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Using Gaze Based Passwords as an Authentication Mechanism for Password Input

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Introduction

- Traditional knowledge based authentication techniques
 - Vulnerable to shoulder surfing
- Gaze as form of password input
 - Shoulder surfing resistant
- User study of gaze based password methods
 - Speed
 - Error rates
- Using subject specific gaze estimation parameters gathered during a calibration procedure
 - Additional layer of security in gaze-based authentication methods
 - Gaze-based passwords are not recognized by the system when using the gaze estimation parameters of a different user

User Study

- 20 Subjects
- 50 Trial Session
- 5 Password Input Methods
 - Keyboard based password method as a reference
- Password lengths for each input method selected so password space for each method would be within the same order of magnitude among different methods

Select your login name and click Next:

Text Password

Gaze over numberpad Password

Gaze Image Password

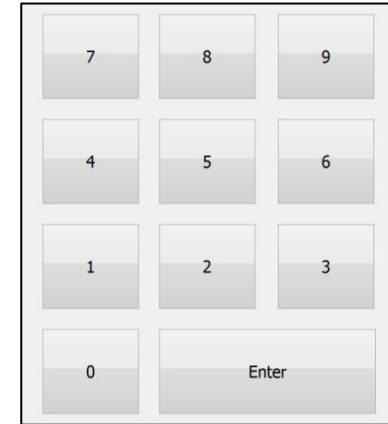
Gaze Gesture Password

Object Track Password

Password Methods

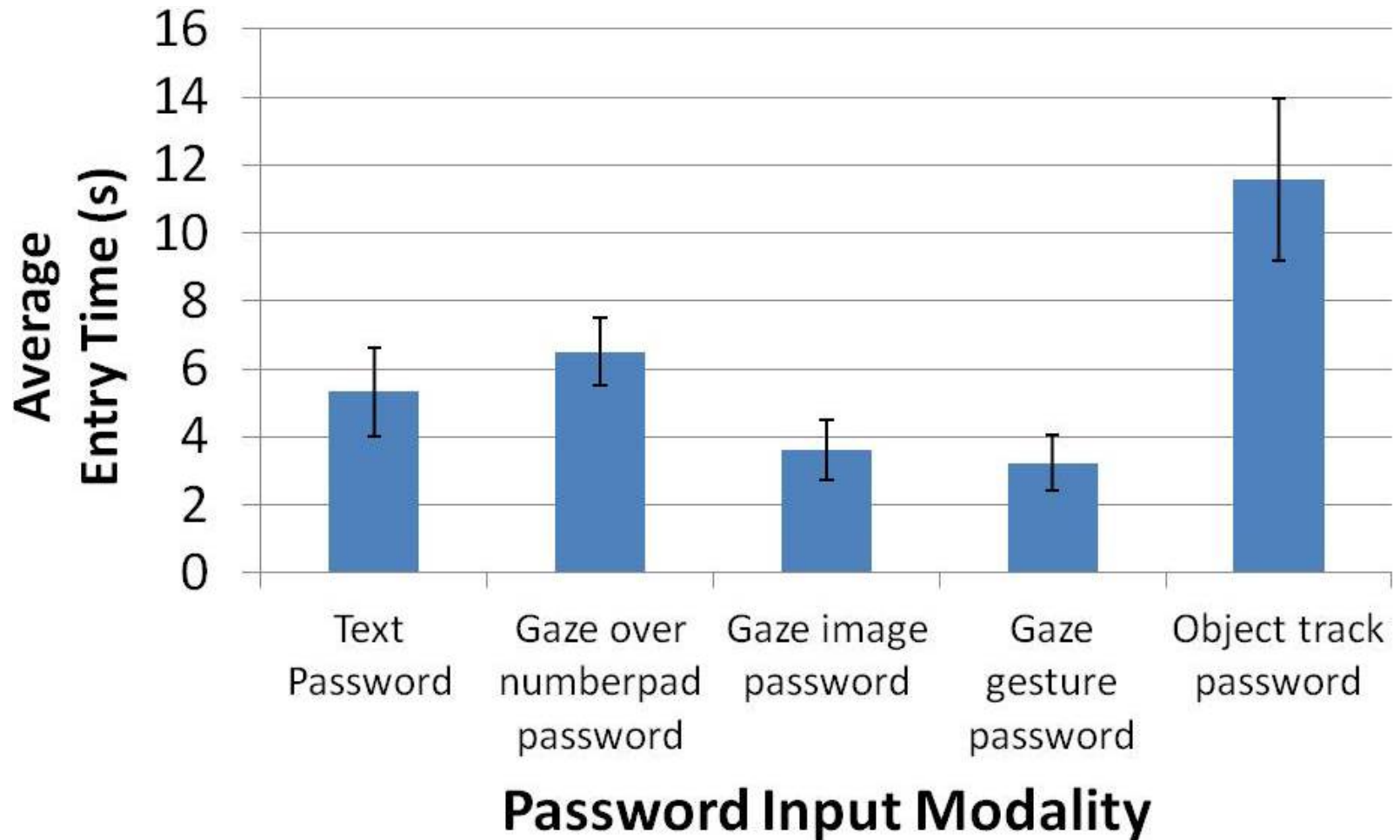
- Traditional Keyboard
- Gaze Over Numberpad
- Gaze Image Password
- Gaze Gesture
- Object track password
 - Using smooth pursuits

