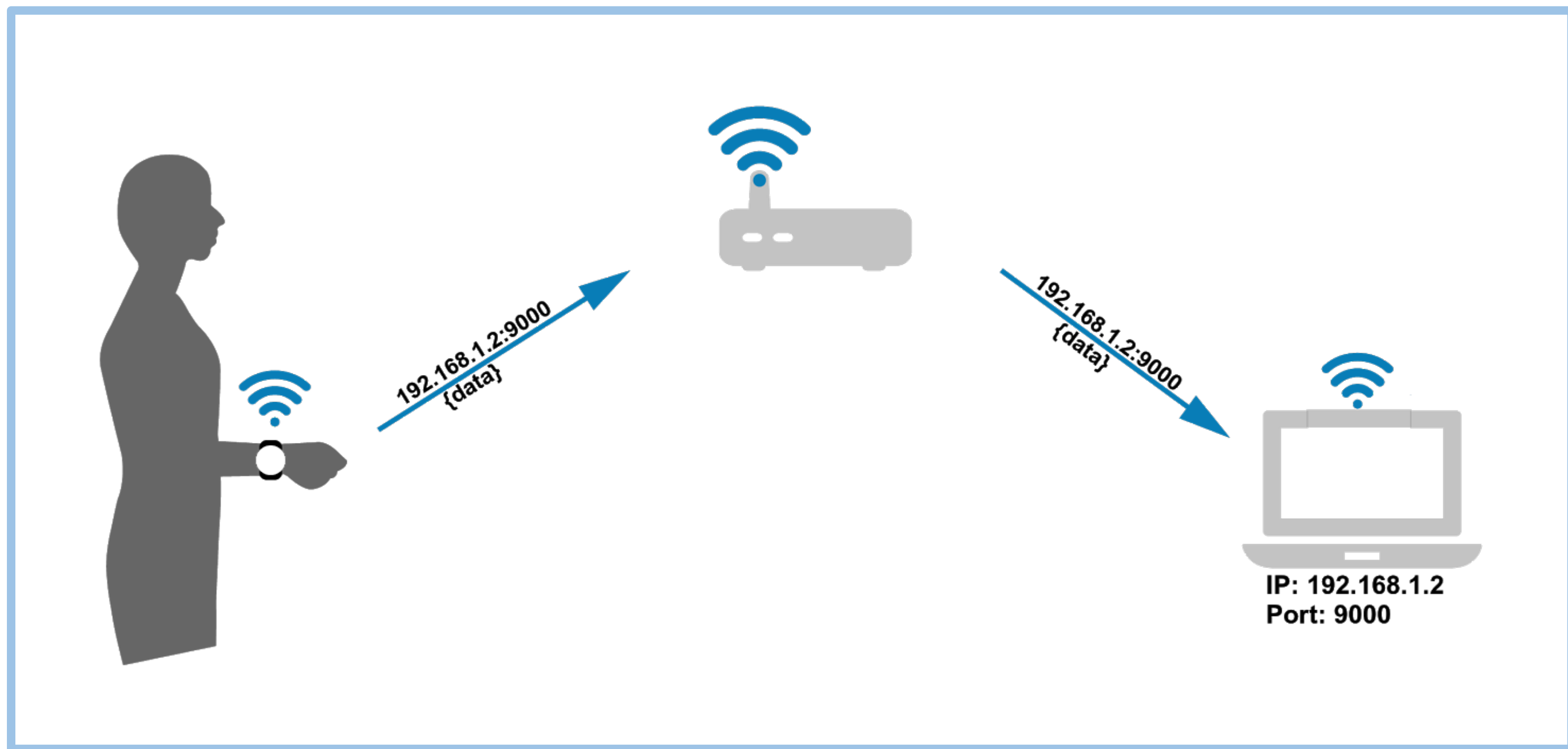


Smartwatch-based Pointing Interaction

