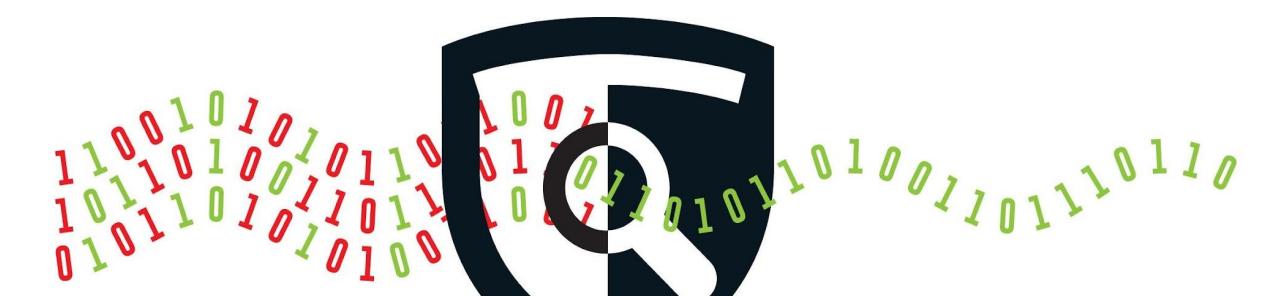# 2023 Privacy and IoT Research Exploration

Team Pepper

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ProperData

Introduction

"Privacy is the cornerstone to the foundation of the connected world"

In our escalating bridge of connectivity among our ever-growing society, we exist within an environment that has implemented technology across vast areas it hasn't existed before. These innovations exist in the form phones, smart tv's, automatic cat feeders, and home based virtual assistants; unfortunately the exchange of convince is entangled with the price of privacy. Our team researched the vast amount of personal information that is vulnerable at any moment. The duration of our research invested into the areas of how a user is tracked and profiled throughout their browser and third parties, and what data is collected to subjugate them to personalized advertisements.

Tracking in Alexa vs Mycroft

Figure 1: the csv file that contains data about tracking in Alexa opened in Google sheets

Our analysis showed that Alexa did not track the user, and nor did Mycroft for the short time interval the data was collected. In the long term however, Alexa tracks the user while Mycroft doesn't.

Tracking & How to Prevent It

We looked at advertising (behavior and contextual based) and how different types of tracking (stateful and stateless) are a part of our daily lives on the Internet. Stateful tracking includes first, as well as third-party tracking and cookies which can be combated through ad blockers. Stateless tracking includes fingerprinting the user using the HTML canvas tag but can be effectively combated with privacy browsers such as Brave and Opera.

Mycroft Skills

- We installed skills from Mycroft.ai and GitHub using the terminal and commands such as "msm install [github link]".
- We also created our own skills such as the magic-eight-ball-skill which worked when the user typed "magic eight ball, " or "magic ball, " followed by their request after the comma.
- We also created the hunger skill which ran when the user stated "I'm hungry" or "I'm starving". It prompted a randomized response from Mycroft regarding eating.

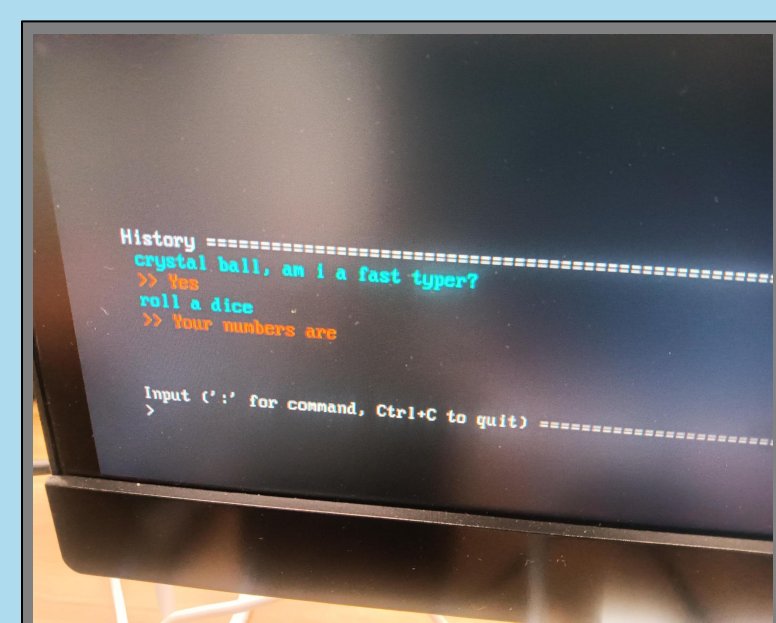*Figure 1: Jonah using the microphone to speak to Mycroft*

