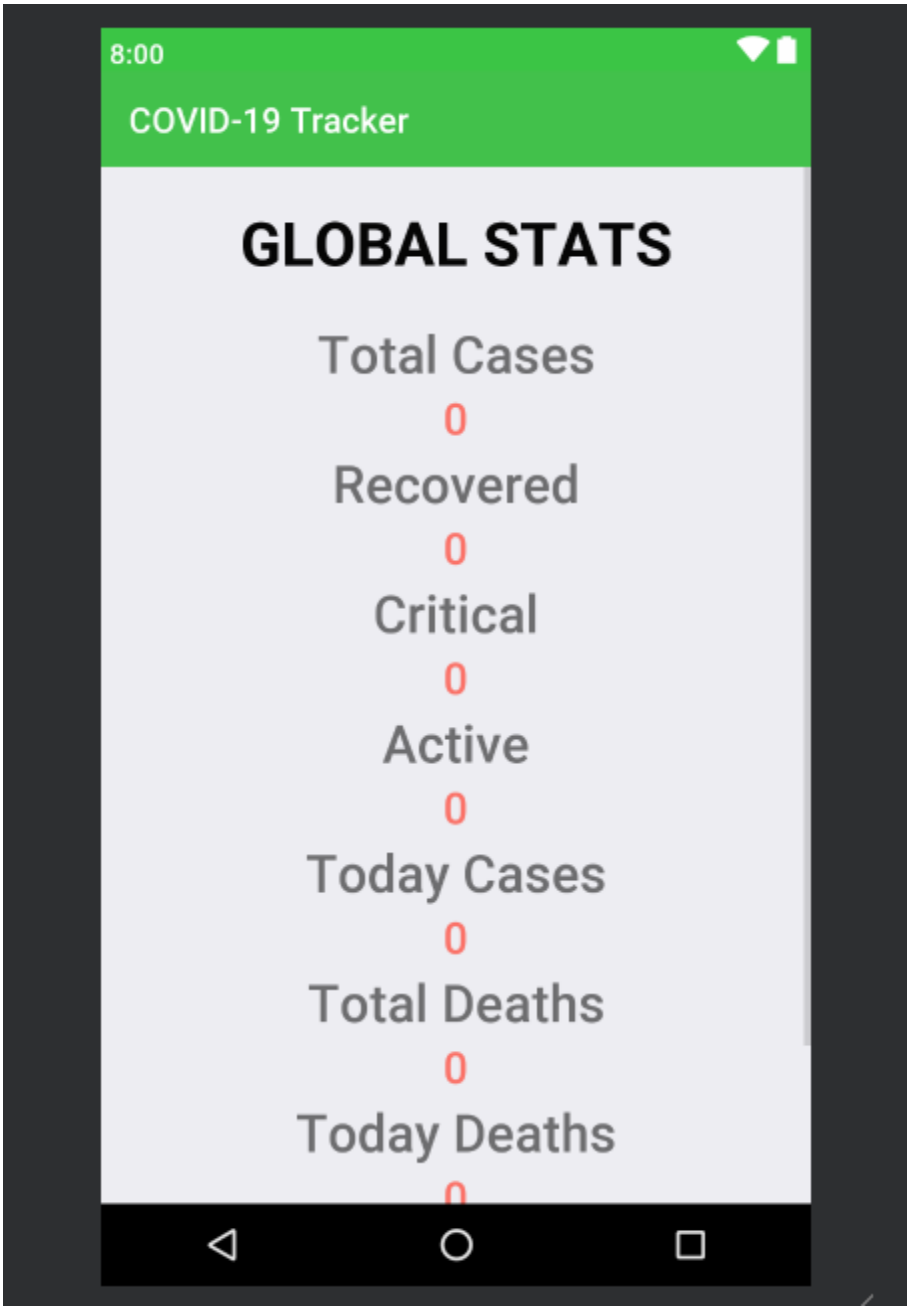
We analyze mainstream platforms such as Twitter, Instagram and YouTube as well as less regulated social media platforms such as Gab and Reddit. Gab is a crowdfunded social media whose structure and features are Twitter-inspired. It performs very little control on content posted; in the political spectrum, its user base is considered to be far-right. Reddit is an American social news aggregation, web content rating, and discussion website based on collective filtering of information.

