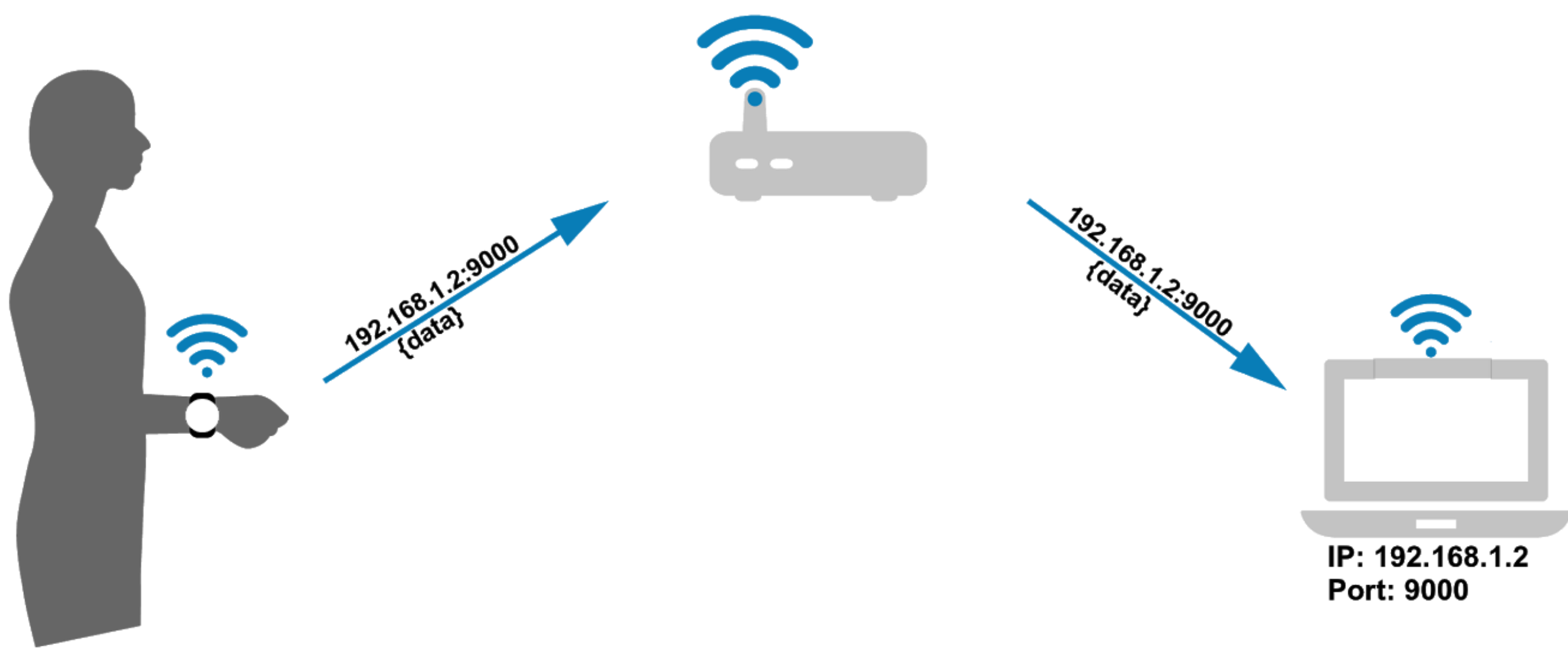


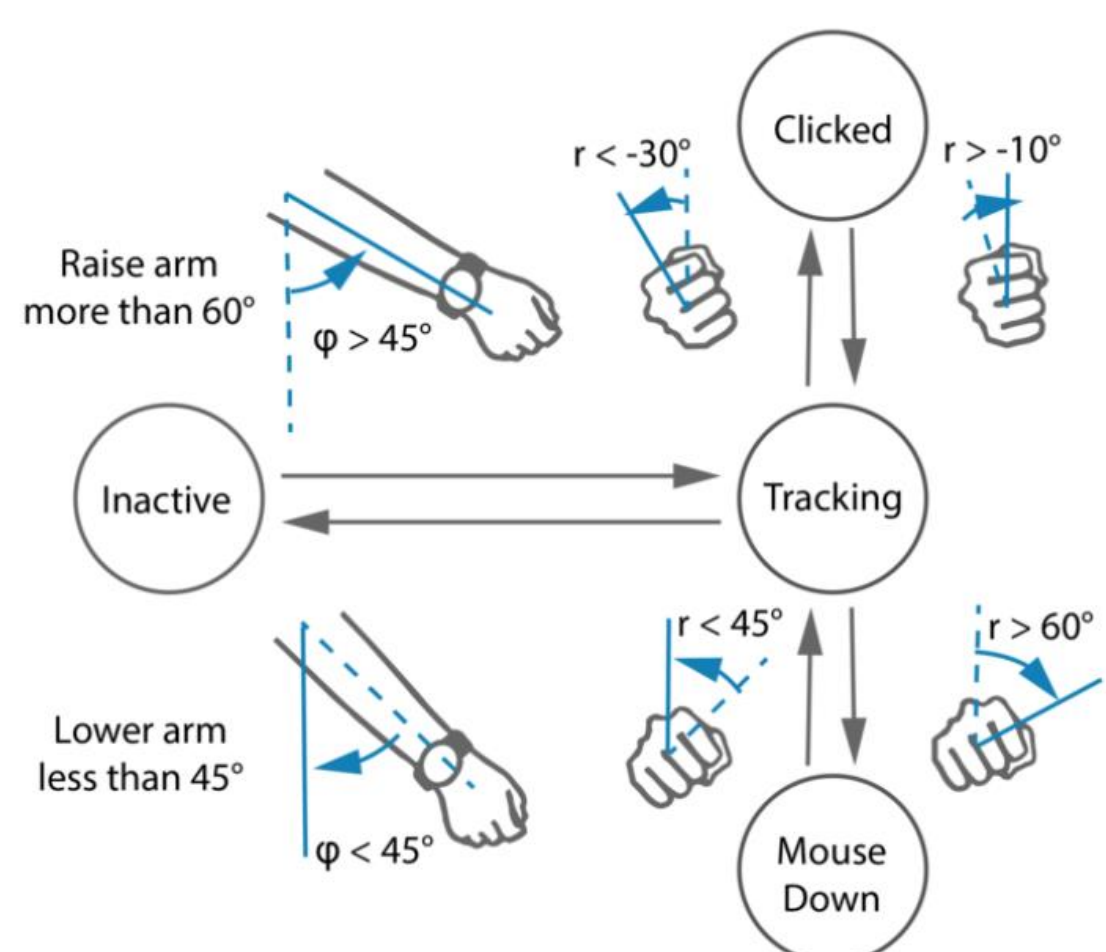
# Smartwatch-based Pointing Interaction

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## Related Work



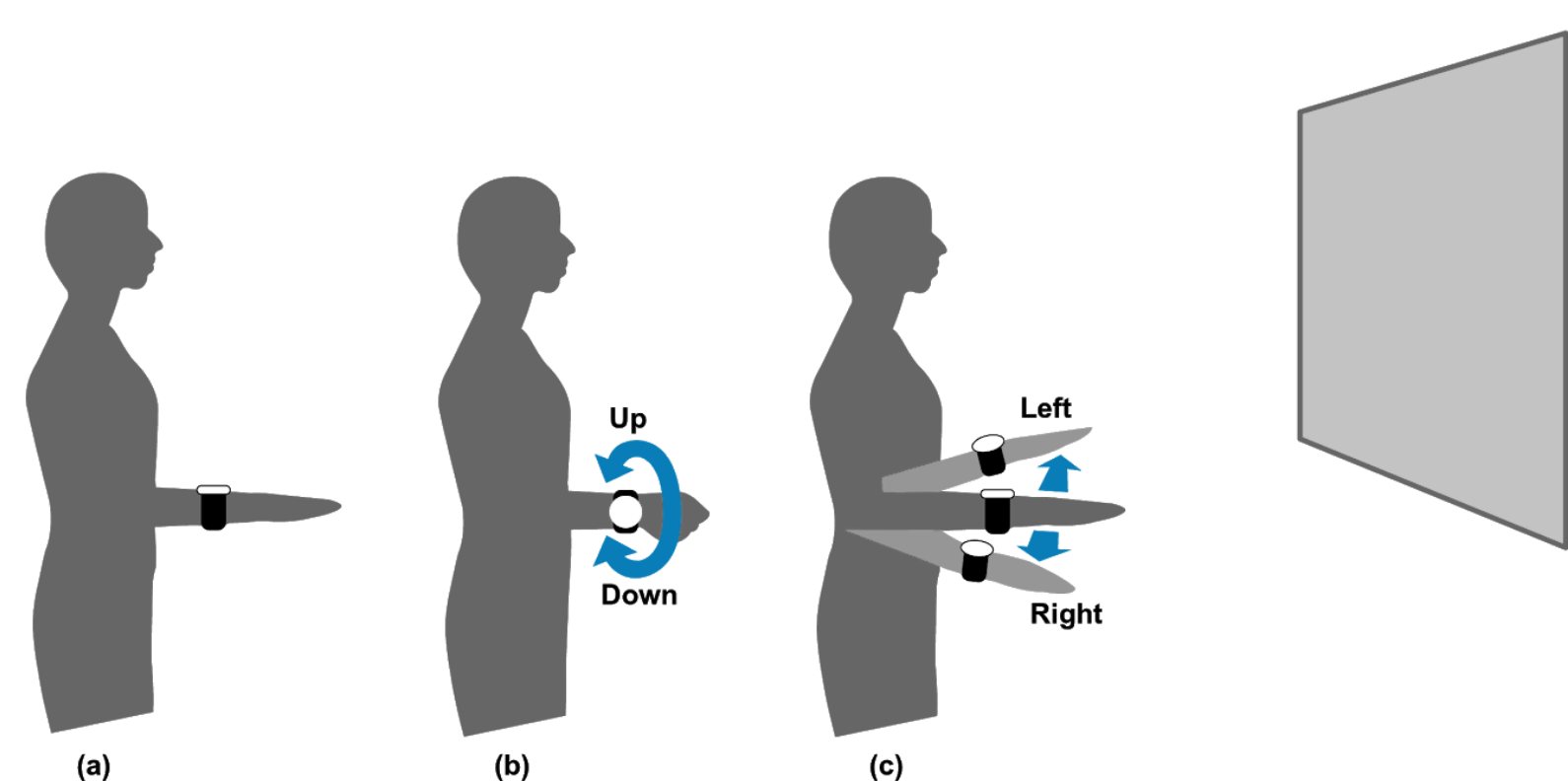
### Watchpoint by Katsuragawa et al. '16

- Left-right-up-down forearm movements & wrist rotation gestures
- Four-state model
- + Outperforms former techniques
- + Provides a freehand interaction
- Does not suitable for a sedentary position
- Triggers to an accidental target selection

## Concept: Twist, Point, and Tap

### Cursor Movement

- Relying on inertial sensors
- Vertical cursor positioning via wrist rotations
- Horizontal cursor positioning via left/right forearm movements
- + Triggers less user fatigue in comparison to Watchpoint
- + Efficiently suitable for casual use scenarios



### Selection Interaction

- Relying on tapping on the touchscreen of a smartwatch
- Left-click (L-C) and right-click (R-C)
- + Provides a mouse-like selection technique
- + Triggers less pronounced Heisenberg effect
- + Supports casual use scenarios



