

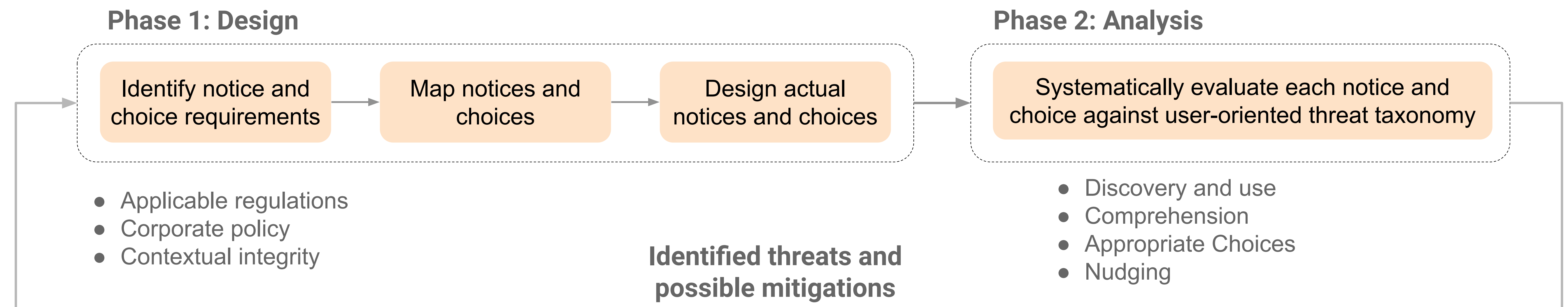
# UsersFirst: A User-Centric Privacy Threat Modeling Framework for Notice and Choice

Tian Wang, Xinran Alexandra Li, Miguel Rivera-Lanas, Yash Maurya, Hana Habib, Lorrie Faith Cranor, Norman Sadeh  
School of Computer Science, Carnegie Mellon University

## Background

- Organizations are increasingly adopting systematic risk analysis strategies to manage privacy risks.
- Existing frameworks may fail to effectively address the **generally poor usability of privacy notice & choice (N&C) interfaces**
- Meanwhile, there is a growing regulatory emphasis on **user-centric privacy**, especially for privacy notices & choices
- We propose **UsersFirst**, a framework to systematically identify and mitigate usability threats in notices & choices

