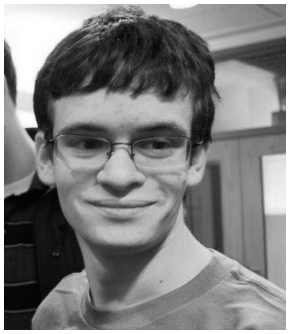
Group 27

Prerak Patel



Ben Wasserman

Dev Gurjar

Daniel Jacobs

Twerty

The next generation keyboard minus the board

Our Requirements

Functional

- Tactile Feedback
- Bluetooth Connectivity
- Probabilistic Typing

Non-Functional

- Typing speed
  - >40 wpm (average typing speed of iPad)
- Multi-surface
- Learning curve
  - 30 second rule

Status Update

The Good

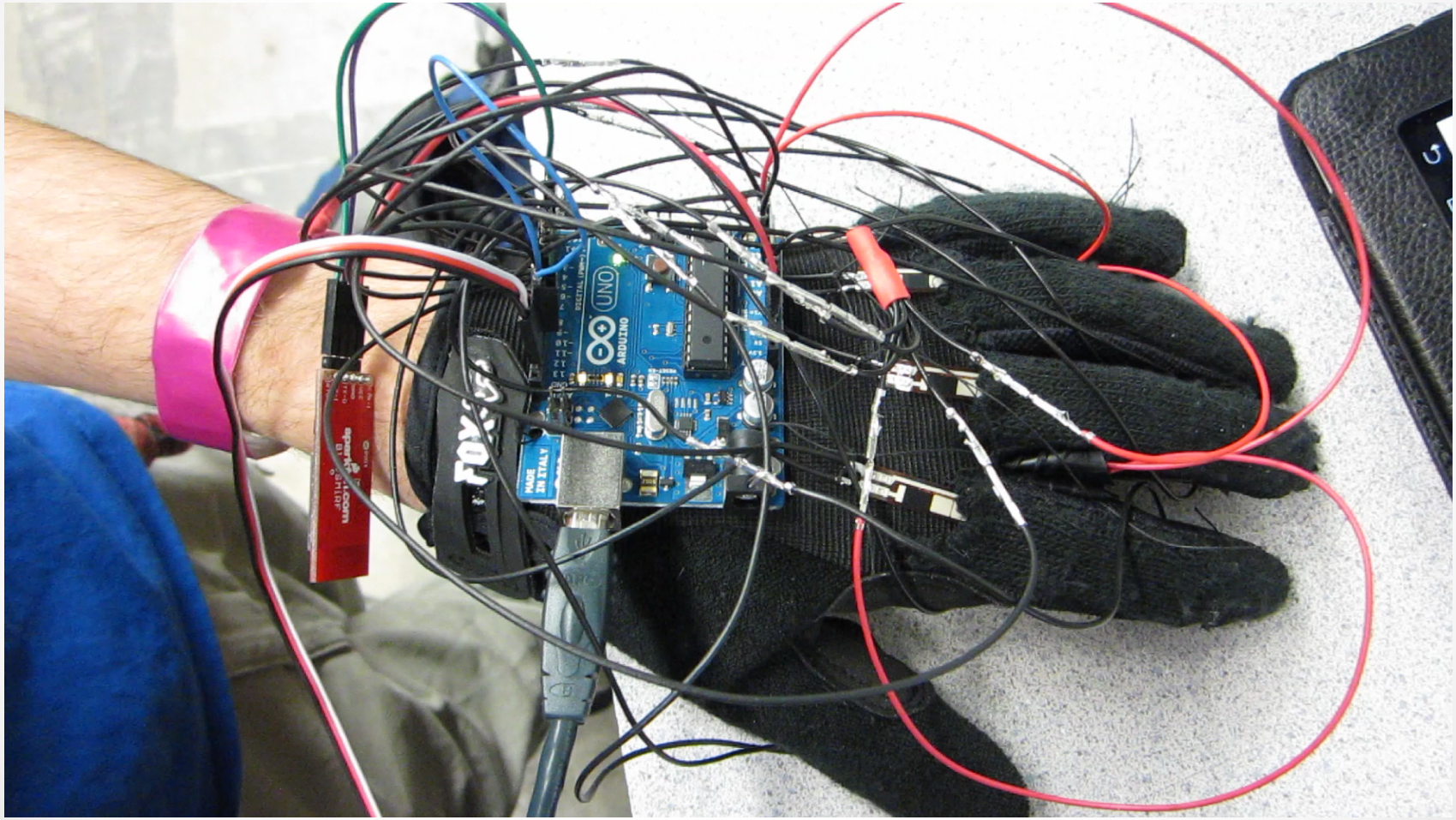
- Two functional gloves
- Tactile feedback
- Horizontal finger motion detection
- Bluetooth connectivity
- Finger flex detection