## Introduction

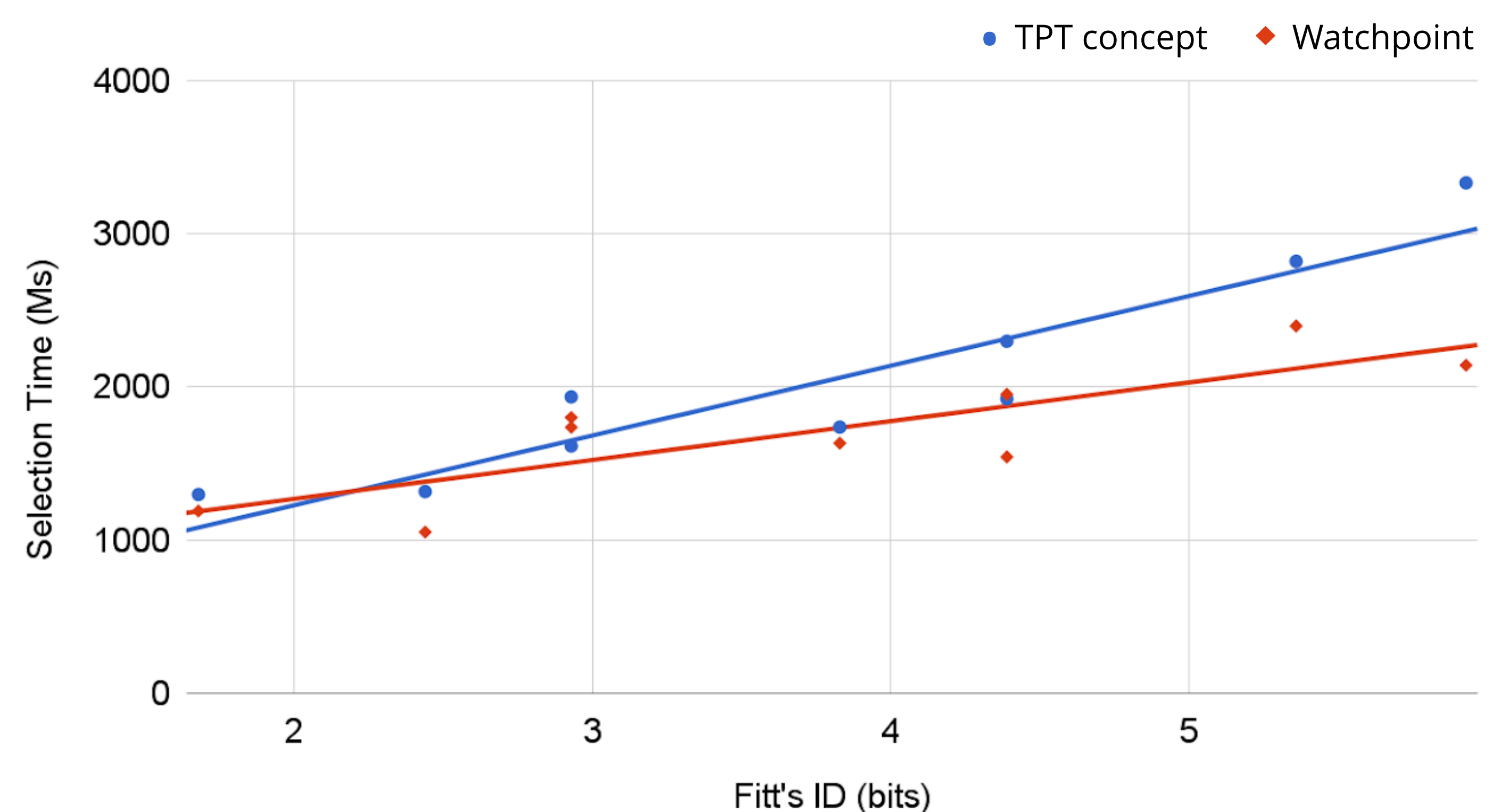
We want to present the design and evaluation of a smartwatch-based mid-air pointing and clicking interaction technique called **Twist, Point, and Tap**, or short **TPT**. Incorporating only commodity devices, we aim to provide a fast and error-prone pointing approach that can easily be deployed to existing environments with a shared display, e.g., meeting rooms or public info points.

