Scalable UIs on Everyday Objects

Our hands and fingers are capable of expressing a rich vocabulary of grasps and gestures. They can touch, sense, and intimately experience the rich variety of materials and objects surrounding us. The aim of RIME is to unlock the potential of touch and tangible manipulation to enable scalable, expressive, and satisfying interactions with everyday objects in our future homes and beyond.

So far, we at RWTH Aachen University have focused our research on design recommendations for textile interfaces that facilitate eyes-free, haptic recognition and orientation—especially for users unfamiliar with the UI.

How Should Textile UI Elements Be Designed?

Textile Sliders (Full Paper at CHI '22)
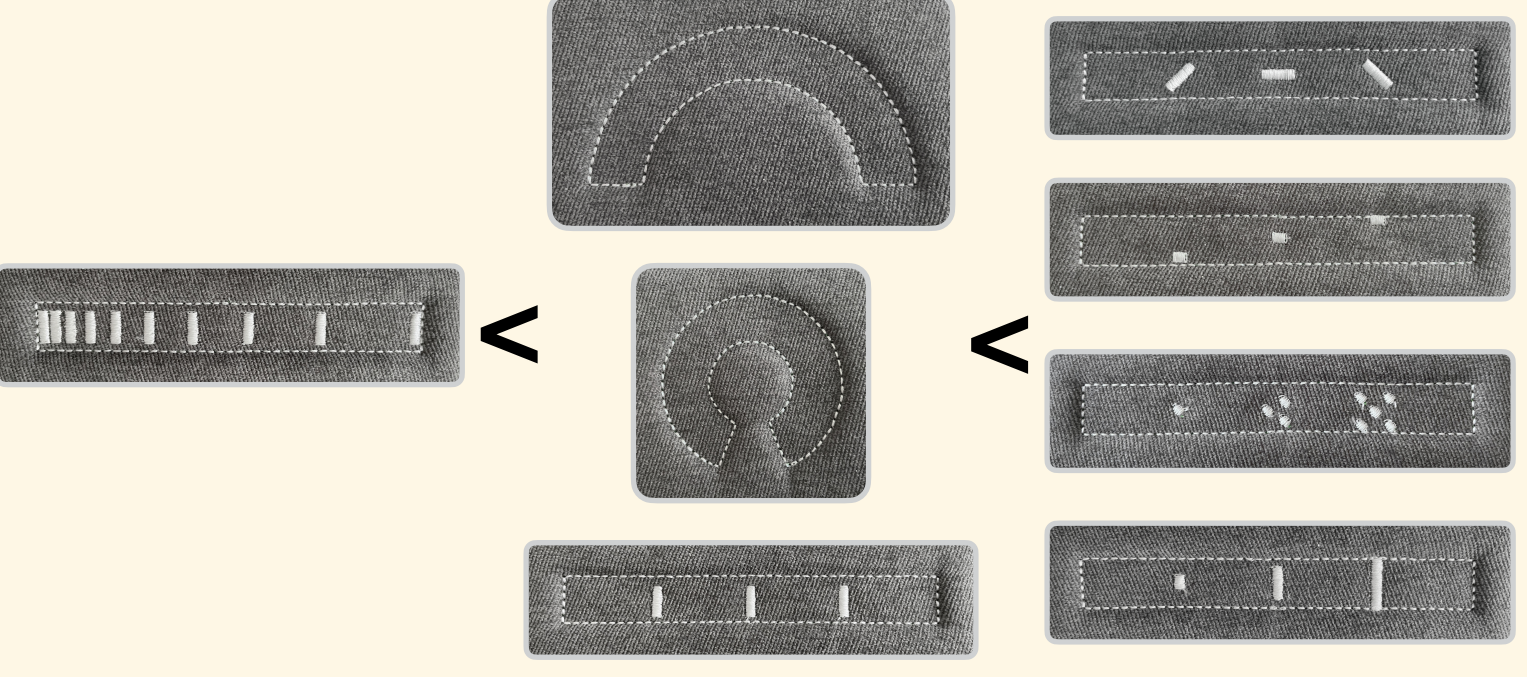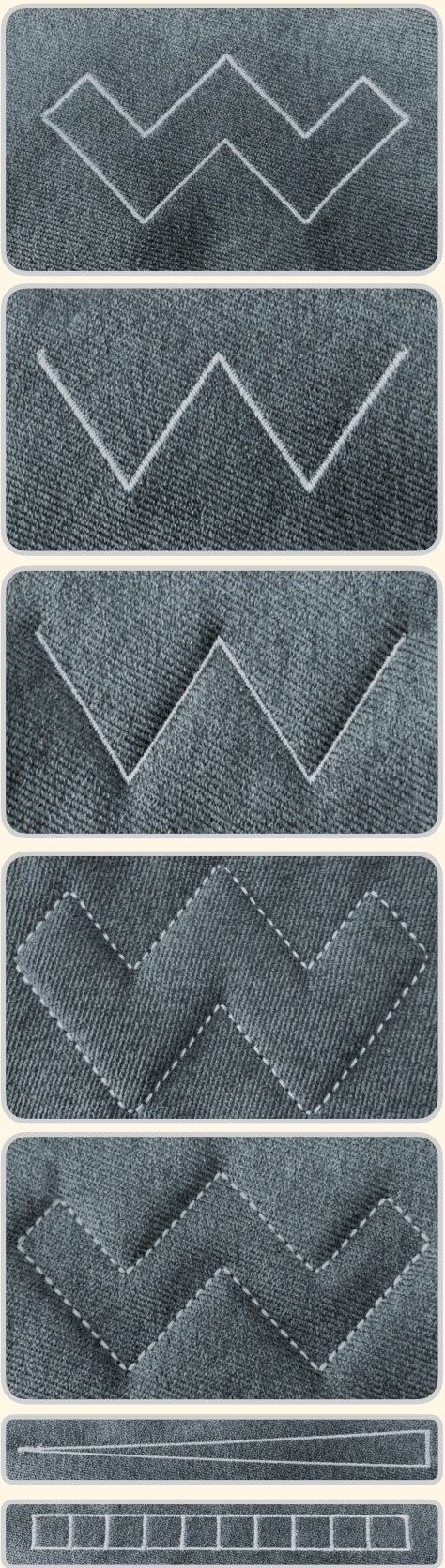
What form factors support eyes-free input?
- *Path* vs. *Closed-Shaped*
- *Raised* vs. *Recessed* vs. *Flat*
- Comparing 6 *Shapes*

