WEDGE

Graphical and Textual Based Password Authentication

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Introduction

- **Problem**: Both textual and graphical passwords are difficult to remember and vulnerable to keystroke logging, video recordings, or shoulder surfing
- **Solution**: Secure login system that combines textual and graphical passwords with wheel interface that utilizes randomized colors and characters

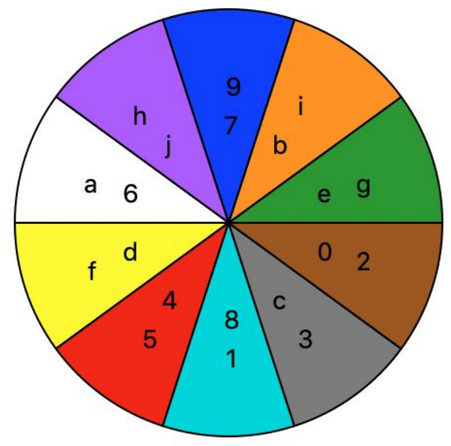

Fig. 1. *Wedge* Password Authentication System

Background

- Many existing graphical and textual authentication schemes have vulnerabilities
- Nevon Projects proposed improved method utilizing wheel, wedges, colors, and characters
- Authenticate by pressing "Clockwise" and "Counterclockwise" buttons to rotate wheel
- Select character's location by pressing "Inner Orbit" or "Outer Orbit" buttons

Approach

- Extend Nevon Projects
  - Objective: eliminate Nevon's security flaws
- Improved Nevon's security with the following new functionality:
  - Keyboard inputs
  - 10 colors
  - 20 characters
  - Randomization of characters and colors

Why Wedge?

- Nevon Projects not immune to video recording, shoulder surfing, or keystroke logging
- Wedge improves security for simple textual passwords with simple interface
- Randomized color wedges and character placement prevents attacks
- Easy to remember username, password, and color

Implementation

- Python3 and Tkinter application
- Control wheel and build password with keys “w", "a", "s", "d”
- Modularized
  - Main module controls routing between Home, Login, and Register windows
  - Login module contains Wheel module, contains Slice modules

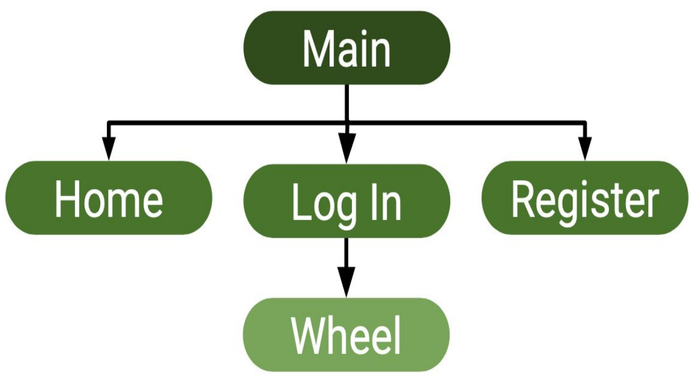

Fig. 2. Software Architecture of *Wedge*

Speed of Authentication

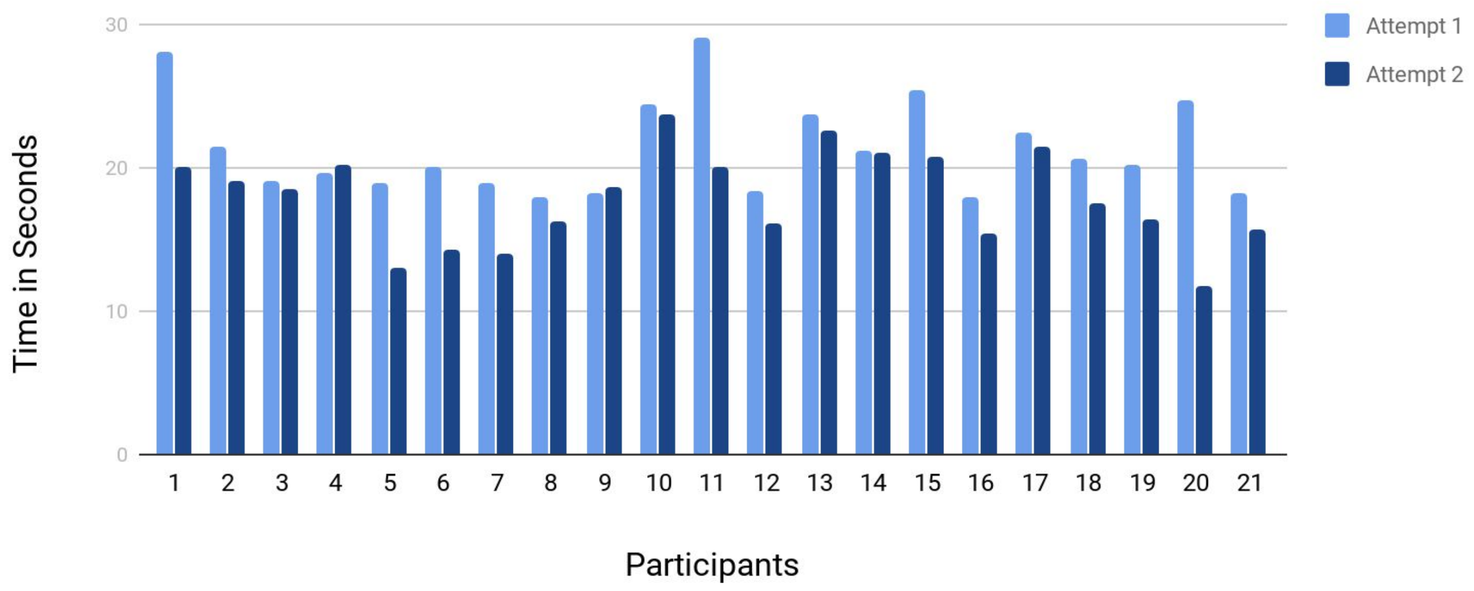

Fig. 3. Graph Chart Indicating Ease of Use

Results

- 21 participants
- **Security Test**: 95.24% of participants unsuccessful in determining password
  - $10 * 20^n$ possible passwords
- **Ease of Use Test**:
  - Attempt 1: ~21.367 seconds
  - Attempt 2: ~17.937 seconds