Temperature Checkpoint System
(ECE Technical Report)

Demystifying Data Collection on Facebook
(CS Technical Report)

Hands in the Cookie Jar: Internet Cookie Consent in the Online Advertising
Industry
(STS Research Paper)

An Undergraduate Thesis Portfolio
Presented to the Faculty of the
School of Engineering and Applied Science
In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Computer Science

by

Jack Schefer

May 7, 2021

Preface

Internet users' data are collected and monetized. Data collectors generally meet the legal standard of user consent, but actual informed consent is seldom obtained. With both technical and regulatory innovations, a standard closer to informed consent could be established. Besides introducing technical and sociotechnical projects about this subject, the preface begins by introducing an unrelated technical project.

In response to the COVID-19 pandemic, many stores, restaurants, and clinics required temperature scans for building entry. To simplify entry, the research team developed an automated system that can take non-contact temperature scans of the wrist and control entry through an automated door lock. It stores and reports anonymized data, including temperatures measured, entrances over time, and frequency of rejection. The team used modular finite-state machine design for the software architecture, and rapid prototyping to construct the hardware. Despite constraints of budget and time, testing indicated that the locking mechanism could automate entrance monitoring.

Social media and online advertising have introduced unprecedented data privacy hazards. In the attention economy, social media companies seek to maximize user engagement. Some of their techniques promote misinformation and political polarization, and can affect mental health. Most users do not know these techniques and are therefore defenseless against them. An online educational platform could help consumers learn which personal data are collected online and how they are used. To test this concept, a mock social media platform implementing a real-time feed of data collection insights was designed. A microservice architecture informed backend system design and a small prototype was presented for the frontend interaction model. The resulting design proposal was submitted to faculty as a feasible implementation guide.

Data collectors track online behavior through cookies. Data collectors, privacy advocates, and consumer rights advocates compete to influence the regulations governing online data collection. Users are divided. Many do not know that their data are collected while others know but do not object. Privacy and consumer rights advocates know and object. Data collectors and brokers strive to protect their business models. Cookies as now configured meet a legal standard of consent but fail by a commonsense standard. In the U.S., data collectors have prevailed over advocates, raising problems of data ownership, user autonomy, and exploitation.

List of Contents