How can we help users orientate?
- Selection using sliders with 0–10 ticks
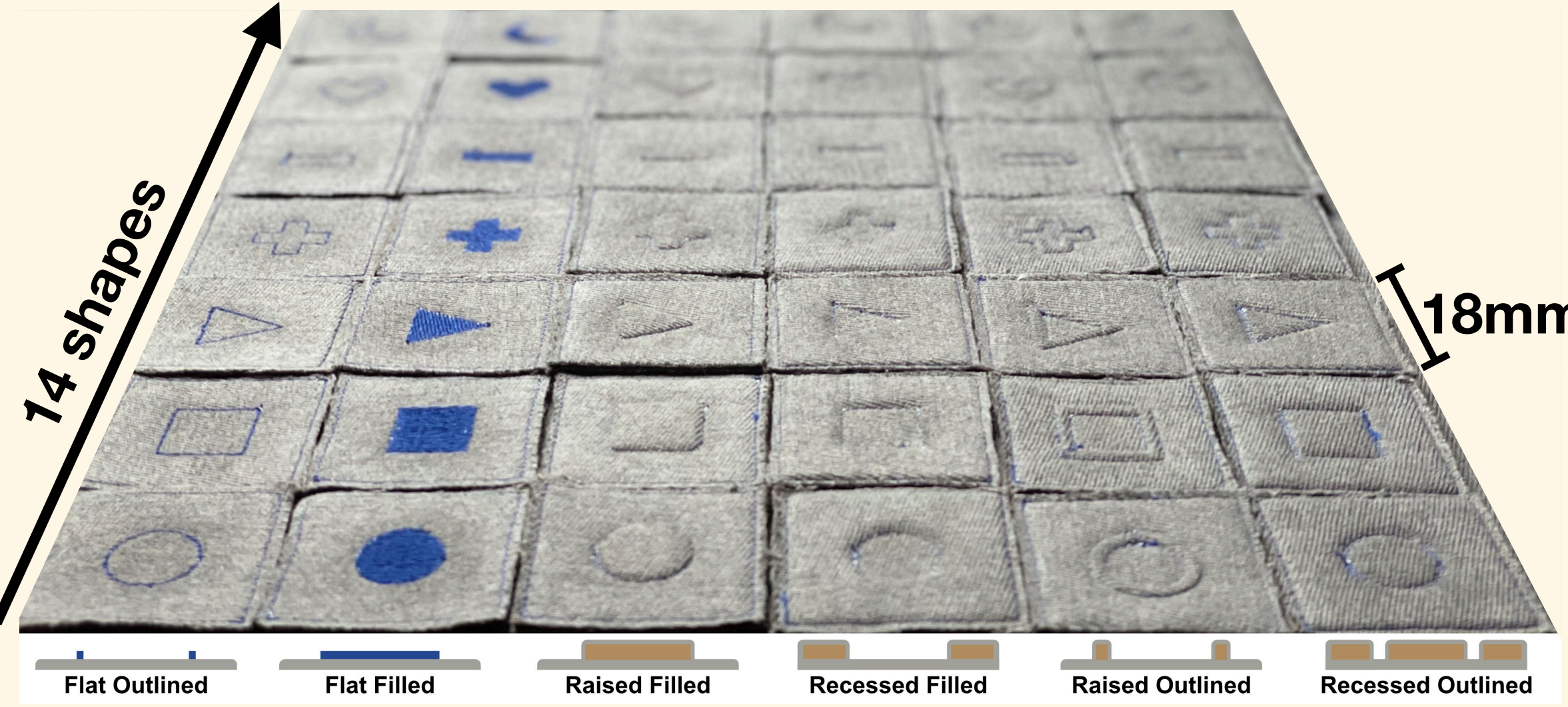- Position estimation with minimal movement