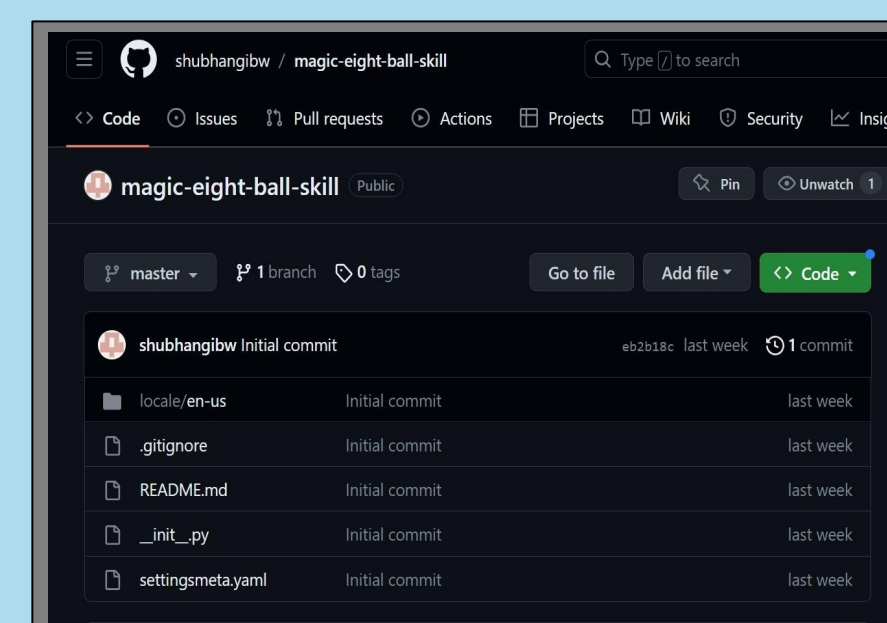*Figure 2: the crystal ball and dice skills installed from GitHub*