The Bad

- Inter-glove *wireless* communication not implemented
  - Using Arduino Unos connected via serial
- No probabilistic autocorrect

Keyboard Implemented

Status Update



Metrics

Functional Tests

- Latency
  - Time to send a character over Bluetooth using HID profile
- Raw Throughput
  - Maximum number of characters that can be received by a tablet per second

User Tests

- Accuracy
  - Given a passage, number of characters typed to complete the passage

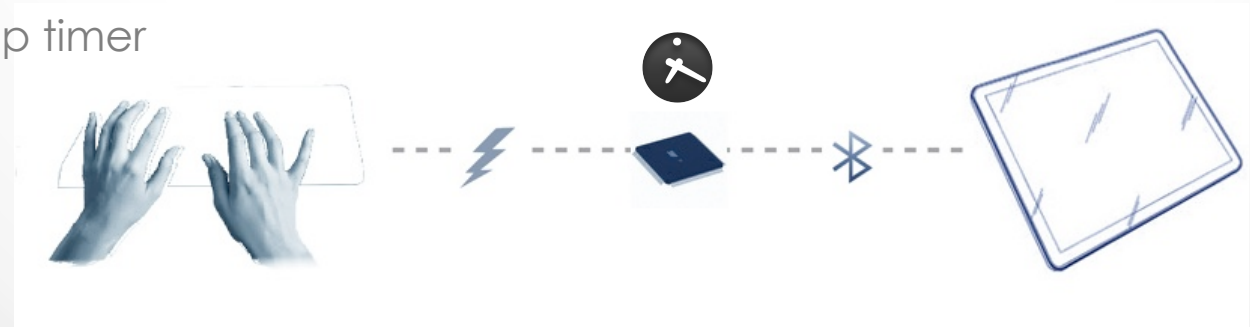
Latency

Procedure

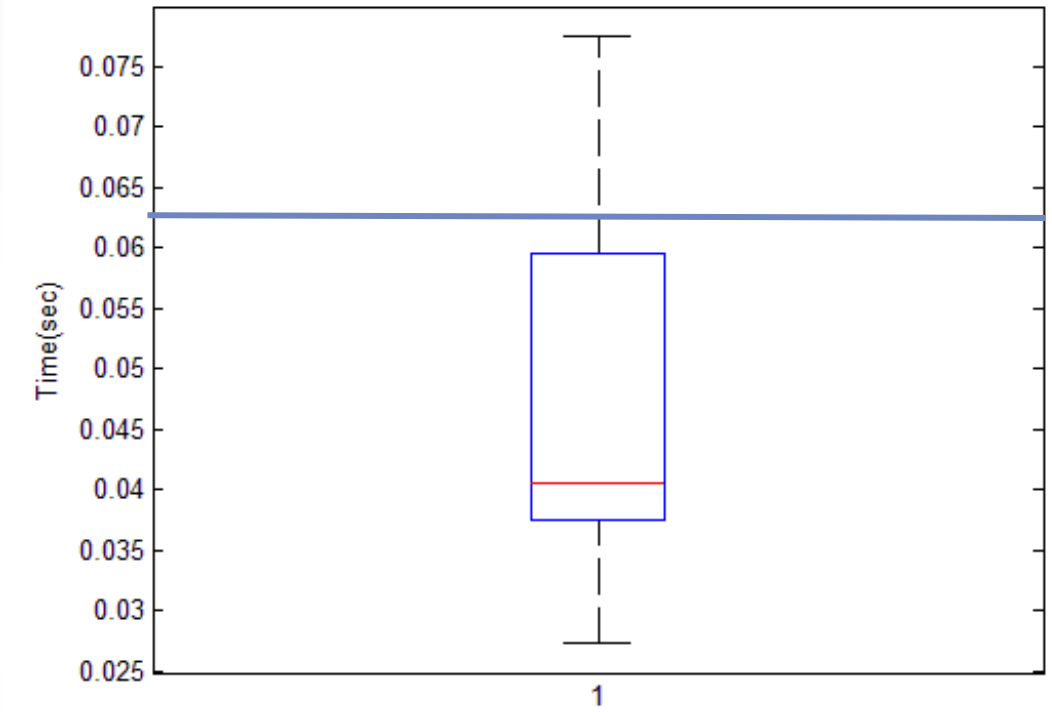
1. Send character from computer to gloves via serial
   - Start a timer
2. Have glove echo the character back to the computer through the HID profile.
   - Stop timer