Enter Your password and press Next:

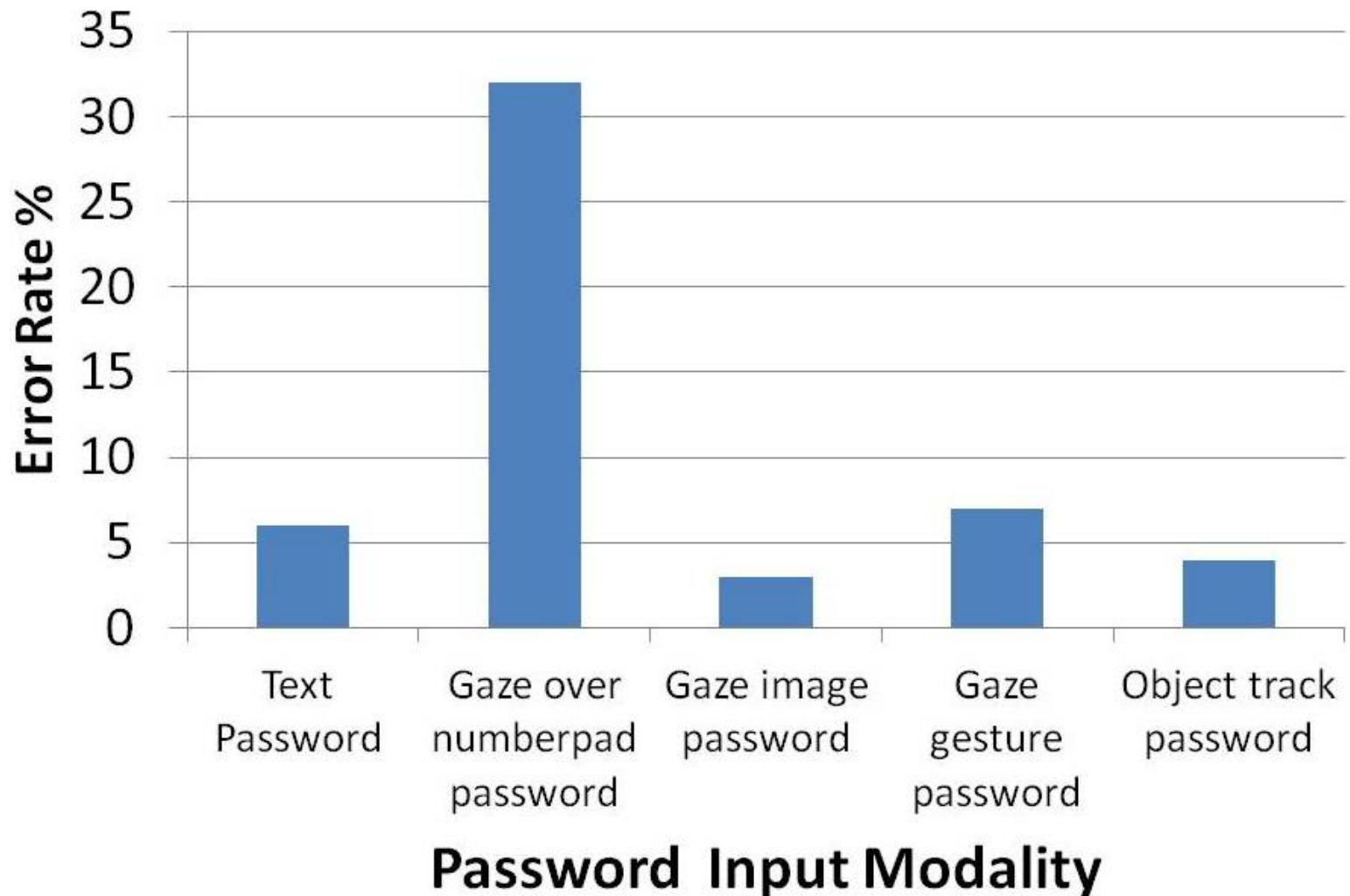




