

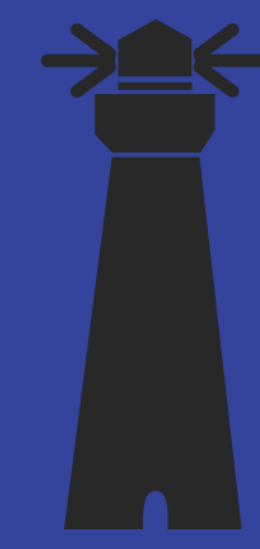
Reimagining Privacy & Transparency Technologies

With Blind People

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Blind people use visual assistance technologies (VAT) in their everyday lives to gain visual information. Despite its benefits, VAT include privacy risks and errors. My dissertation explores how to enable blind people to detect error and safeguard their privacy.

Study 1: Blind People's Perspectives on Privacy Features (CSCW 2022)

We interviewed 20 blind participants to explore their views on emerging AI-enabled privacy-enhancing technologies in VAT (refer to Figure 1 & 2).

Participants expressed the need for greater control over private content, highlighting the fluidity of access and privacy needs. In particular, the challenges of emerging privacy technologies are:

- Privacy needs are subjective. Arab participants noted differences in privacy concerns between the Middle East and the U.S.
- It is difficult to non-visually detect and verify errors in emerging privacy features.

Our study calls for rethinking privacy technologies through interdependence, a disability justice tenet [1], and advocates for blind people's involvement in developing AI-enabled privacy tools, from dataset creation to interaction design.

i This work is published in CSCW 2022 [1].

Step 2: How Blind People Contest and Detect AI Error (ASSETS 2024)

We conducted interviews with 26 blind people to explore how they interact with AI-enabled visual assistance technologies (VAT). Key findings include:

- Blind users experience various AI errors, such as cross-cultural bias and processing mistakes.
- They engage in daily experimentation, testing AI VAT in known settings. However, VAT lacks verification support.
- Blind people wanted avenues to understand AI input.

By applying the disability studies lens of misfitting [3], we reveal that computer vision systems are typically designed for sighted users. Blind people with intersecting marginalized identities face heightened challenges. Our research generates implications for responsible AI practice, including accessible explainability features like camera guidance and promoting disability-centered AI audits

i This work is published in ASSETS 2024 [2].

Study 3: Co-Designing Descriptors to Detect High-Risk Errors (ongoing)

Non-visual verification and error detection are essential in high-risk settings such as visual privacy management. We conducted interviews and focus groups to understand how framing obfuscated content may allow blind people to spot errors. We found that some visual descriptors (e.g., color, dimensions, and distance) are incompatible with blind people's identification process. The description of obfuscated content should be malleable, accounting for individual preferences, various environments, and use cases.

Study 4: Developing Privacy Policies (future work)

Moving away from technical approaches to privacy management, we are interested in understanding blind people's preferences for data controls. We will design and deploy a survey to unpack blind people's perspectives on data processing justifications in VAT (e.g., advertisement, fraud detection) and data controls (deletion of data, limitation of data processing). This study will contribute community-centered policies to regulate data collection within VAT.