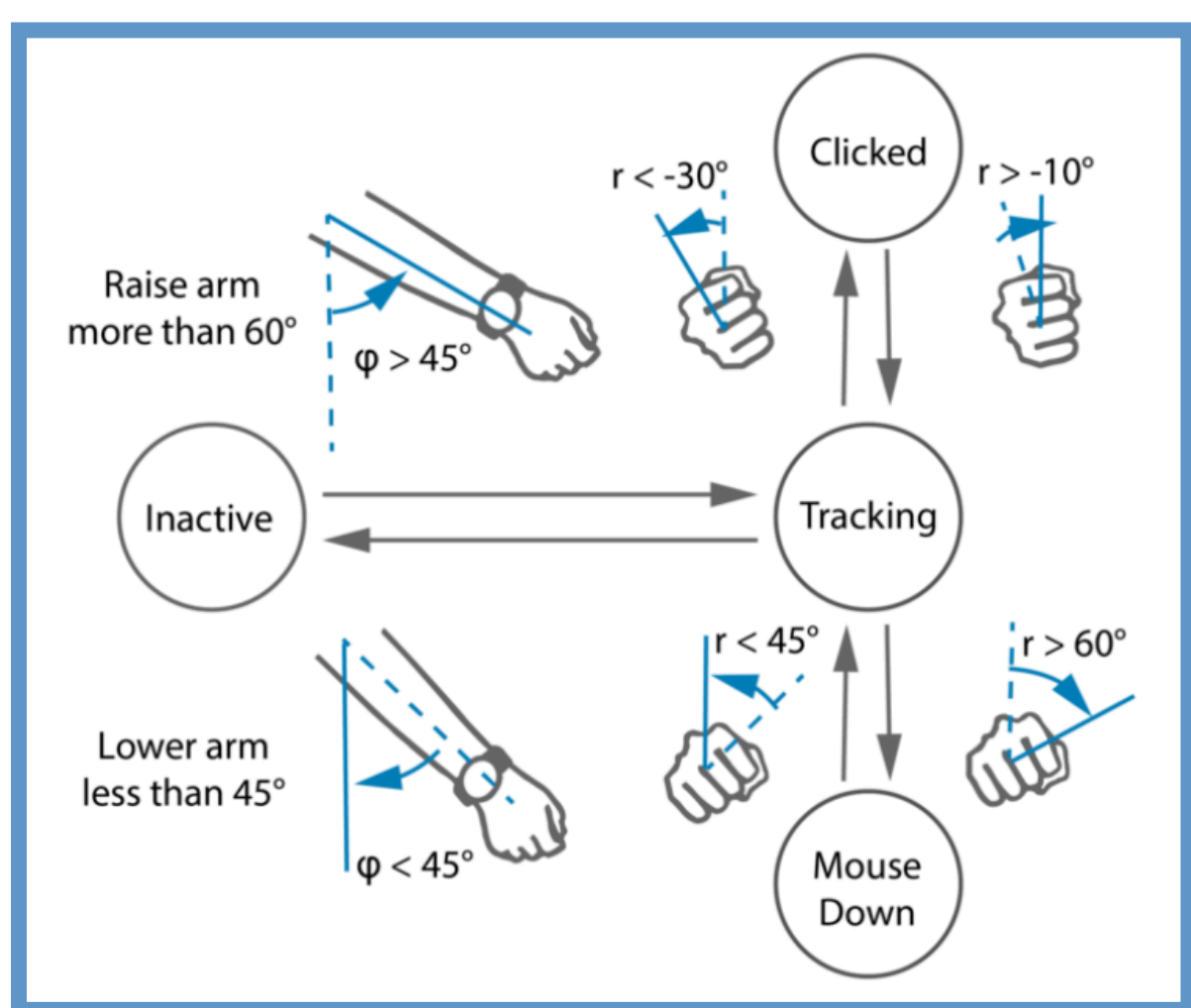
Javid Abbasov¹, Tom Horak², Raimund Dachzelt²