Expectation

- There should be no visible lag, the latency should be less than 0.0625 seconds

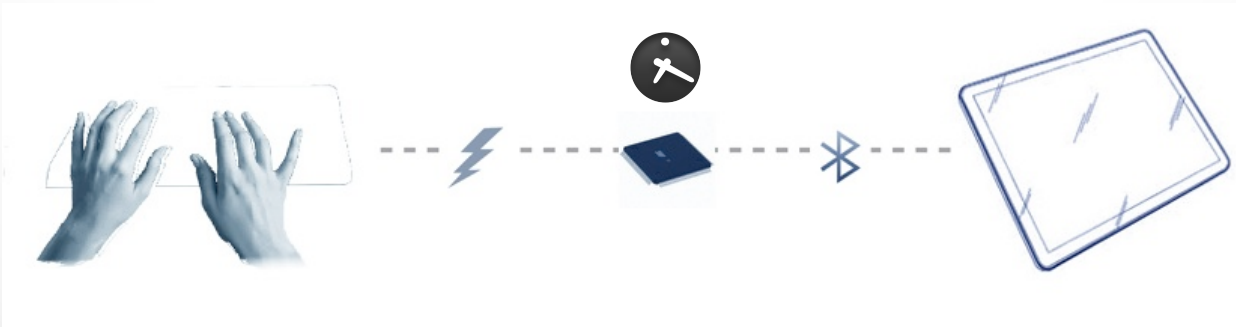


Latency



Minimum noticeable delay .0625 seconds

Result of 11 Tests



Raw Throughput

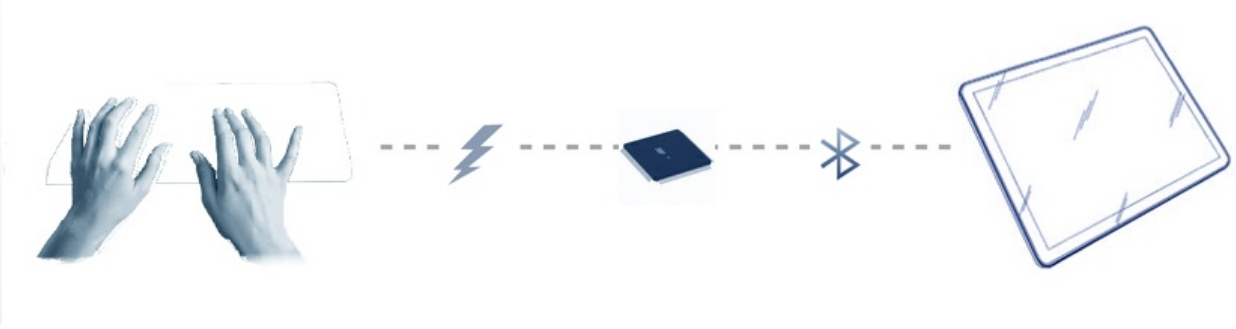
Procedure

1. Press random keys as fast and frequently as possible for 10 seconds