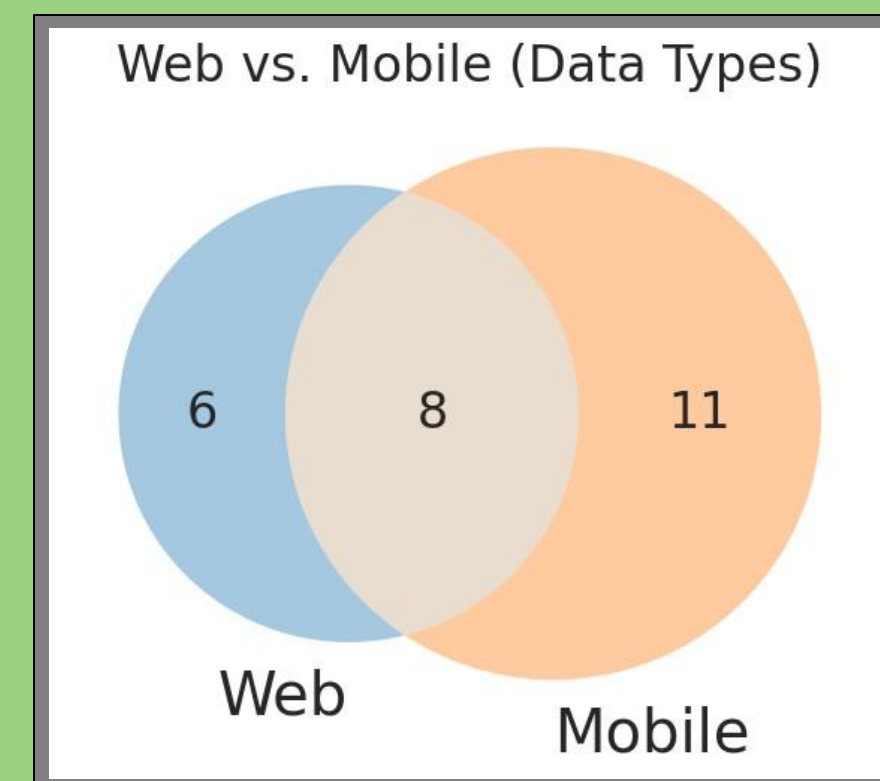*Figure 3: magic eight ball skill create through GitHub*

TikTok

Web vs. Mobile (Data Types)
6 — 8 — 11
Web — Mobile

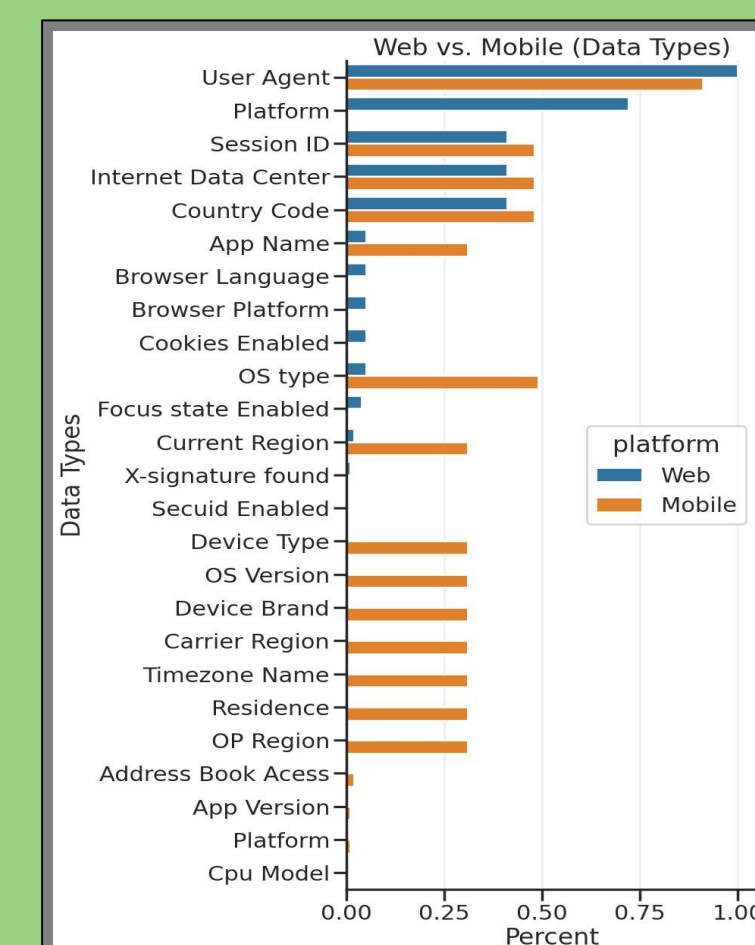*Figure 1: mobile vs web data types*

Web vs. Mobile (Data Types)

Figure 2: comparison of the mobile vs web data types

We studied the data that TikTok collects through its mobile and web versions through packet analysis. Some initial visual differences we noticed included lesser ads on the web version, and a significantly worse recommendation algorithm for videos. Upon further [packet] analysis, we realized that the absence of data types that were used for tracking in the web system were the cause of this phenomena. Whereas on the mobile version, TikTok collected much more data that could be used to track the user.