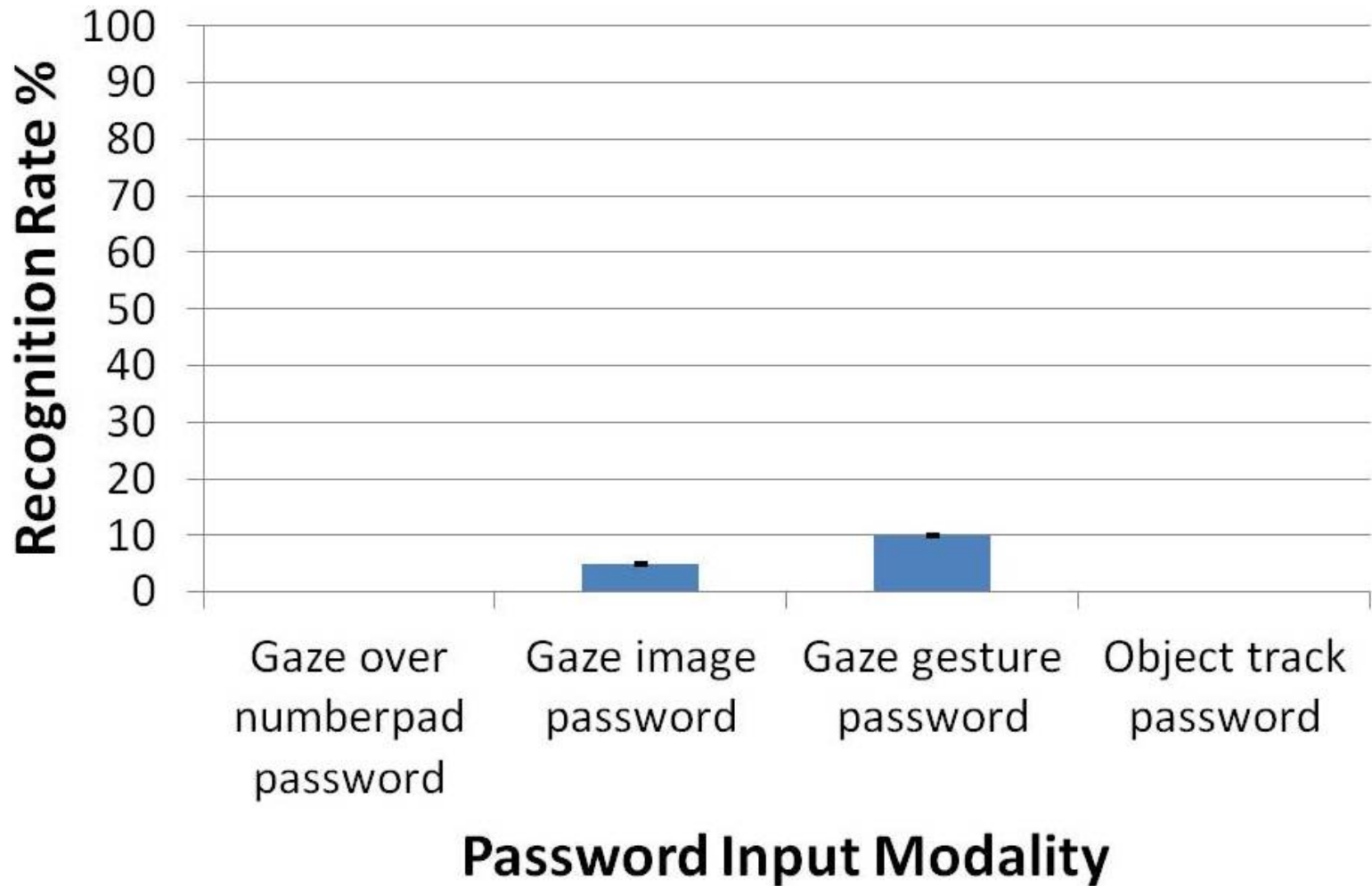
Average Password Entry Time



