COVID-19

How is MagicBox involved in the response?
NYC social distancing

Mobility being reduced in NYC in the last days significantly.
Average Radius of movement almost halved.
Average number of contacts from 8 to 5.5 (Wuhan lowered it from 10 to 2)
**Larger NYC**

Evident drop of movements

Data from: Cuebiq
Analysis by: Esteban Moro, MIT & UC3M
Predicting spread: Global flight traffic

Thanks to Amadeus*, through MagicBox, UNICEF has access to global flight data, at airport level, including origin-final destination as well as intermediary legs.

Data is on a weekly resolution, updated every monthly, with about 20 days of delay after the month ends.

*Amadeus: major IT provider for global travel
Global spread

Globally the disease moves through the flight network. Countries “closer” to China and affected countries from a travel network perspective show introduction of cases earlier.

Order of CoViD introduction over travel network: The more central in the network the earlier the country gets cases

Size of node: how early cases detected
Size of edge: volume of travelers between countries
Label: [Order of first case detected] [country code]

This network analysis of the disease allowed us to do risk mapping and forecasting…
CAIRO – 14 February 2020: Egypt’s Health Ministry announced, Friday first Coronavirus infection for a ‘Chinese’ national in Egypt.
https://www.egypttoday.com/Article/1/81641/Egypt-announces-first-Coronavirus-infection

MagicBox January models with flight data from Amadeus showed Egypt as the most common destination of passengers from China, putting it in the top list of countries at risk in Africa.
But our efforts have since shifted towards understanding the secondary impacts of the response

- what effect will the closing of schools have on our societies?
- what effect will closed factories have?
- what about panic?

1. Doing proof-of-concepts to quantify these
2. Scaling up our data science capacity
Proof-of-concepts
In week 4 China already shows a sharp decrease of passengers flying within country.

Over 700,000 less than expected in week 4.

More than 1.3 Million less than expected in week 5

Data from Amadeus
New data: approx 26th March
The decrease of movement in China during week 5 can be pinned down to **Wuhan lockdown** (23 Jan 2020).

More than 150,000 travelers less, compared to the same week of 2019 (despite the overall great increase of domestic travelers over 2019).

*Data from Amadeus*

*New data: approx 26th March*
Through a partnership with Cuebiq (a private company) we have access to data about visitation patterns of Points of Interest in lower Manhattan. New data expected to cover cities in more than 8 countries.

Data from: Cuebiq
Analysis by: Laura Alessandretti, DTU
Starting earlier in Chinatown

Chinatown vs Lower Manhattan

Chinatown

Lock down of Wuhan (immediate effect on visitors to chinatown)

Fewer visitors for Chinese new year

Rest of Lower Manhattan

Change in visitors first after WHO declares the outbreak an International emergency

Data from: Cuebiq
Analysis by: Laura Alessandretti, DTU
Prices of PPE in the US have been rising
Out of stock since early in the epidemic. Huge rise from 3rd party sellers. Small drop in prices recently from the high panic peak.

Jan 21st First case detected in US

Analysis by: Esteban Moro, MIT & UC3M

Data: Amazon prices from Camelcamelcamel.com
New data: Waiting for partnership agreement
School closures
Exploring news monitoring to map school closures

Data from GDELT.
Next update: Daily
Border closures
Exploring similar techniques for news related to closing borders
Search patterns

Background

When people search on Google for a term the search engine offers a list of suggestion to autocomplete the query

The suggestions are a prediction, based on what people are looking for and what other people have already searched for
USA (New York)

- Coronavirus is
- Coronavirus is it contagious
- Coronavirus is man made
- Coronavirus is not new
- Coronavirus is airborne
- Coronavirus is it dangerous
- Coronavirus is it safe to fly
- Coronavirus is it curable
- Coronavirus is a bioweapon
- Coronavirus is it fatal
- Coronavirus is it safe to travel

- Coronavirus update
- Coronavirus nyc
- Coronavirus symptoms
- Coronavirus new york
- Coronavirus Italy
- Coronavirus death toll
- Coronavirus vaccine
- Coronavirus cure
- Coronavirus death rate
- Coronavirus vs flu
Hong Kong

