UNIVERSITY
OF WOLLONGONG
AUSTRALIA

Prototype Presentation

FYP-21-S1-02: Typing Habit Gesture Authentication System

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Our Members

Name	Role
Alicia Tan	Project Manager/Programmer
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Terrence Yap	Lead Programmer
Joel Teo	Lead Documentation

Table of contents

Interpretation of project requirements

- Passwords can be secure but unsafe if compromised
- Anyone can log into an account with the password
- Typing gesture habit authentication can help overcome this problem
  - Keystroke dynamics cannot be replicated
- This project explores typing gesture habit as a form of authentication that replaces traditional password

Functional requirements

- GUI application
- 2 roles
  - User and admin
  - Both roles require authentication to log in
- Registration: 4 steps
- Authentication: 3 steps
- User functions
  - Able to recalibrate typing habits
  - Able to modify their email/personal details
- Admin functions
  - Able to view all user profiles
  - Able to delete user profiles
  - Able to view and edit data in database

Non-functional requirements

- Usability
  - Simple and straightforward
- Reliability
  - Always available
- Performance
  - Fast while maintaining high accuracy in identifying anomalies
- Supportability
  - Be able to run by all users
  - Easy to test with various test cases
  - Only supported on computer

Non-functional requirements

- Security
  - Users should not see each other's profiles
  - Only admin has admin privileges
  - Users cannot log into their other accounts
  - Users' login through typing habit
- Scalability
  - Machine learning should be simple
  - Machine should always learn users' habits
  - Updates to system only accessible to admin

Existing work in the market

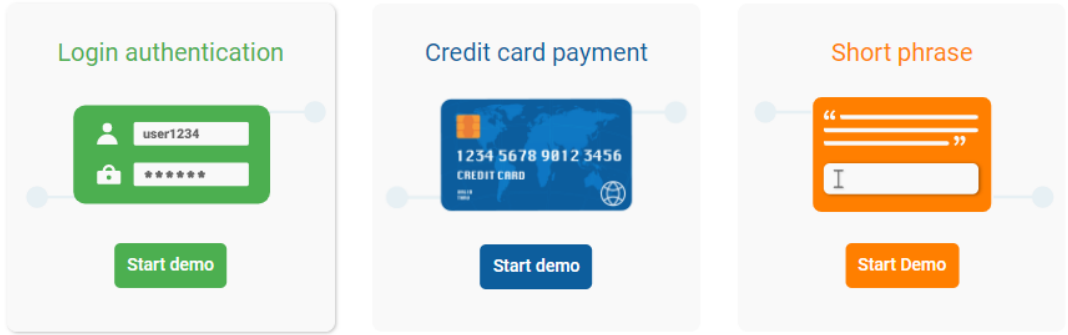
- TypingDNA
  - A smarter, user-friendly authentication that replaces SMS 2FA codes, reducing costs by an order of magnitude.
  - Recognizes users by the way they type on their keyboards.
  - Their typing biometrics engine, exposed by a RESTful API, analyses typing patterns and accurately determines if they are a match with a known, enrolled user.
  - Protect user accounts with powerful typing biometrics analysis, accurately and passively.
  - Available anywhere people type, with a flexible API and low-code integration.

Reference :
https://www.typingdna.com/

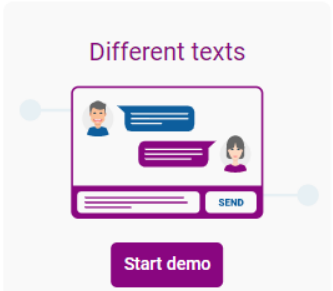
Existing work in the market

typingdna

Same text: identical enrollment and verification texts



Any text: enrollment text is different than verification text



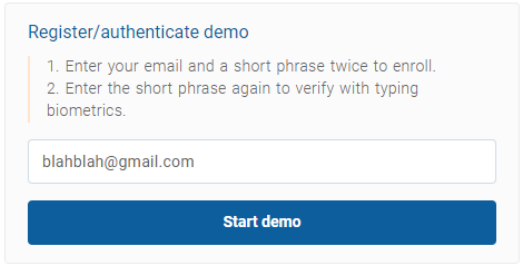
Reference :
https://www.typingdna.com/demo-api.html?hsCtaTracking=ed137683-315a-43c0-8c25-c319b87109d2%7C0047a7f0-7490-45c6-baf9-c75fb98d8c6d

Existing work in the market

AUTHENTICATION API

Short phrase demo

Short phrase verification works with typed texts that need to be the same each time.



