

CountMarks: Multi-touch Marking Menus for Head-Mounted Displays

GI19



THE PROBLEM

Current methods for interacting with head-mounted displays (HMDs) can be impractical:

- **speech recognition** is inappropriate for public use
- **in air gestures** (including wands) are prone to arm fatigue and gesture recognition problems
- **Handheld devices** further introduce mapping problems and cumbersome interaction techniques

We propose a new technique using small multi-touch swipe gestures on a smartphone the user already carries.

DESIGN CONSIDERATIONS

We suggest interaction techniques for everyday mobile HMDs like smart-glasses should have the following characteristics:

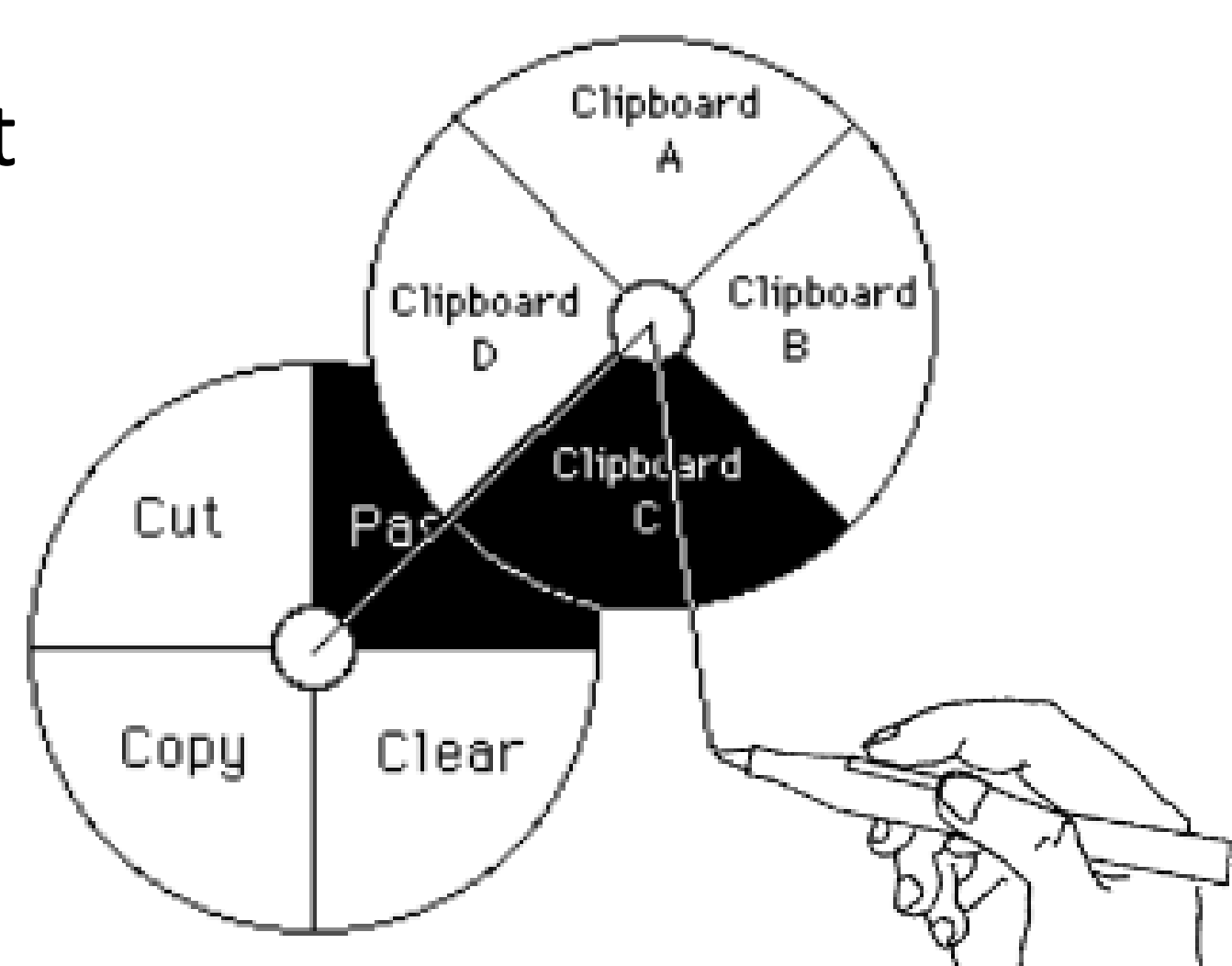


- **Socially acceptable** movements that do not embarrass the user
- **Private interactions** that can allow the user to safely enter sensitive data in public
- **Ergonomic actions** that can be performed hundreds of times a day without fatigue