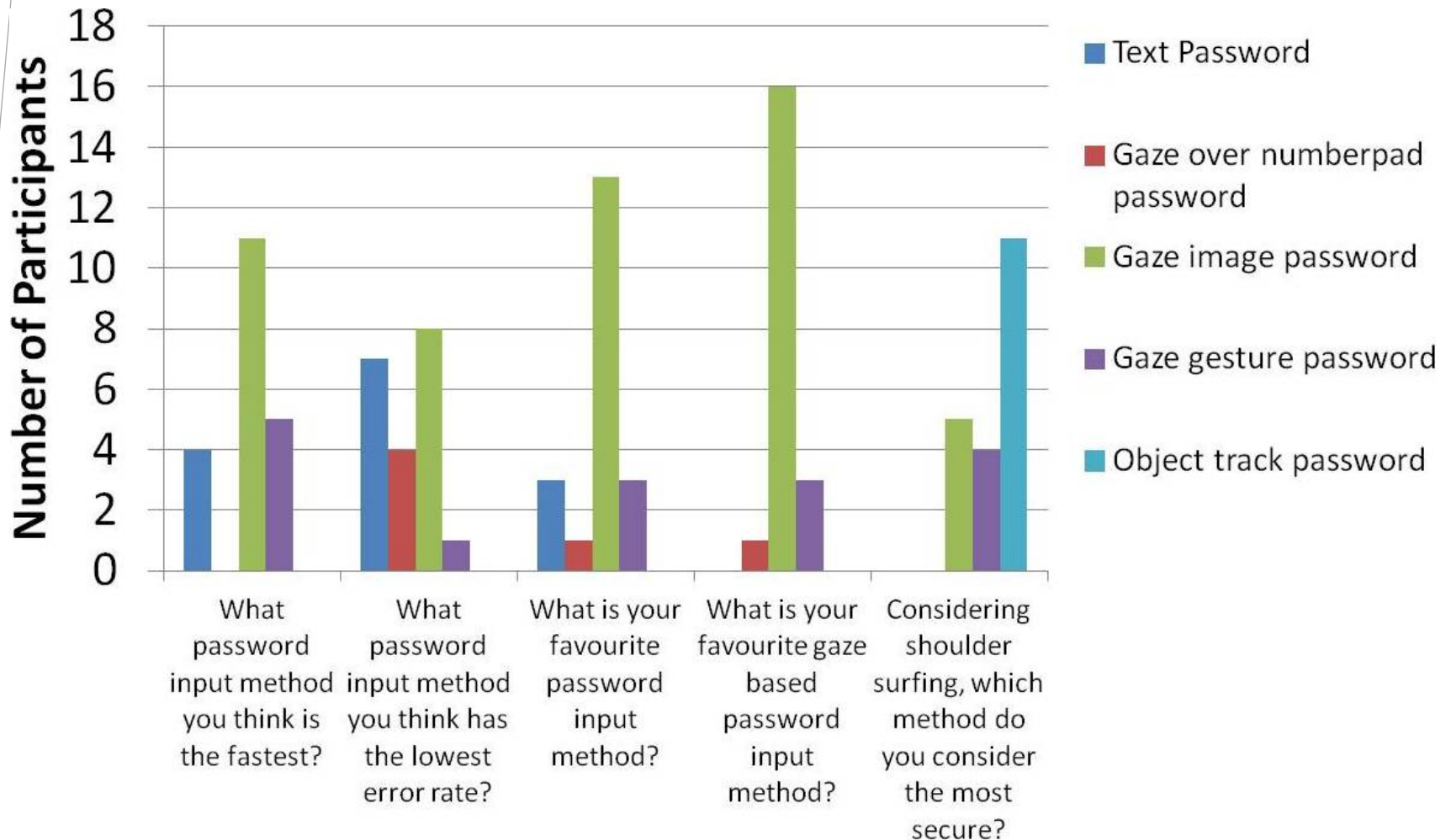
Average Error Rate



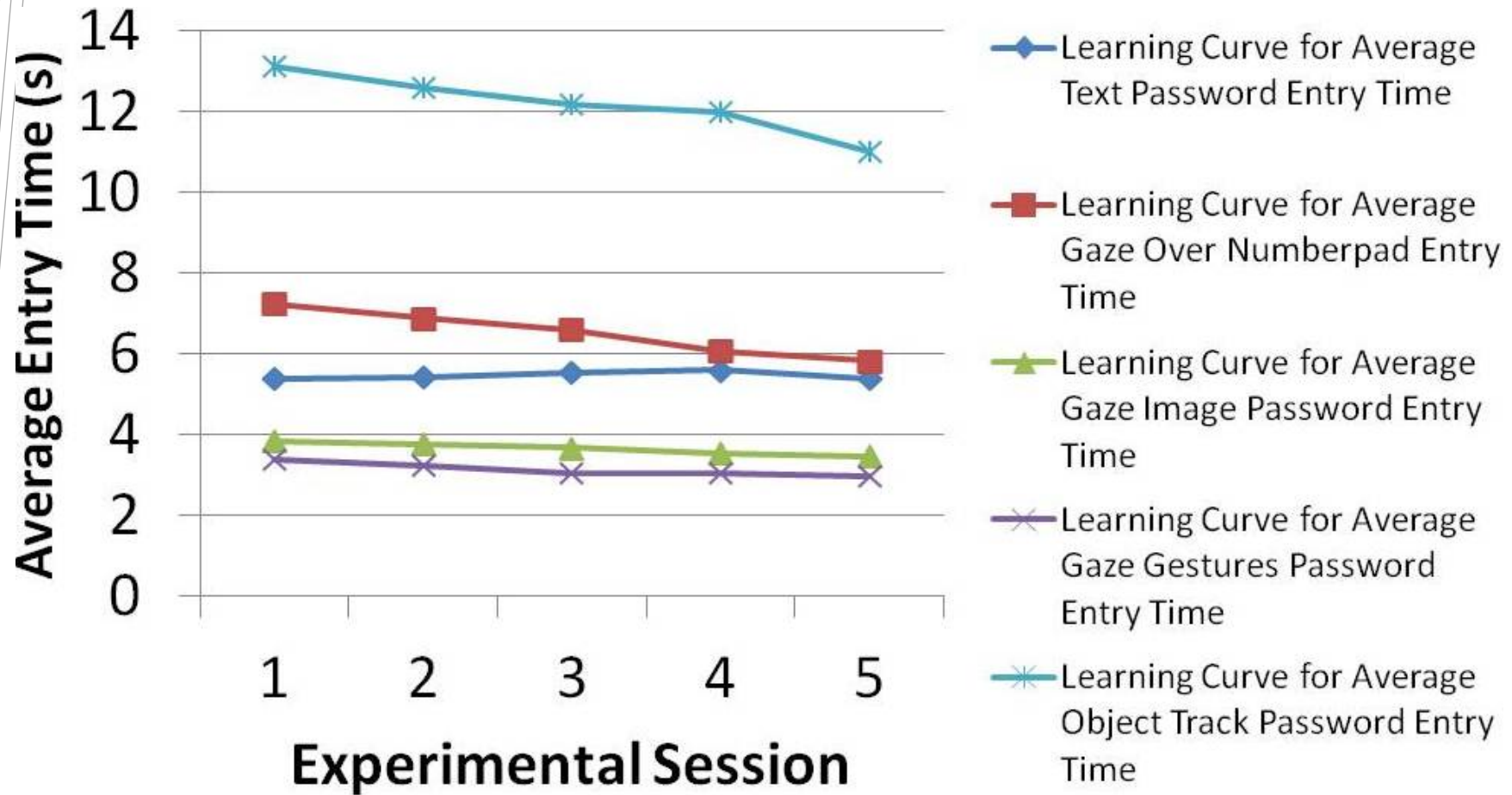
Average Recognition Rate with Wrong Calibration Parameters