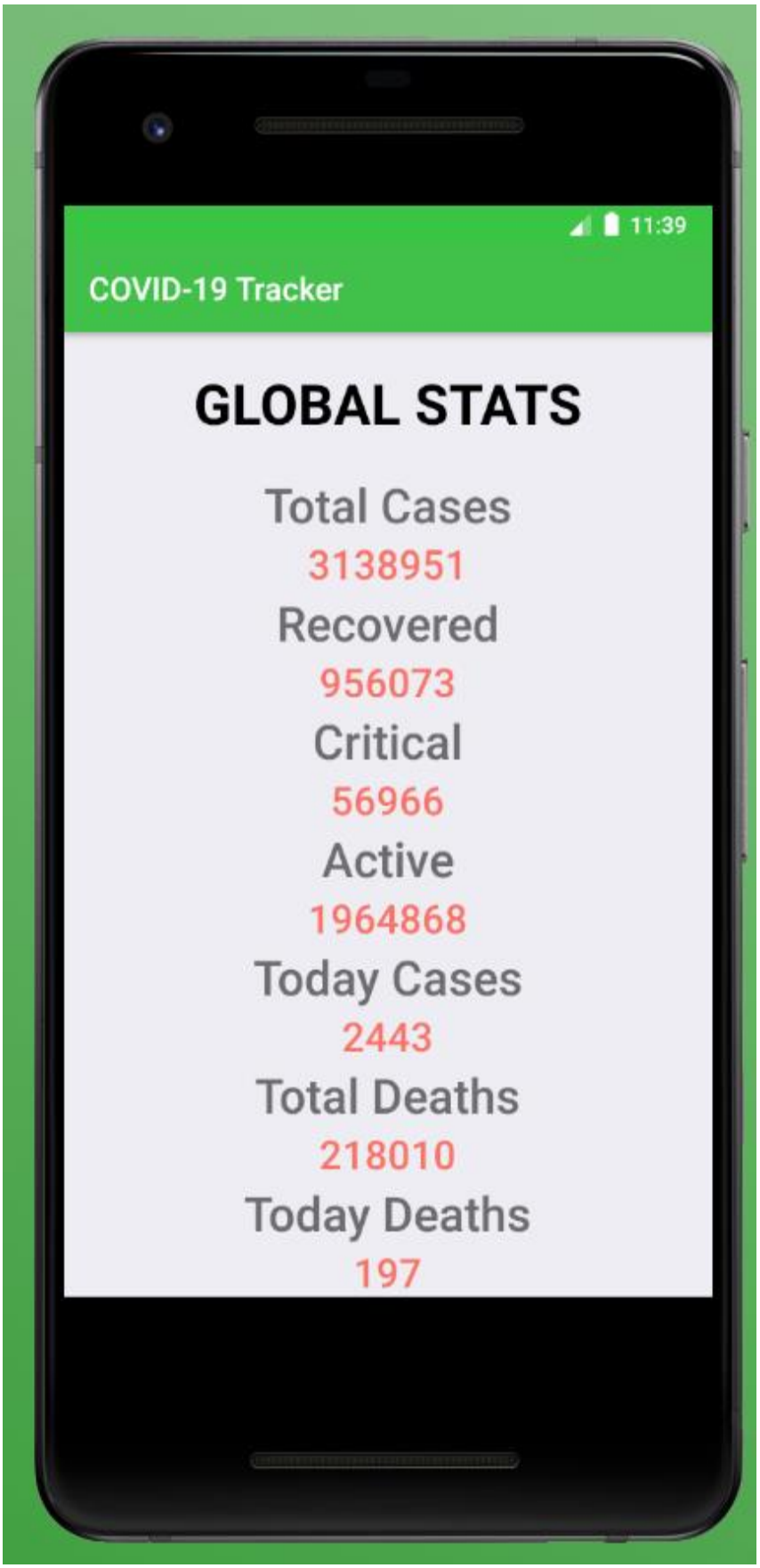
We perform a comparative analysis of information spreading dynamics around the same argument in different environments having different interaction settings and audiences. We collect all pieces of content related to COVID-19 from the 1st of January to the 14th of February. Data have been collected filtering contents accordingly to a selected sample of Google Trends' COVID-19 related queries such as: *coronavirus*, *coronavirusoutbreak*, *imnotavirus*, *ncov*, *ncov-19*, *pandemic*, *wuhan*. The deriving dataset is then composed of 1,342,103 posts and 7,465,721 comments produced by 3,734,815 users. For more details regarding the data collection refer to Methods.

Interaction patterns

First, we analyze the interactions (i.e., the engagement) that users have with COVID-19 topics on each platform. The upper panel of Fig. 1 shows users' engagement around the COVID-19 topic. Despite the differences among platforms, we observe that they all display a rather similar distribution of the users' activity characterized by a long tail. This entails that users behave similarly for what concern the dynamics of reactions and content consumption. Indeed, users' interactions with the COVID-19 content present attention patterns similar to any other topic35. The highest volume of interactions in terms of posting and commenting can be observed on mainstream platforms such as YouTube and Twitter.

Output:


8:00
COVID-19 Tracker
GLOBAL STATS
Total Cases
0
Recovered
0
Critical
0
Active
0
Today Cases
0
Total Deaths
0
Today Deaths
0


11:39
COVID-19 Tracker
GLOBAL STATS
Total Cases
3138951
Recovered
956073
Critical
56966
Active
1964868
Today Cases
2443
Total Deaths
218010
Today Deaths
197