T-Systems Multimedia Solution¹

Interactive Media Lab, Technische Universität Dresden²



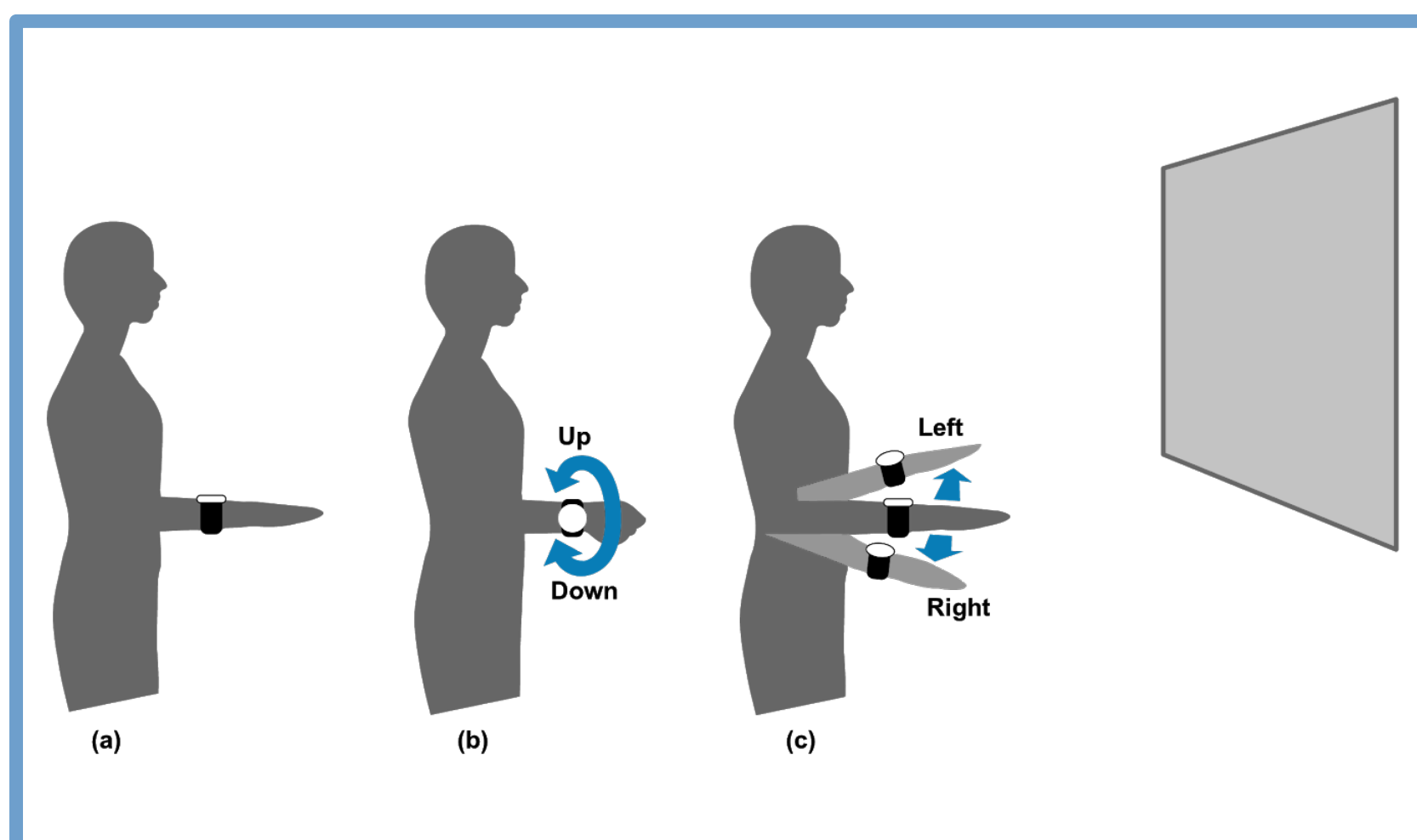
Related Work



➤ Watchpoint, by Katsuragawa et al. 2016

- 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

Twist, Point, and Tap Concept



➤ 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

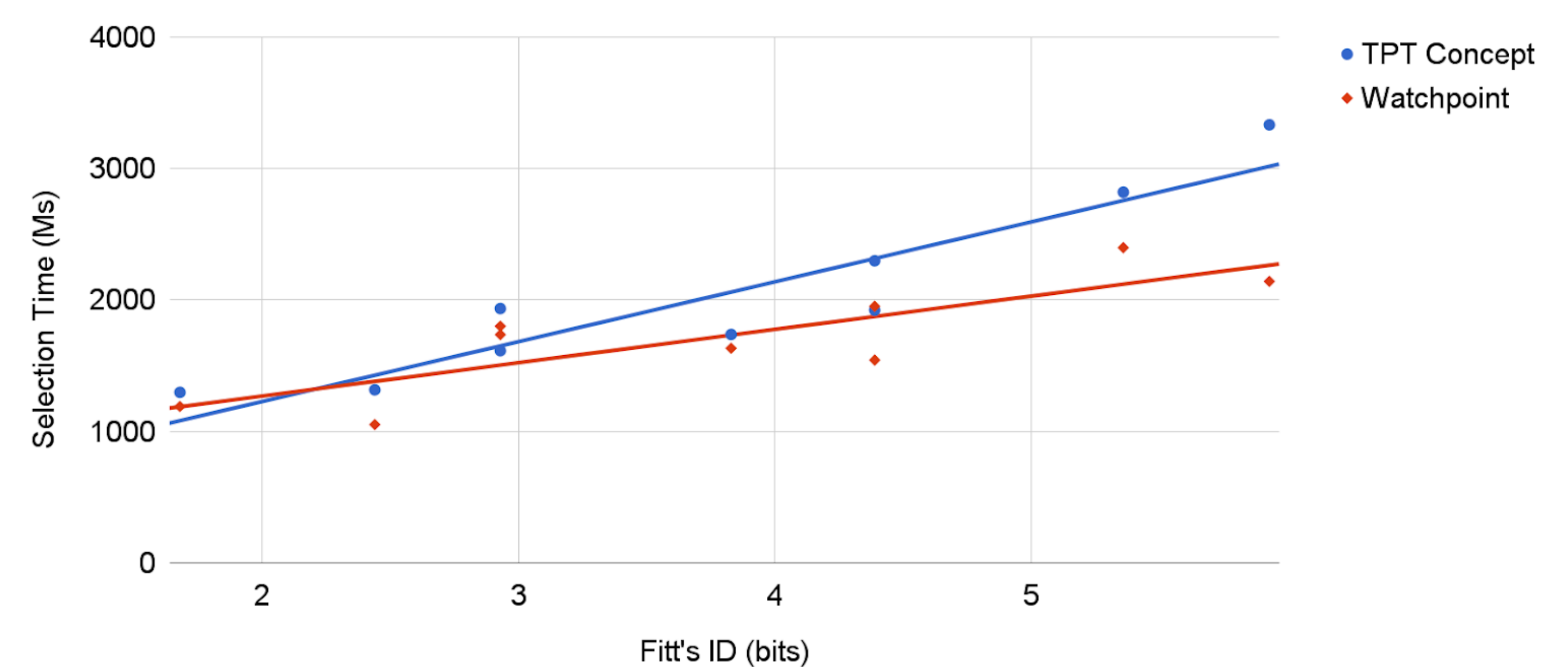
We want to present the design and evaluation of a smartwatch-based mid-air pointing and clicking interaction technique called Twist, Point, and Tap, or short TPT. Incorporating only commodity devices, we aim to provide a fast and error-prone pointing approach that can easily be deployed to existing environments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