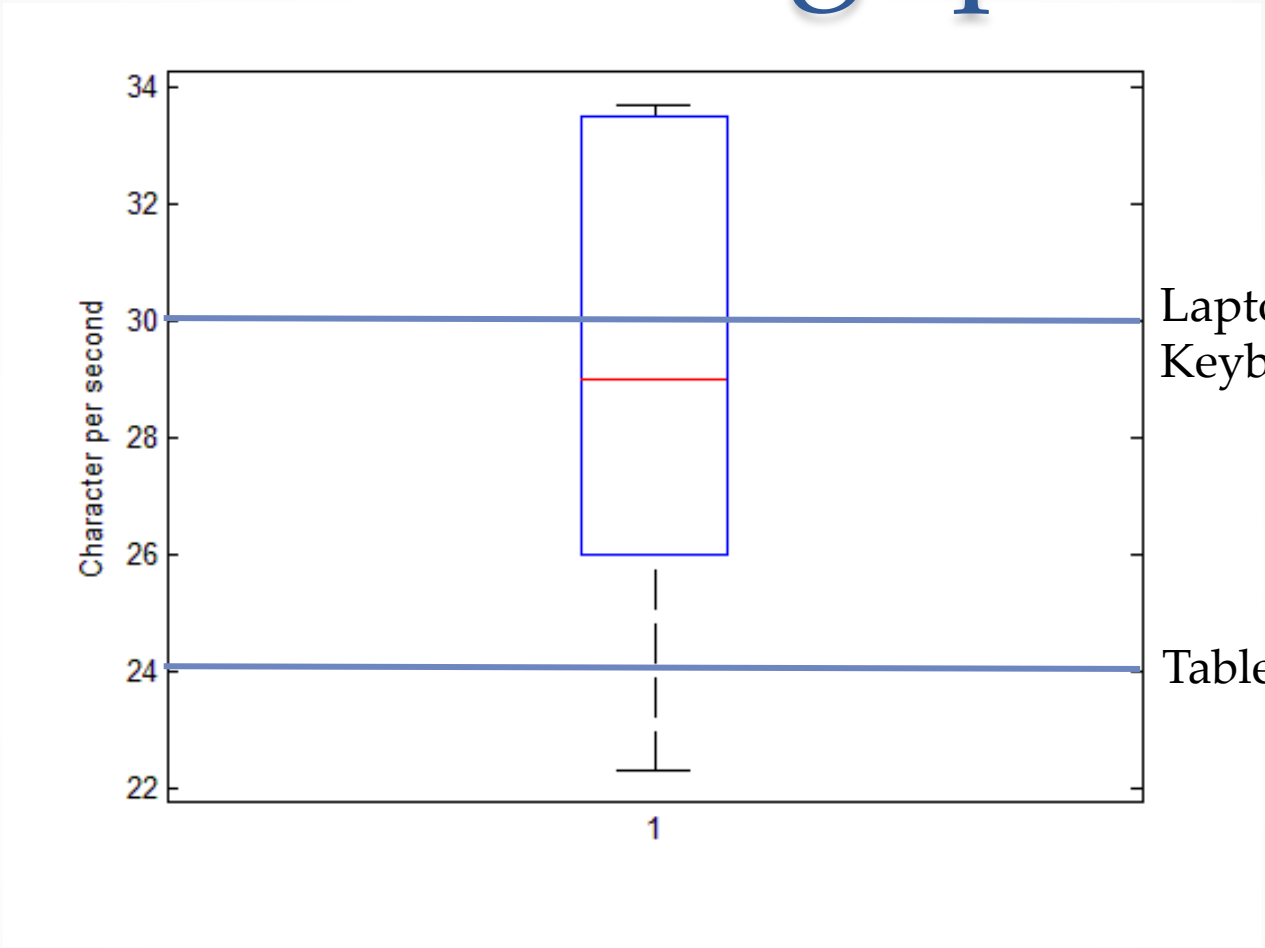
2. Count number of characters displayed on the connected device. Divide by time to get keys per second.

Expectation

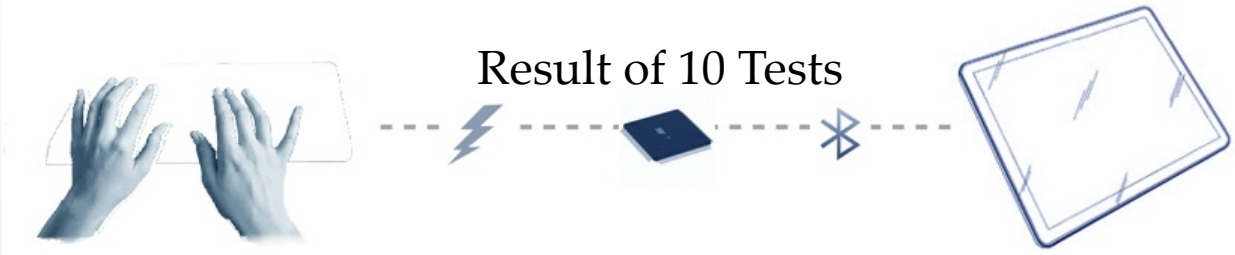
- Our set value for throughput can support max typing speed. Should be faster than tablet keyboard.