## The UsersFirst Methodology

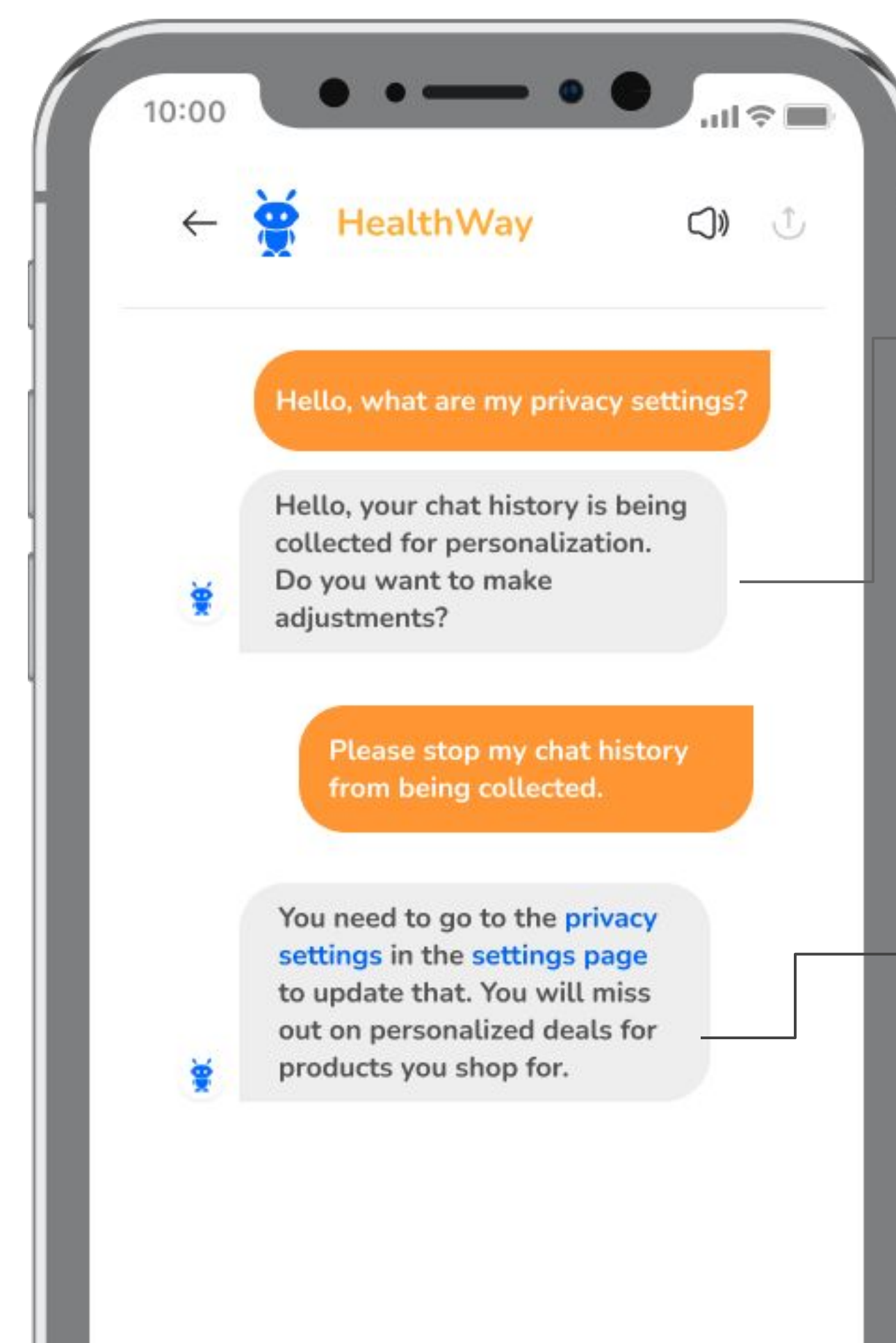


## Case Study on HealthWay - A Hypothetical Multi-channel Retail Pharmacy

To illustrate how an organization's privacy team might employ the UsersFirst framework, we applied the methodology to HealthWay's privacy notice and choice interfaces. We assume that HealthWay implements a chatbot to answer customers' questions and act as a personalized shopping assistant by collecting data (e.g., chat history) from customers.

Below shows how HealthWay identifies and mitigates N&C threats when the chatbot presents users with privacy choices:

