

Reflection on Data-Driven Information Systems

I. System 1: Facebook

1.1 Overview and Type of Data Used.

Facebook, owned by Meta Platforms, Inc., is a **global social media platform** that enables users to **connect, share content, and engage** in various online communities. To facilitate these services, Facebook collects a wide array of data, including:

- **Personal Information:** Names, email addresses, phone numbers, dates of birth, and gender.
- **User Activity Data:** Posts, comments, likes, shares, group memberships, and event participations.
- **Behavioural Data:** Browsing history, search queries, interaction times, and advertisement engagements.
- **Device and Location Data:** IP addresses, device types, operating systems, and geolocation information.

This extensive data collection allows Facebook to tailor user experiences and provide targeted advertising (Meta, 2022).

1.2 How to use data and the consequences when data doesn't exist.

Facebook leverages collected data to:

- **Personalise Content:** Algorithms analyse user interactions to curate news feeds, displaying content that aligns with individual interests.
- **Suggest Connections:** By examining mutual friends and shared activities, Facebook recommends potential connections to users.
- **Deliver Targeted Advertising:** Advertisers utilise user data to reach specific demographics, enhancing the relevance of advertisements.
- **Enhance Security:** Monitoring user behaviour aids in identifying and mitigating fraudulent activities.

Without access to this data, Facebook's ability to offer personalised experiences would be significantly diminished, leading to generic content delivery and reduced user engagement.

1.3 Process of creating, storing and managing data.

Data Generation & Capture: Users generate data through profile creation and interactions on the platform. Additionally, Facebook collects data via tracking technologies like cookies, even when users navigate external websites.

Data Storage: Collected data is stored in Meta's global data centres, employing cloud infrastructure to ensure scalability and redundancy.

Data Management: Advanced analytics and artificial intelligence (AI) systems process the data to enhance user experiences and optimise platform performance.

1.4 Security and privacy risks.

Several significant concerns arise regarding the security and privacy of data on Facebook:

- **Data Breaches:** Incidents like the Cambridge Analytica scandal, where personal data was harvested without consent, exposed significant weaknesses in Facebook's privacy practices (Cadwalladr and Graham-Harrison, 2018).
- **Third-Party Access:** Facebook's data-sharing practices with third-party applications have led to unauthorised use of personal information.
- **Regulatory Fines:** In 2022, Meta was fined €17 million by the Irish Data Protection Commission due to violations of GDPR rules regarding personal data handling (European Commission, 2023).
- **User Trust:** Continuous privacy issues have eroded user trust, prompting calls for stricter data protection measures.

II. System 2: Google Maps

2.1 Overview and Type of Data Used.

Google Maps is a **web-based mapping** service developed by Google, offering **real-time navigation, traffic conditions, and location information**. To provide these services, Google Maps collects various types of data:

- **Location Data:** Real-time GPS coordinates, IP addresses, and Wi-Fi access points.
- **Search and Usage Data:** Places searched, routes taken, and interactions with map features.
- **Device Information:** Device identifiers, operating systems, and browser types.
- **User-Generated Content:** Reviews, photos, and ratings contributed by users.

This data enables Google Maps to offer accurate navigation and personalised recommendations (Google Support, 2024).

2.2 How to use data and the consequences when data doesn't exist.

Google Maps utilises collected data to:

- **Provide Accurate Navigation:** Real-time location data ensures precise directions and estimated arrival times.
- **Offer Personalised Recommendations:** Analysis of search history and location data allows for tailored suggestions for restaurants, attractions, and services.
- **Monitor Traffic Conditions:** Aggregated user location data helps identify traffic congestion and suggest alternative routes.
- **Enhance User Engagement:** User-generated content enriches the platform with reviews and photos, aiding others in decision-making.

Without access to this data, Google Maps would lose core functionalities such as route prediction, real-time traffic updates, and user-customised experiences, significantly reducing its usefulness (Meineck, 2020).

2.3 Process of creating, storing and managing data.

Data Generation & Capture: Users generate data through interactions with the app, such as searching for locations or submitting reviews. Location data is captured via GPS and network signals.

Data Storage: Information is stored on Google's secure servers, distributed globally to ensure reliability and quick access.

Data Management: Google applies advanced machine learning algorithms to process and analyse user data, thereby improving services like real-time ETA estimation and business recommendations (Google Support, 2024).

2.4 Security and privacy risks.

Several significant concerns arise regarding the security and privacy of data on Google Maps:

- **Continuous Location Tracking:** Google has been criticised for tracking user locations even when location history is turned off. Investigations have shown that Google services store location data from searches, app usage, and background activities, raising concerns about transparency and user consent.
- **Third-Party Access:** Google Maps shares location data with third parties, including advertisers and government agencies. While this data is often anonymised, researchers have warned about the potential for re-identification, leading to surveillance risks and personal privacy violations.
- **Legal Penalties:** Google has faced multiple legal fines over privacy violations. In 2022, the company was fined €10 million by Italian authorities for failing to provide clear privacy settings for location tracking (Collins and Gordon, 2022). Previously, in 2019, the French data authority CNIL fined Google €50 million for lack of transparency and consent regarding personalised advertising (European Data Protection Board, 2019).
- **User Trust:** Repeated privacy concerns, combined with Google's extensive data collection practices, have led to growing distrust among users. As awareness of data privacy increases, there are increasing demands for stricter regulations and improved user control over personal location information.

III. References

- Cadwalladr, C. and Graham-Harrison, E. (2018). *Revealed: 50 million facebook profiles harvested for cambridge analytica in major data breach*. [online] The Guardian. Available at: <https://www.theguardian.com/news/2018/mar/17/cambridge-analytica-facebook-influence-us-election>.
- Collins, D. and Gordon, M. (2022). *40 states settle Google location-tracking charges for \$392M*. [online] AP NEWS. Available at: <https://apnews.com/article/google-privacy-settlement-location-data-57da4f0d3ae5d69b14f4b284dd084cca>.
- European Commission (2023). *Data protection*. [online] commission.europa.eu. Available at: https://commission.europa.eu/law/law-topic/data-protection_en.
- European Data Protection Board (2019). *The CNIL's Restricted Committee Imposes a Financial Penalty of 50 Million Euros against GOOGLE LLC | European Data Protection Board*. [online] www.edpb.europa.eu. Available at: https://www.edpb.europa.eu/news/national-news/2019/cnils-restricted-committee-imposes-financial-penalty-50-million-euros_en.
- Google Support (2024). *How Google protects your privacy & keeps you in control - Google Maps Help*. [online] support.google.com. Available at: <https://support.google.com/maps/answer/10400210?hl=en>.
- Meineck, S. (2020). *Six Reasons Why Google Maps Is the Creepiest App On Your Phone*. [online] VICE. Available at: <https://www.vice.com/en/article/six-reasons-why-google-maps-is-the-creepiest-app-on-your-phone/>.
- Meta (2022). *Meta Privacy Policy - How Meta collects and uses user data*. [online] www.facebook.com. Available at: <https://www.facebook.com/privacy/policy/>.