**CASE STUDY: Responsible AI** 

# COVID-19 Community Mobility Reports

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Google		COVID-19 Comm**	
Louisiana Mar	ch 29, 2020	Retail & recreation	+80%
Mobility change	es	-45%	+40% Baseline
Google prepared this rep distancing guidance rela prognostic, or treatment plans.	ort to help you and public health ed to COVID-19. This report sho purposes. It also isn't intended	compared to baseline	-40% -80% Sun Feb 16 Sun Mar 8 Sun Mar 29
Location accuracy and th don't recommend using t different characteristics	e understanding of categorize his data to compare changes l e.g. rural versus urban areas).	Grocery & pharmacy	+80%
We'll leave a region out o we calculate these trend Retail & recreation	f the report if we don't have sta and preserve privacy, read Abo	-16%	H40% m Baseline g
-45%	+40%	compared to baseline	-40% -80% Sun Feb 16 Sun Mar 8 Sun Mar 29
compared to baseline	-80% Sun Feb 16 Sun Mar 8 Sun Mar 29		
Grocery & pharmacy	+80%	rks Mobility trends for places like grow	+80%
-16%	+40% Baseline	markets, food warehouses, farmers markets, specialty food shops, drug stores, and pharmacies.	+40%
compared to baseline	-80% Sun Feb 16 Sun Mar 8 Sun Mar 29		

### The Project

During the COVID-19 pandemic, public officials have stated that seeing aggregated trends in mobility could help them make critical decisions to combat the spread of COVID-19. The COVID-19 Community Mobility Reports provide insights into how mobility changes over time, which can help inform policies and research aimed at fighting the spread of COVID-19.

Google has strict Privacy and Security Principles, and we incorporate these principles into all our work and as we develop AI technologies (AI Principle #5). In developing the Covid Mobility Reports, we wanted to ensure that no personal data, such as an individual's location, contacts or movement, is made available at any point. This approach is similar to how Google Maps uses aggregated, anonymized data to show how busy certain types of places are at a specific time.

The reports show movement trends over time by geography, across different categories of places such as retail and recreation, groceries and pharmacies, parks, transit stations, workplaces, and residential. The reports display the percentage point increase or decrease in visits, but do not share the numerical value of visits to any particular location. These reports

are intended to help support decisions about how to manage the COVID-19 pandemic, such as social distancing measures and lockdown restrictions. Understanding not only whether people are traveling, but also the trends in destinations and movement over time, can help officials design guidance to protect the needs of the communities while upholding public health best practices and standards. This is an example of how our work can be socially beneficial (AI Principle #1).

These reports show trends over several weeks compared to a local baseline. Because these reports reflect real-life human mobility, which, by nature, is always in flux, it is important to note that reports are not designed to be permanent. Given the sensitivity of mobility data, we committed to making these reports available for a limited time.

## The Approach

By using aggregated, anonymized data, the reports are designed to ensure that no personal data, such as an individual's location, movement, or contacts, can be derived from the resulting metrics. This is done using differential privacy, the same world-class anonymization technology that is used in Google products every day.

The reports are created with aggregated, anonymized sets of data from users who have turned on the Location History setting, which is off by default. People who have Location History turned on can choose to turn the setting off at any time from their Google account.

The data was queried using Google's open-source differential privacy library, which adds noise to protect each metric with differential privacy. Metrics on daily visits to public places, residential metrics, and workplace metrics are all calculated differentially. All the metrics are aggregated per day and per geographic area. These metrics are then used to identify the percentage changes in relation to the day of the week that was published in the reports. If metrics are unreliable or are coming from a geographic region that might be too small to maintain privacy protections, they are discarded.

#### The Outcome

Data is powerful and has the potential to help public health officials make more informed decisions that can ultimately save lives. The team generating these reports stayed in alignment with Google's AI Principles, by extensive use of privacy-protecting techniques as outlined in this technical paper. The report has been referenced in over 2,000 research papers. In fact, the CDC added metrics from the reports to their official dashboards. They are using the "Workplaces", "Retail and recreation" and "Transit" categories. Google received the 2021 FPF Award for Research Data Stewardship in recognition of commitment to privacy and ethics that

#### was made in producing, aggregating, and anonymizing these publicly available Community Mobility Reports.

#### About Google's Al Principles

In 2018, Google published our Al Principles to help guide ethical development and use of the technology. Our objectives: 1. Be socially beneficial. 2. Avoid creating or reinforcing unfair bias. 3. Be built and tested for safety. 4. Be accountable to people. 5. Incorporate privacy design principles. 6. Uphold high standards of scientific excellence. 7.Be made available for use in accord with these principles. In addition to the above objectives, we will not design or deploy Al in the following application areas: 1. Technologies that cause or are likely to cause overall harm. Where there is a material risk of harm, we will proceed only where we believe that the benefits substantially outweigh the risks, and will incorporate appropriate safety constraints. 2. Weapons or other technologies whose principles or implementation is to cause or directly facilitate injury to people. 3. Technologies that gather or use information for surveillance violating internationally accepted norms. 4. Technologies whose purpose contravenes widely accepted principles of international law and human rights. As our experience in this space deepens, this list may evolve.

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