Raw Throughput



Result of 10 Tests



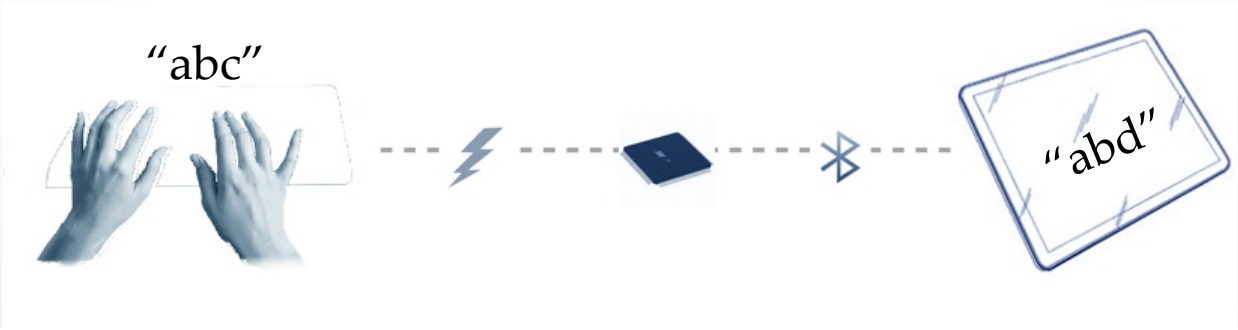
Accuracy

Procedure

1. Have touch-typist type a given set of characters
   - Paper keyboard layout will be given for visual reference
2. Wait until the user is done
   - Determine the number of attempts it took for the user to type the set of characters correctly
   - Do not include backspace

Expectation

- Calibrated users should perform more accurately and consistently than novice non-calibrated users



Accuracy

Calibrated

Knowledgeable

Novice

Input Strings

"the keyglove wearable input device"

"by putting the keys into hands instead"

"the next generation keyboard minus the board"