Make Your Own Ad Blocker

We created our own ad blocker by navigating to the Network tab after right-clicking on a page and clicking on the Inspect option. Depending on what website this is being tried on, the process and the results will vary. In our case, we blocked the request included the phrase "show-ads" which happened to be a javascript file. Doing so resulted in the removal of the ads but as Figure 3 depicts below, the website still maintained the ad slot (the gray area). On the bright side, this solution will work every time for that specific website with the same browser. Just navigate to the Network tab in the Inspect option and enable network blocking.
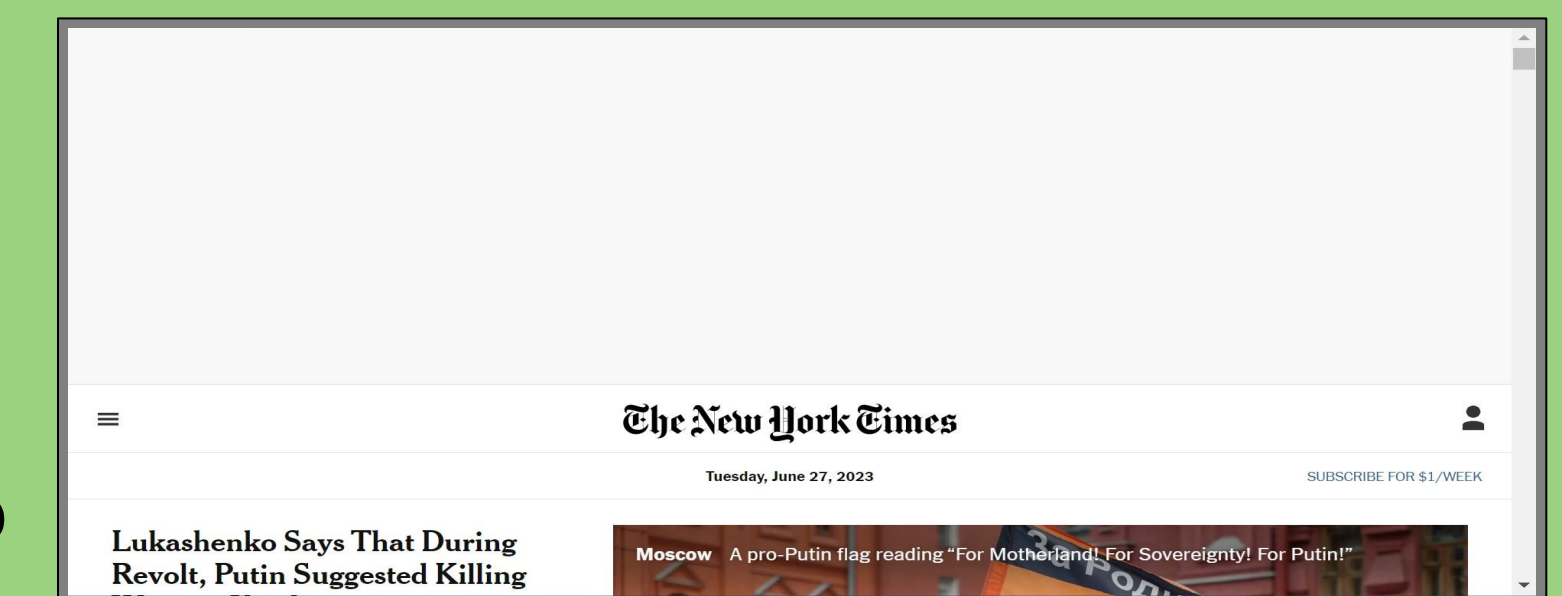

Figure 3: this is what the New York Times website looks like when the ads are blocked manually