<table>
<thead>
<tr>
<th>coronavirus*</th>
</tr>
</thead>
<tbody>
<tr>
<td>冠状病毒</td>
</tr>
<tr>
<td>冠状病毒 口罩  (coronavirus mask)</td>
</tr>
<tr>
<td>冠状病毒 蝙蝠  (coronavirus bat)</td>
</tr>
<tr>
<td>冠状病毒 夏天  (coronavirus summer)</td>
</tr>
<tr>
<td>冠状病毒 抗体  (coronavirus antibody)</td>
</tr>
<tr>
<td>冠状病毒 狗    (coronavirus dog)</td>
</tr>
<tr>
<td>冠状病毒 药    (coronavirus drugs)</td>
</tr>
<tr>
<td>冠状病毒 治疗  (coronavirus treatment)</td>
</tr>
<tr>
<td>冠状病毒 上海  (coronavirus Shanghai)</td>
</tr>
<tr>
<td>冠状病毒 是什么 (what is coronavirus)</td>
</tr>
<tr>
<td>冠状病毒 抵抗力 (coronavirus resistance)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>coronavirus*</th>
</tr>
</thead>
<tbody>
<tr>
<td>冠状病毒</td>
</tr>
<tr>
<td>冠状病毒 口罩  (coronavirus mask)</td>
</tr>
<tr>
<td>冠状病毒 蝙蝠  (coronavirus bat)</td>
</tr>
<tr>
<td>冠状病毒 夏天  (coronavirus summer)</td>
</tr>
<tr>
<td>冠状病毒 抗体  (coronavirus antibody)</td>
</tr>
<tr>
<td>冠状病毒 狗    (coronavirus dog)</td>
</tr>
<tr>
<td>冠状病毒 药    (coronavirus drugs)</td>
</tr>
<tr>
<td>冠状病毒 治疗  (coronavirus treatment)</td>
</tr>
<tr>
<td>冠状病毒 上海  (coronavirus Shanghai)</td>
</tr>
<tr>
<td>冠状病毒 是什么 (what is coronavirus)</td>
</tr>
<tr>
<td>冠状病毒 抵抗力 (coronavirus resistance)</td>
</tr>
</tbody>
</table>

* "coronavirus_"

* "coronavirus"

-space

(potential mis-information)

(people want information)
Brazil

coronavirus is contagious, dangerous, and serious. Coronavirus is transmitted by what animal? It infects humans. Ribeirão Preto is a city in São Paulo state, with a new suspected case in Brazil. Has a cure?
Prices on PPE

Even though masks are not recommended by WHO, they have been going out of stock in the US since late Jan.

Big spike in 3rd party sellers' cost in the last week

Data from camelcamelcamel.com
Analysis by MIT
Next update: No partnership established with Amazon or similar data provider. Manual updates from MIT group in http://moribus.media.mit.edu/impact_demand/
We can compare historically

For example, hand sanitizer in the US had not seen a peak this high since 2015.

Data from: Camelcamelcamel.com
Analysis by: Esteban Moro, MIT & UC3M
Monitoring COVID social media chat

Where do we have tweets from (2020-02-10 to 2020-02-17)

Next update: on hold until UNGP is able to extend agreement limitations on Volume
If we compare to number of tweets per capita the picture is a bit different
If we zoom in, we see that Hong Kong is among the places with most tweets per capita.
How much do people tweet about the coronavirus?

WHO declares the outbreak a Global Health Emergency

First case in the US

Next update: on hold until UNGP is able to extend agreement limitations on Volume

Data from Twitter
Which websites are the most popular

Data from 2020-02-10 to 2020-02-17. **Youtube main source of CoVID related links shared**
Websites compete for attention

WHO declares the outbreak a Global Health Emergency
Websites compete for attention

Driven by three videos being massively shared

1. “Diamond Princess is a COVID-19 production machine. Why did you get out of the boat in a day?”

2. “Chinese scientists says COVID-19/coronavirus could have originated from government ... ”

3. “Diamond Princess is COVID-19 mill. How I got in the ship and was removed from it within one day.”

Since then they have all been removed from YouTube!
What languages do people tweet in?

*Caveat: keywords are in english

WHO declares the outbreak a Global Health Emergency

Increase of cases in Italy
What are people talking about?
Finding topics in conversations on social media

German cluster

Spanish cluster

WHO & hand washing cluster
What do we need

- 3-4 more researchers / data scientists on staff
- 1 Sysadmin/Data engineer to manage data/platform
- A dedicated focal point in PFP for data for emergencies
- A briefing to relevant senior management
- Partnerships with Mobile Network Operators / other corporates, where they provide their data to us (see deck on MNO asks)