Study findings
- If you can't use padding, use path sliders
- Use recessed sliders
  - Raised sliders also work well
- Prefer 3–4 tick marks
- For fast & confident value estimation, use elevating or rotating tick marks

Textile Icons (Full Paper at CHI '23)

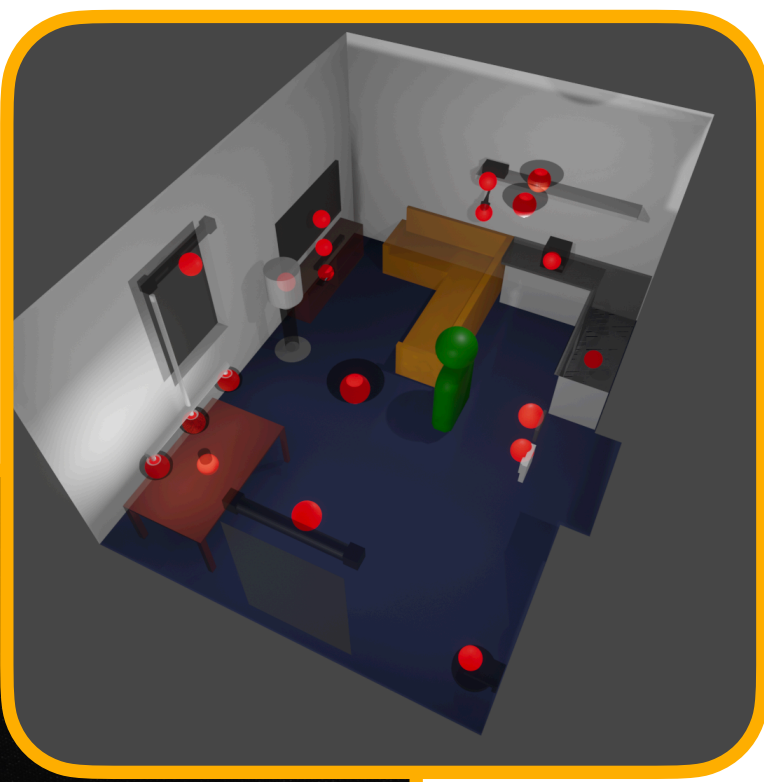How well can people recognize common icons on textiles without looking?