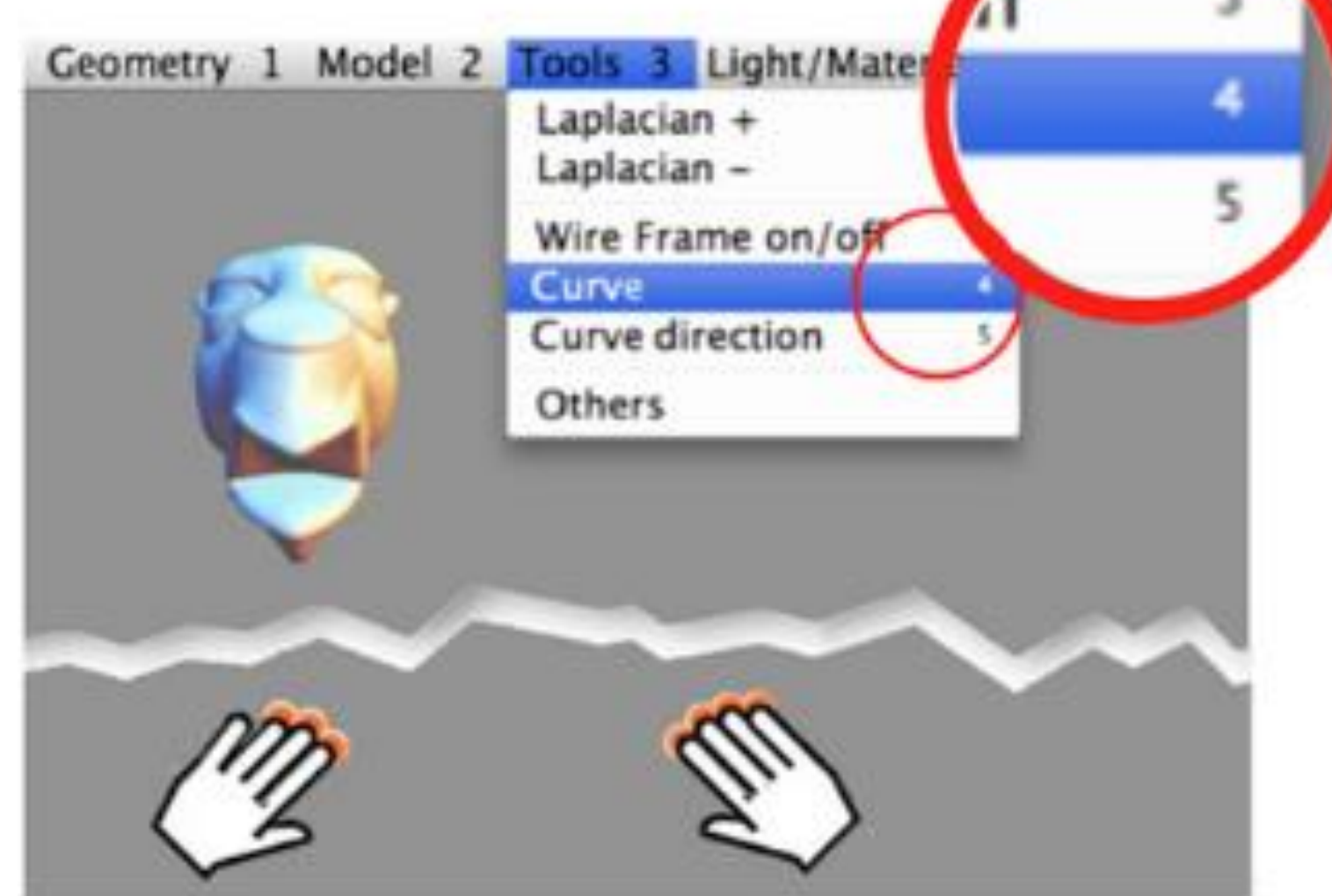
COUNTMARKS

CountMarks is a menu selection technique that extends classical marking menus by combining them with count menus.

