Test Automation for Multi-touch User Interfaces of Industrial Applications

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Challenges in Multi-Touch-UI Testing

- **Complexity**
  - A gesture spans a period of time
  - Multiple states

- **Diversity**
  - Characteristics of a performed gesture are very individual
  - Gestures are more vulnerable to disabilities than traditional user input

- **Fuzziness**
  - Touch-interactions are less precise than mouse input
  - "Gravity" is a common technique to expand the touch-sensitive area beyond the actual bounds of a control

Parameter | Physical characteristics
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Timestamp | speed of finger movements
Height and width of Bounds | contact pressure of finger
Left, Top of Bounds, Position | jitter of finger movements
Relative position of touch points to each other | size of the hand, one-hand vs. two-hand gesture (rough estimation)
Interchange of up- and downstream events | jitter (different movement speed) of finger movements
Insertion of TouchUp and TouchDown events | jitter (brief lifting of fingers) of finger movements

Gravity

Button A

Button B

Approach and Implementation

- **Preconditions**
  - Windows 7 Embedded: missing tool support for test automation
  - Keep impact on existing code as low as possible

- **Test Automation**
  - Windows Message Queue

- **Gesture Recognition**
  - Replay

- **Low level touch events**

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