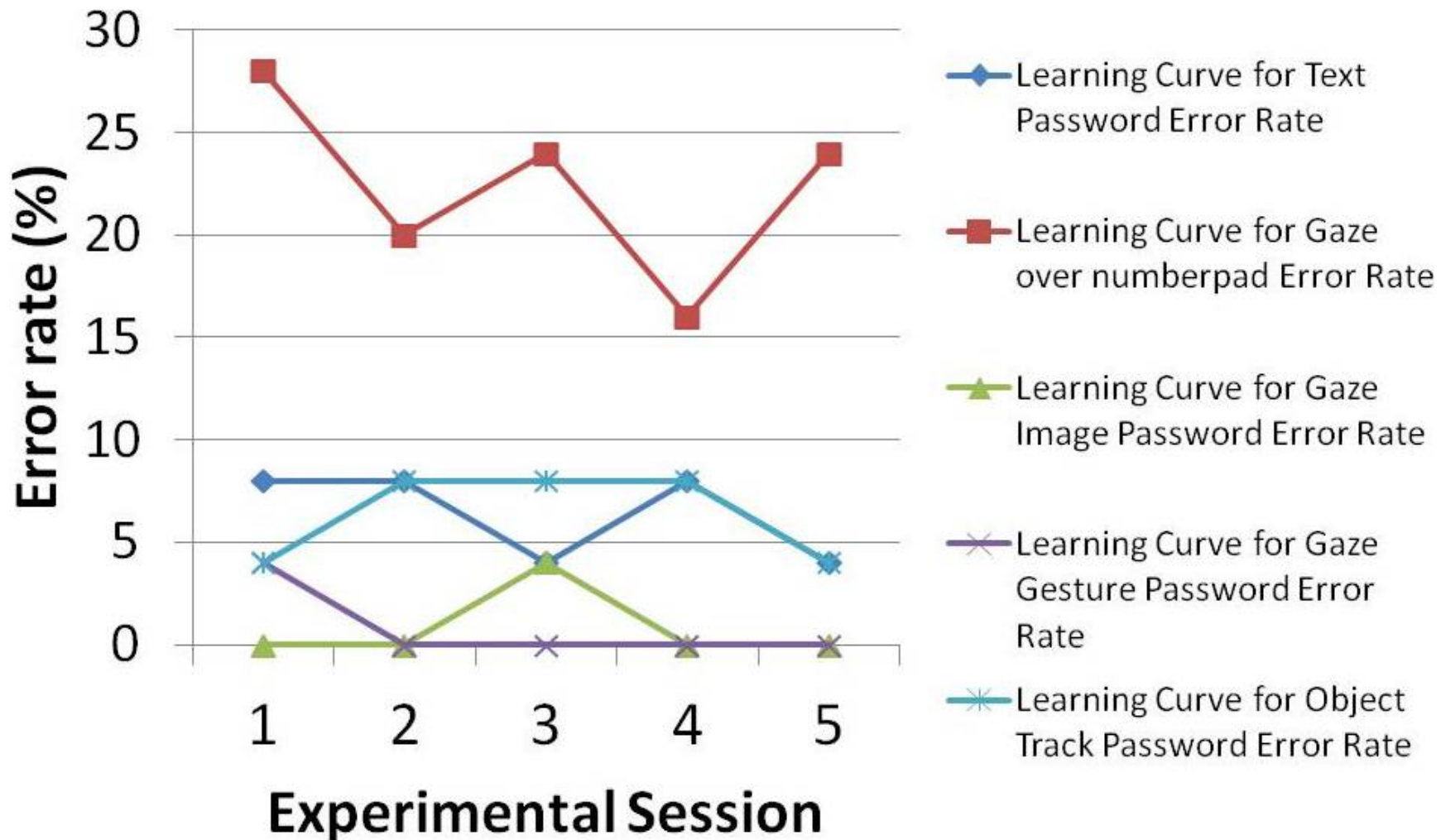
Average Recognition Rate with Wrong Calibration Parameters



Learning Curve



Learning Curve



Summary

- Gaze can be used for authentication purposes in HCI
 - Several possible modalities
 - Each one with its own set of trade-offs
- Users like the level of security added with gaze based password methods
- Keeping a database of gaze calibration profiles representing users with access to the system can provide an additional layer of security
 - Eliminates the problem of token in the wrong hands for Token-based authentication

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Thank you

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