AUTHENTICATION API

Short phrase demo

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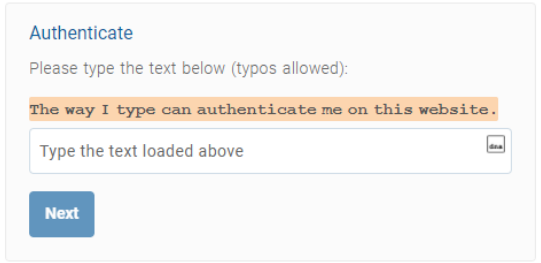
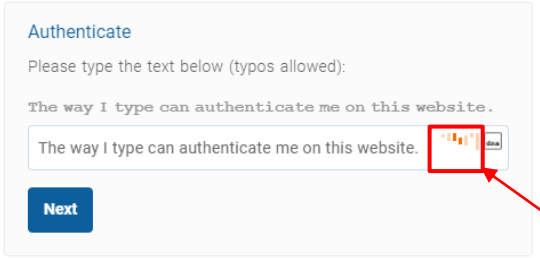
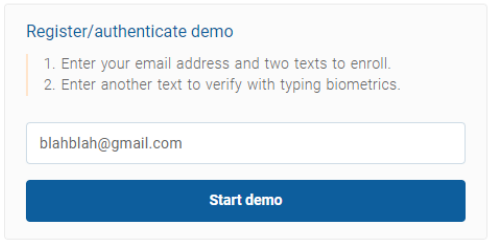




AUTHENTICATION API

Different texts demo

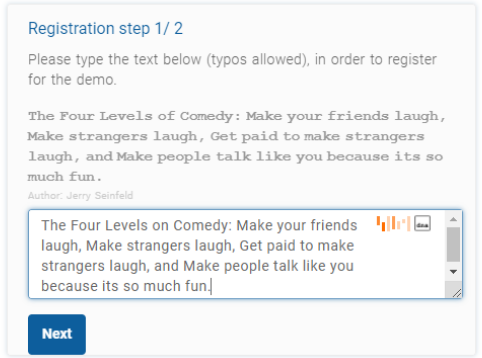
Different texts verification works with typed texts that do not need to be the same each time.

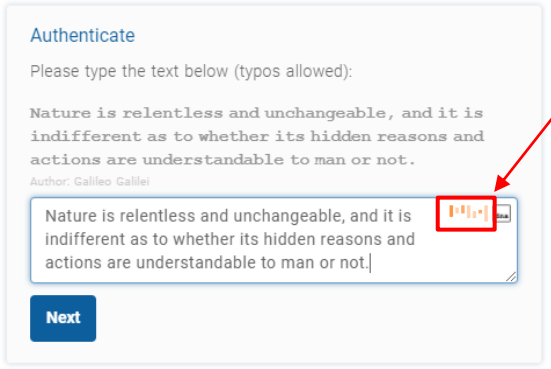


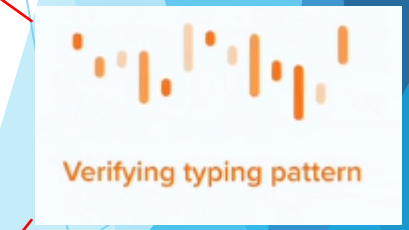
AUTHENTICATION API

Different texts demo

Different texts verification works with typed texts that do not need to be the same each time.