We present:

- Limitations of related work
- Concepts for pointing interaction via smartwatch
- Evaluation

## Evaluation: TPT versus Watchpoint

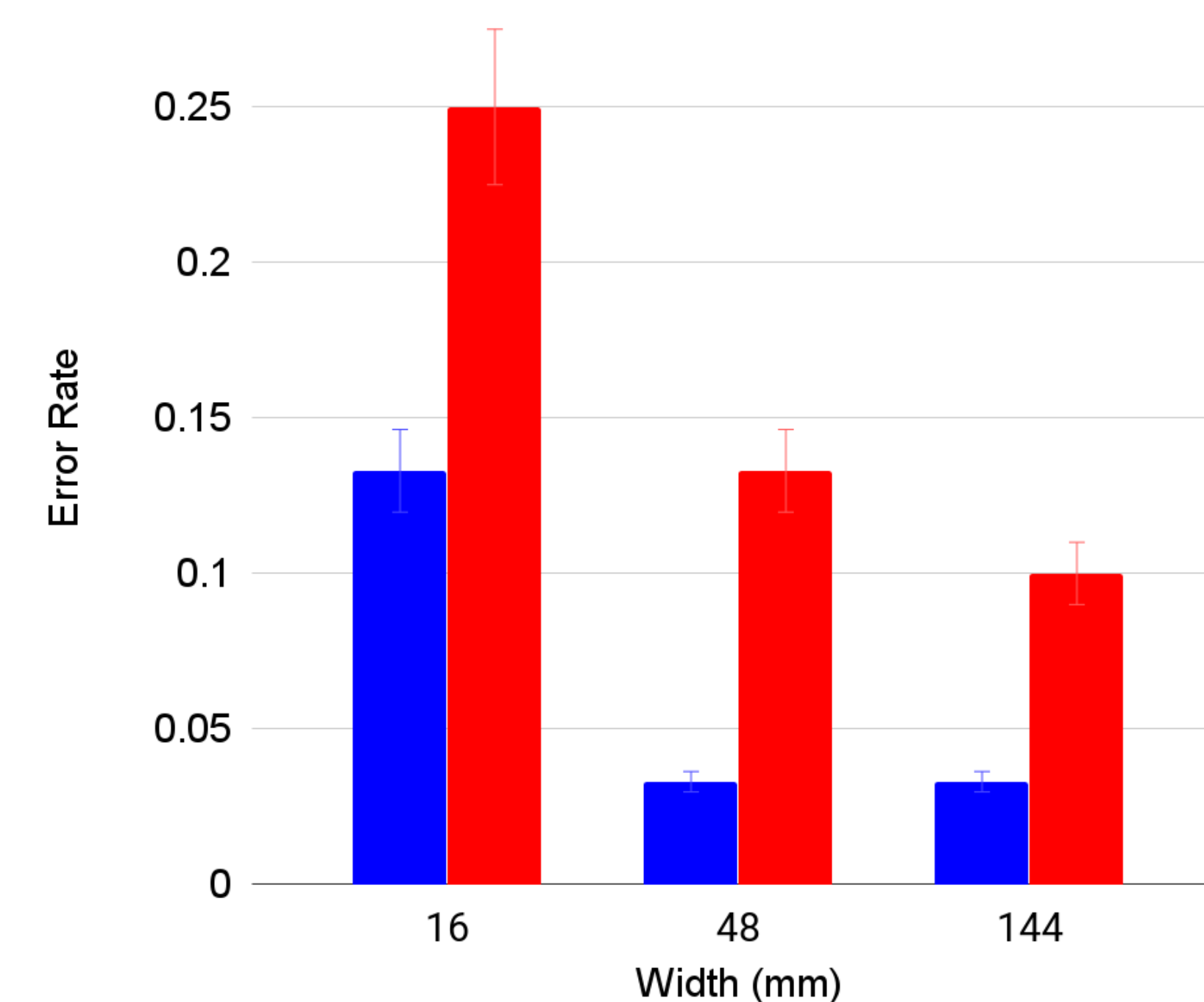
### Selection time



The TPT concept:  $R^2 = .86$   $MT = 318 + 455 \times ID$

Watchpoint:  $R^2 = .68$   $MT = 763 + 253 \times ID$

### Error rate



### Overall error rate

- TPT concept: 6.3%
- Watchpoint: 13.8%