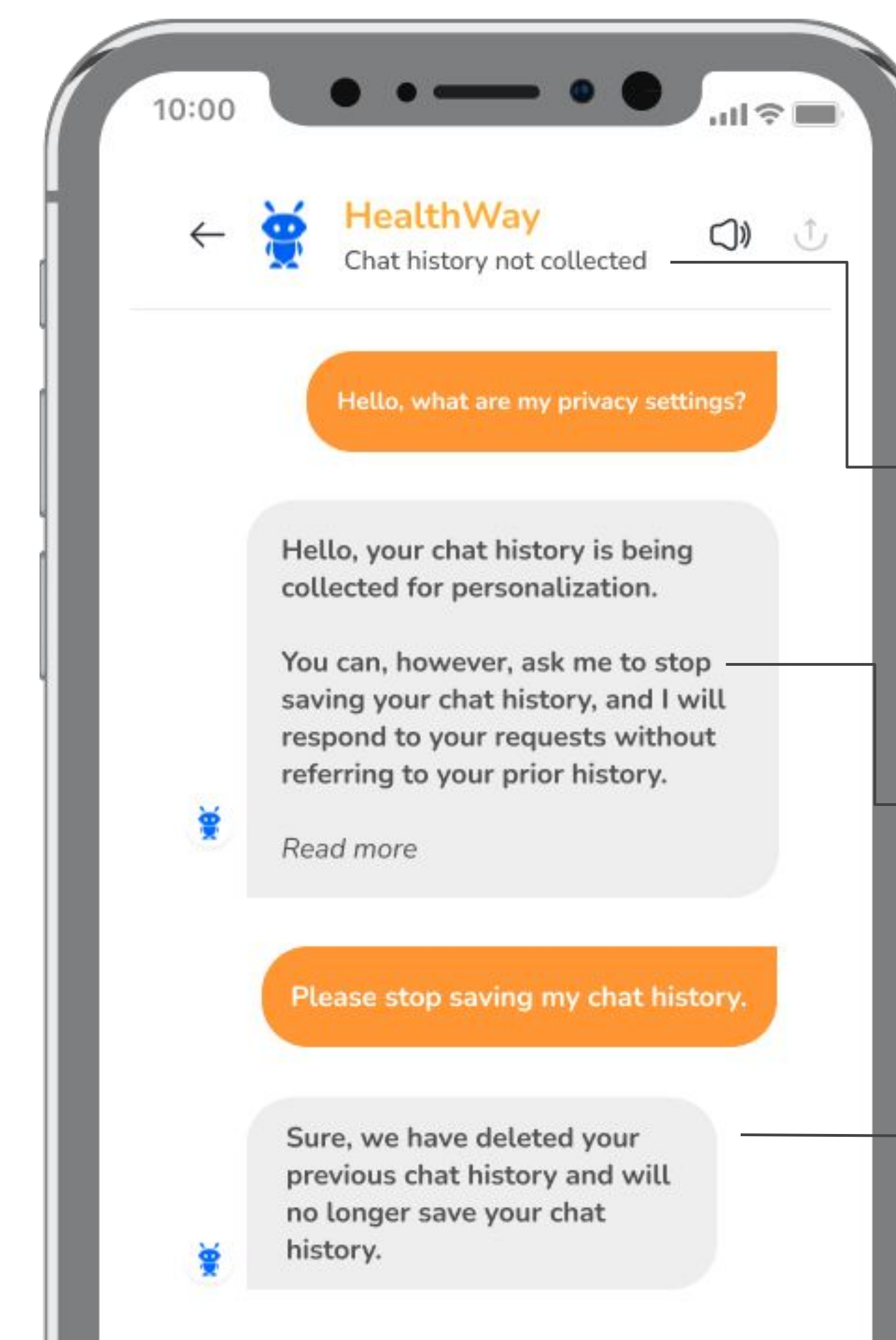
### Identify N&C Threats with the UsersFirst Taxonomy



**Less Privacy Protective Defaults:** the default settings are not privacy protective (*By default, the chat history is being collected. Users need to manually opt out the collection of their chat history.*)

**Manipulative Statements:** using manipulative language or content to influence users toward an action (*"You will miss out on personalized deals on products you shop for."*)

### After Applying UsersFirst: Mitigate N&C Threats



Provide clear and accurate feedback on current privacy settings based on the user's choice

Directly inform users about available privacy choices

Objectively notify users about effects of the privacy choice they made

## Our Proposed Framework: UsersFirst

- A supplement to existing frameworks, with a focus on user-centered design
- Informed by previous research in usable privacy notice & choice design
- Identified best practices for notice & choice through a systematic analysis of regulation, frameworks, and literatures
- Designed to be flexible so that orgs can determine notice & choice requirements appropriate for their context

### Acknowledgements

The researchers gratefully acknowledge the support of the Digital Transformation and Innovation Center at Carnegie Mellon University sponsored by PwC. We thank Geetika Gopi, Seo Young Ko, Yanhao Qiu, and Ziping Song for initial works on the UsersFirst framework.