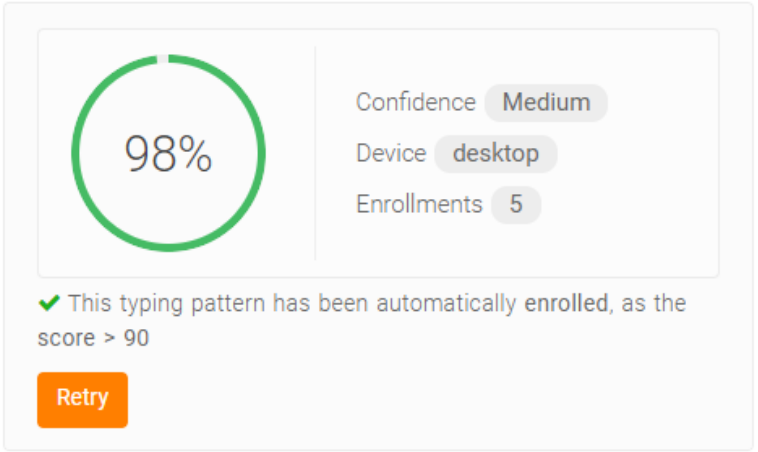


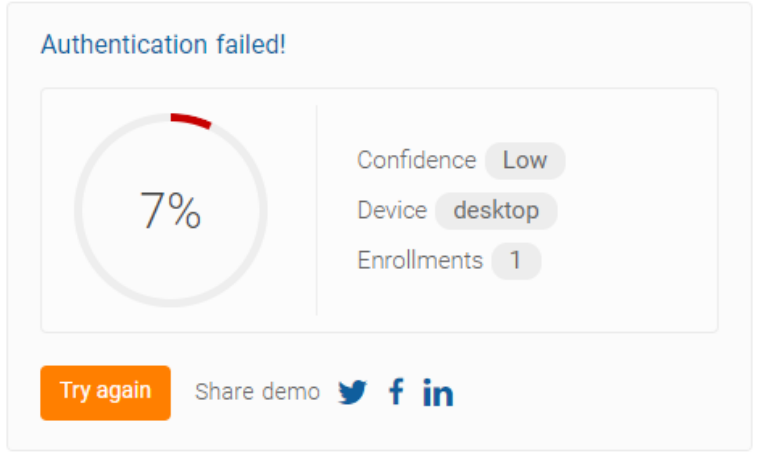




Reference :
https://www.typingdna.com/demo-sametext.html
https://www.typingdna.com/demo-anytext.html