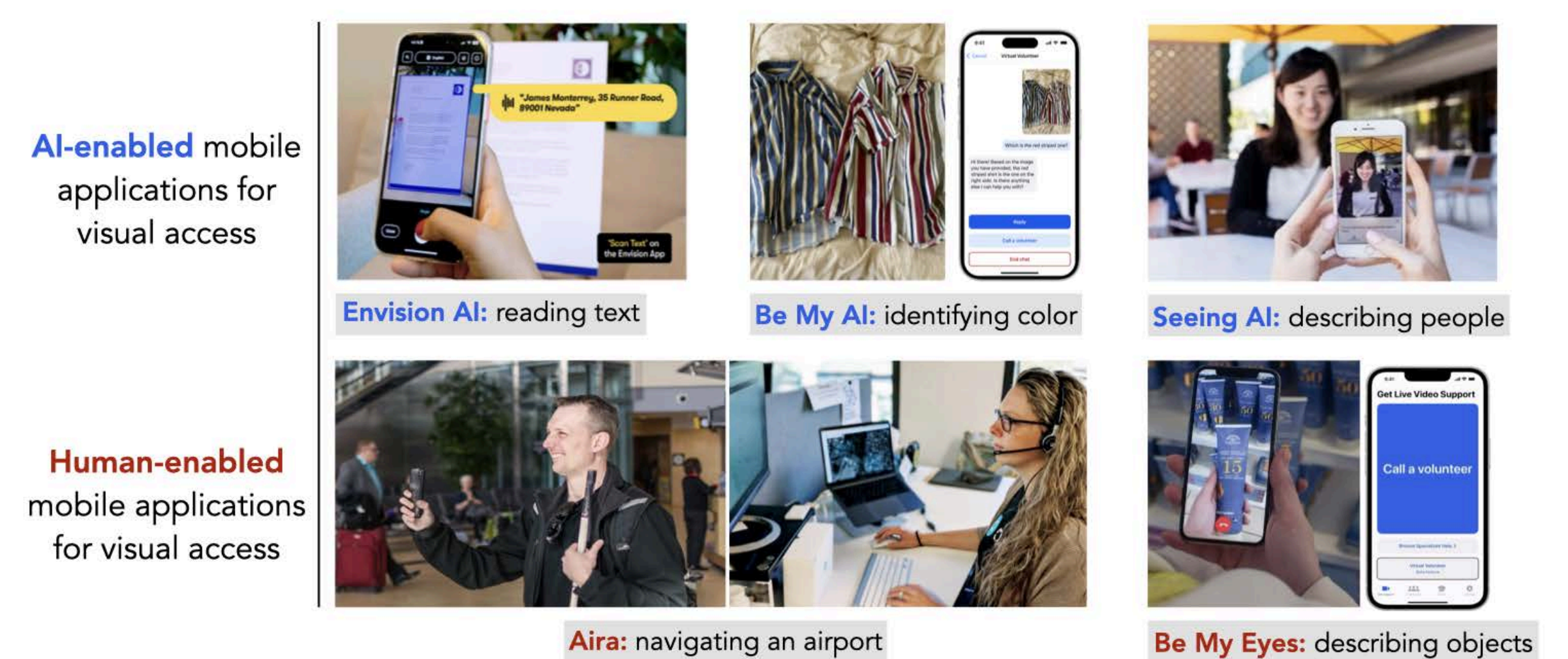


Figure 1: overview of real-world VAT and its use cases.