1

2 - 3

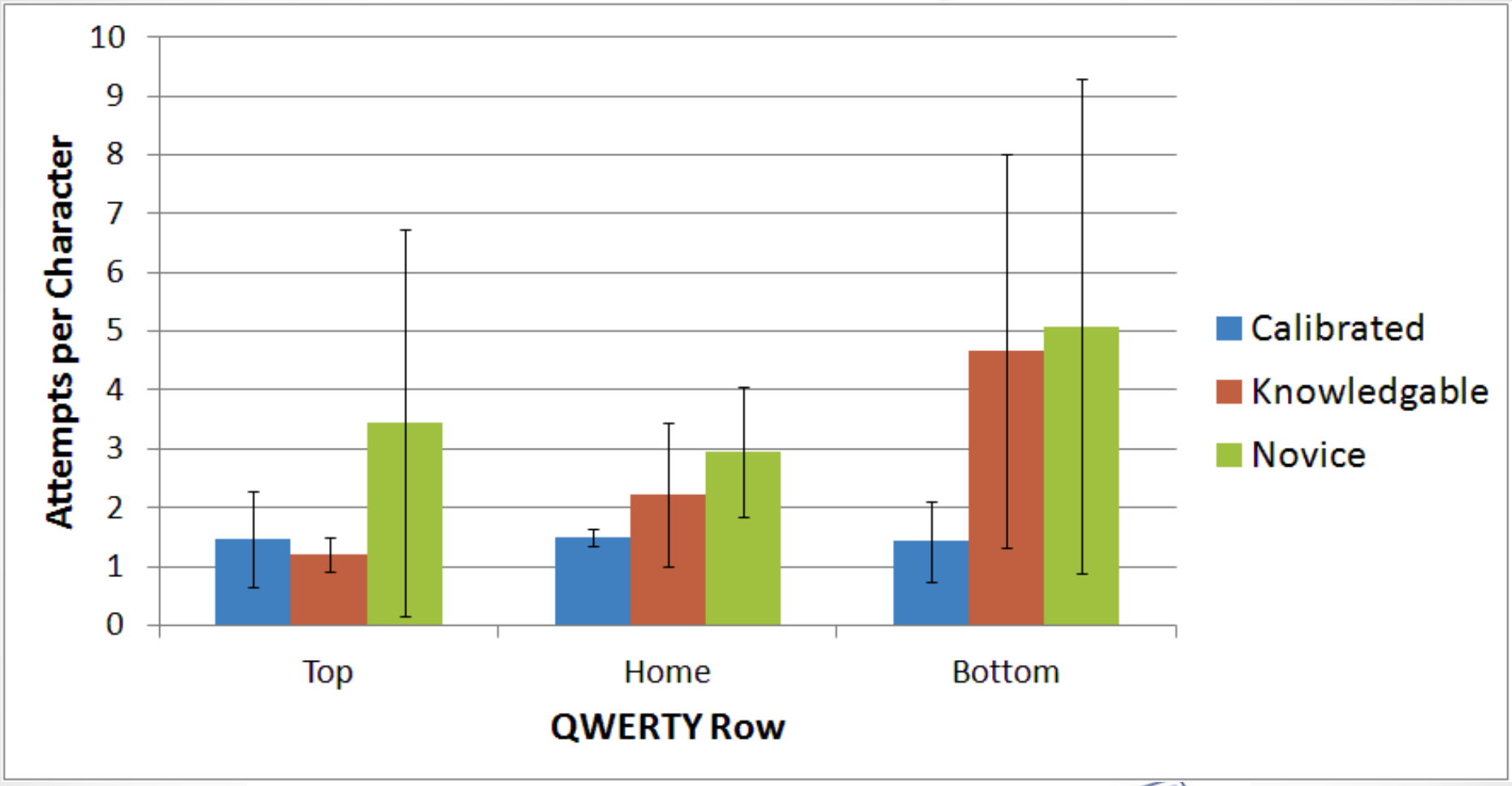
3 - 4

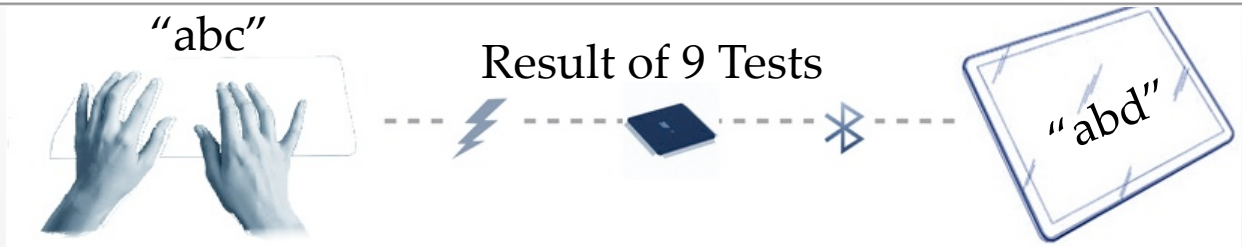
5 - 6

7+

avg. characters needed

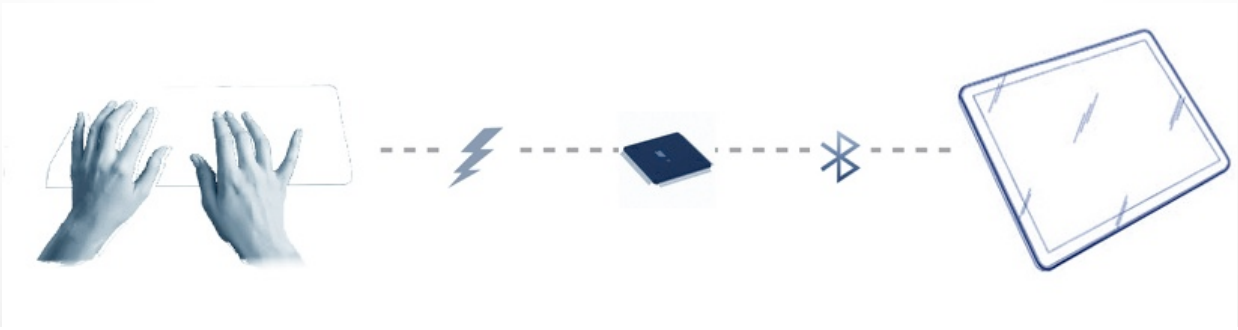
Accuracy


10
9
8
7
6
5
4
3
2
1
0
Attempts per Character
Top
Home
Bottom
QWERTY Row
Calibrated
Knowledgable
Novice


“abc”
Result of 9 Tests
“abd”

Final Demo

- Inter-glove wireless communication
  - Worst Case: Arduino Uno
  - Best Case: Atmega128RF
- Probabilistic autocorrect
- Automatic calibration
- Better form factor
- Battery



Questions?