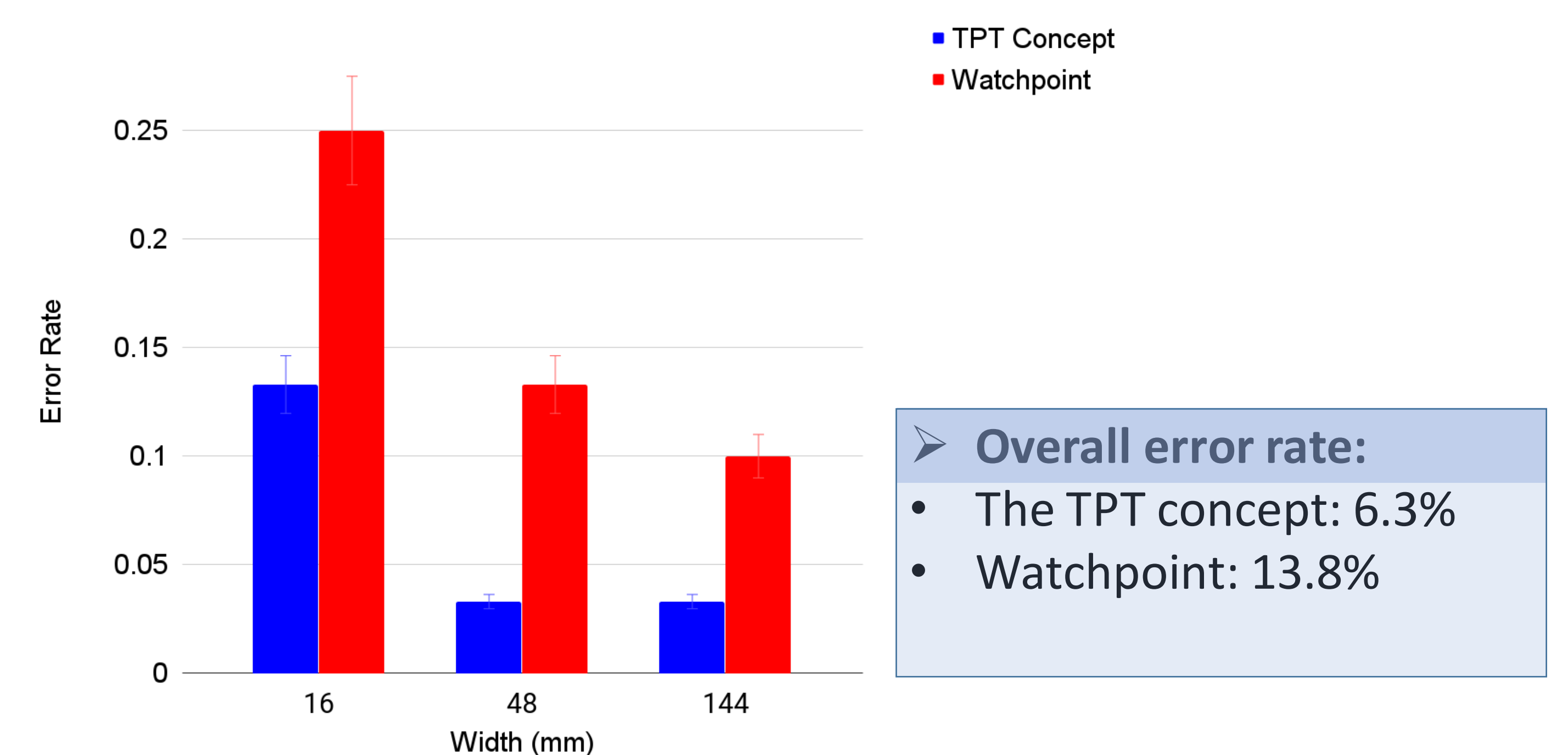
Evaluation

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:

- The TPT concept: 6.3%
- Watchpoint: 13.8%