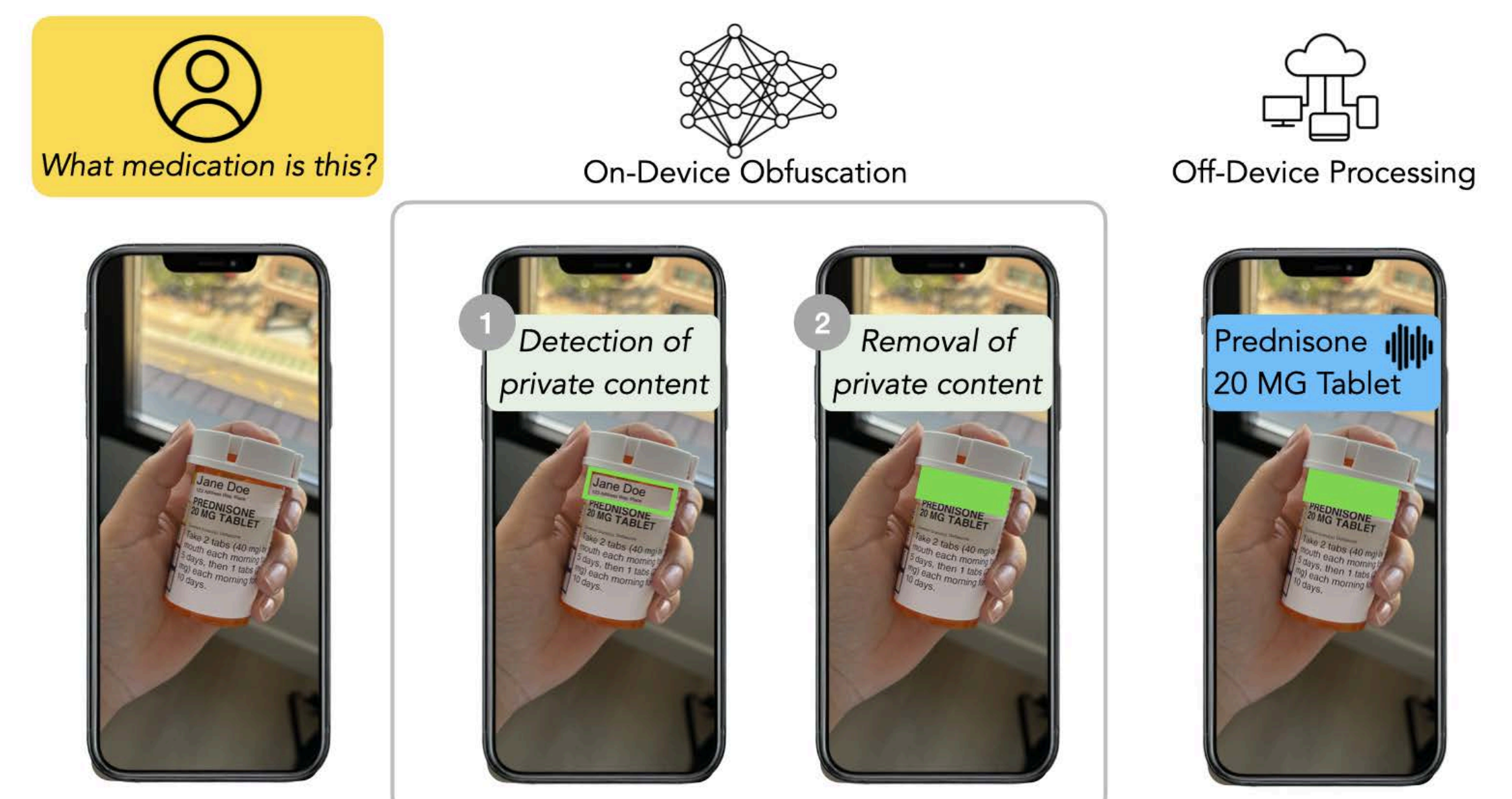


Figure 2: process of AI-enabled privacy technologies (obfuscation)

Dissertation Contributions

- **Empirical:** we contribute findings from over 46 blind and low vision participants, revealing the limitations of technical privacy approaches and common errors in VAT.
- **Theoretical:** we draw and extend frameworks from disability studies, disability justice activism, and science and technology studies to the context of AI for visual access.
- **Design recommendations:** we outline design opportunities to inform transparency and privacy technologies.

References:

- [1] Alharbi, R., Brewer, R. N., & Schoenebeck, S. Understanding emerging obfuscation technologies in visual description services for blind and low vision people. (CSCW 2022)
- [2] Alharbi, R., Lor, P., Herskovitz, J., Schoenebeck, S., & Brewer, R. Misfitting With AI: How Blind People Verify and Contest AI Errors. (ASSET 2024)
- [3] Garland-Thomson, R. (2011). Misfits: A feminist materialist disability concept. *Hypatia*, 26(3), 591-609
- [4] Mingus, M. (2017). Access intimacy, interdependence and disability justice. *Leaving evidence*, 12.

On the job market!

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