14 shapes — 18mm

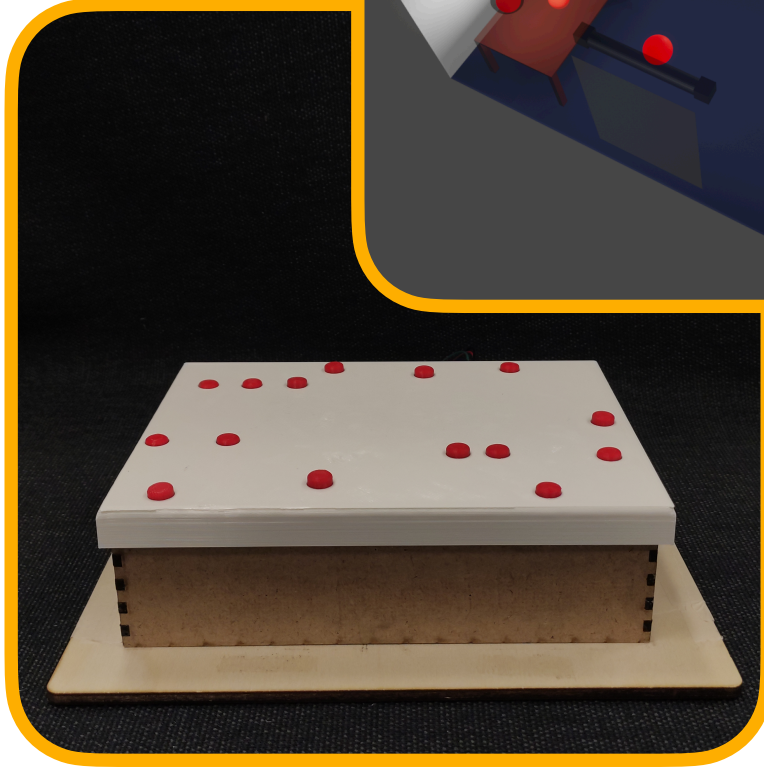Flat Outlined | Flat Filled | Raised Filled | Recessed Filled | Raised Outlined | Recessed Outlined
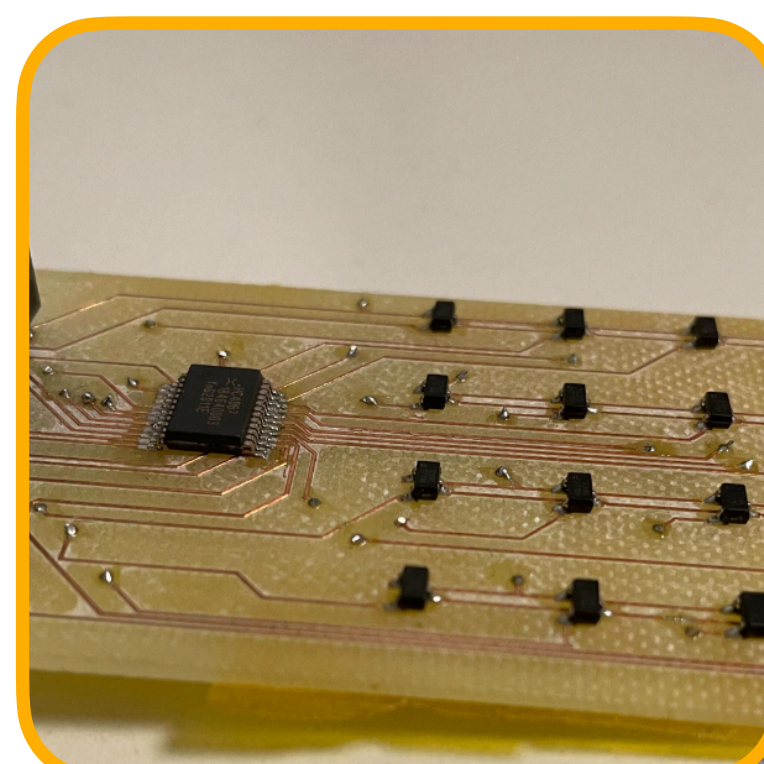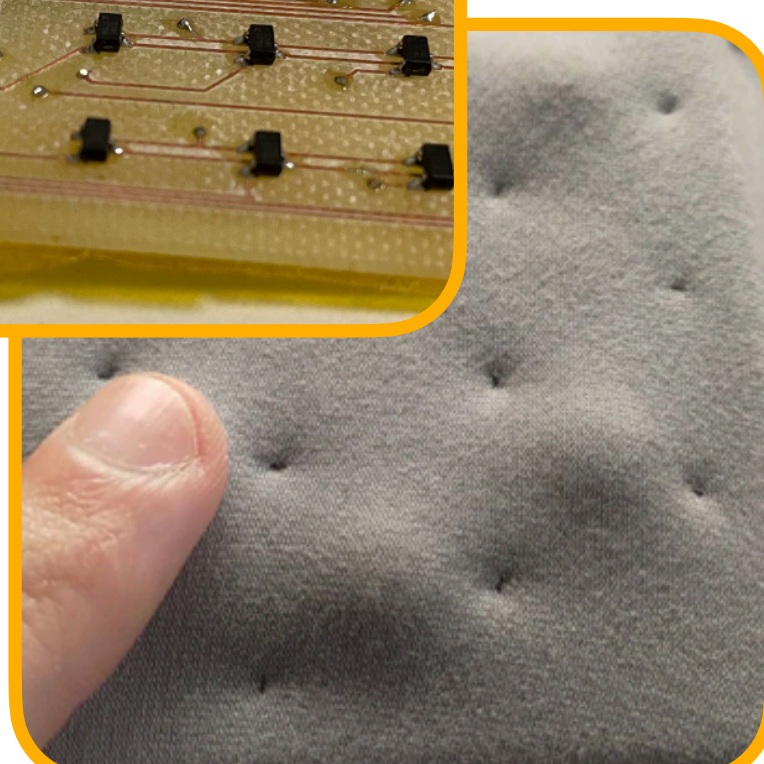
Study findings
- Raised icons easy to recognizable
- Flat icons not suitable
- Confusions mostly uni-directional
- People may confuse different looking icons when using only touch

Ongoing RIME Research

Addressing smart home devices

Understanding haptic differences

Adding functionality to unused surfaces

Our Related Research

SoRoCAD: Designing shape changing soft robots (LBW CHI '22)

FabricFaces: Foldable textiles with wireframes (LBW CHI '23)

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Further Information
https://hci.rwth-aachen.de/rime