Marking Menu



Count Menu



CountMarks



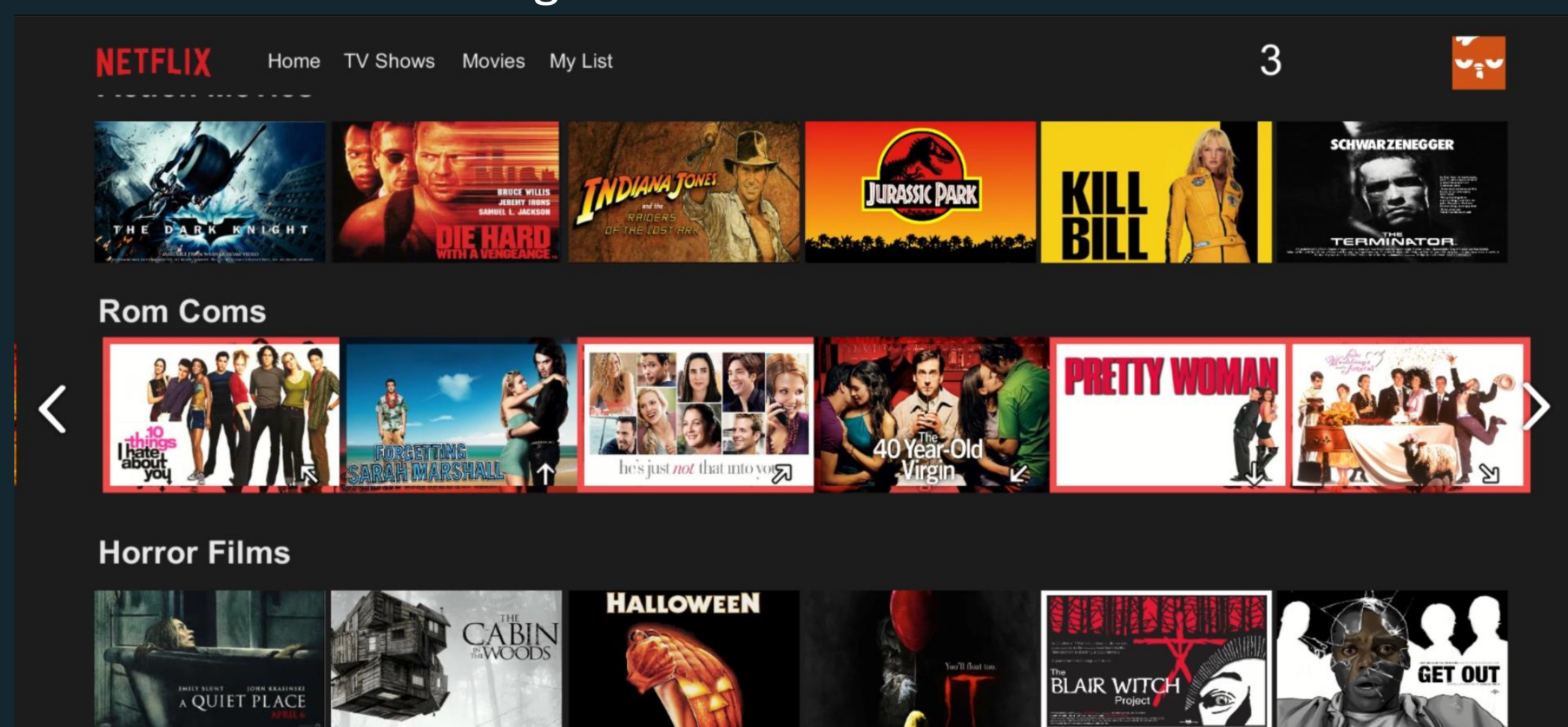
MODE SHIFT

We include a mode changing gesture to provide additional menu options. The user double taps the screen with one finger to show 4 new menus. They can double tap again to return to the previous mode.

IMPLEMENTATION

We implemented CountMarks in a mock Netflix App.

- The user can scroll vertically by sliding one finger on the screen.
- Touching two or more fingers on the screen lets the user select from different movie genres, highlighting the row and displaying arrows for swipe directions
- A double tap with one finger shifts modes to select from settings and other menus



PRELIMINARY STUDY

We compared CountMarks to multi-stroke marking menus

- 18 participants
- Search to find and select targets from up to 64 items across 8 menus