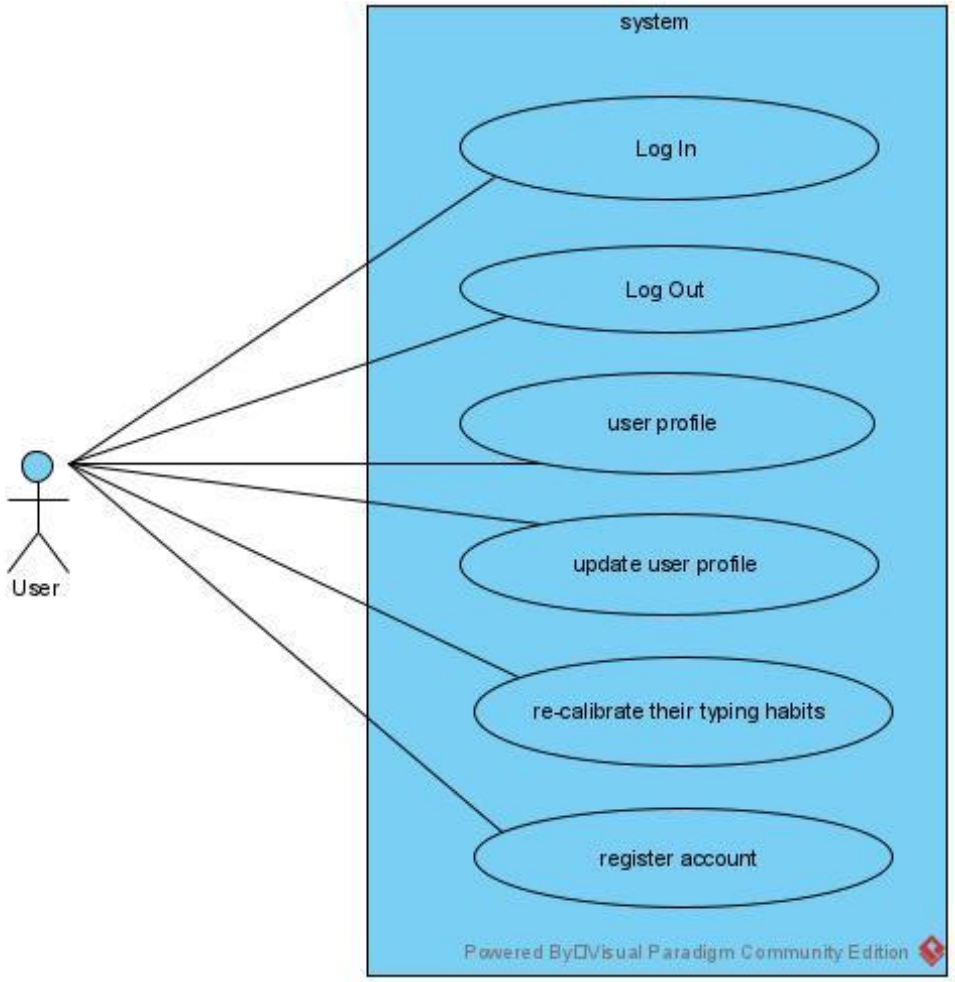
Existing work in the market





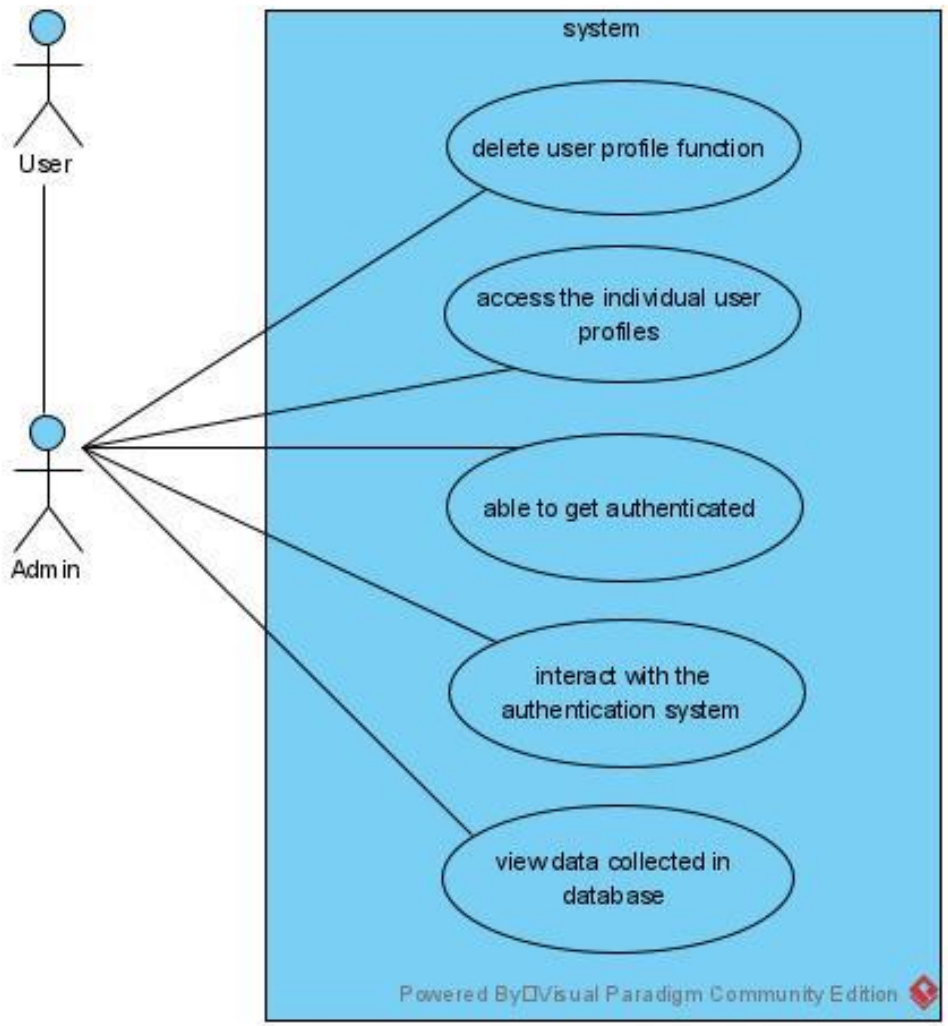
Use Case diagram

- The use cases implemented in the Prototype are:
- User:
  - Log in Account
  - Log out Account
  - User profile
  - Update user profile Account
  - Re-calibrate their typing habits
  - Register account



Use Case diagram

- The use cases implemented in the Prototype are:
- System Admin:
  - Delete user profile function
  - Access the individual user profile
  - Able to get authenticated
  - Interact with the authentication system
  - View data collected in database



Analysing typing habit

- Two parts
  - Recording keystrokes
  - Machine learning algorithm

Recording keystrokes

- Keystrokes are registered using tracer_add() function in Tkinter module, tied to the input box during the registration of typing habits.
- 5 dimensions to be recorded
  - Accuracy
  - Words per minute (WPM)
  - Time taken to type the sentence (in seconds)
  - Dwell time (Time taken to press 1 key)
  - Flight time (The time interval recorded in between pressing 2 keys)

Machine Learning Algorithm (Approach)

- Data visualization
  - Self-organizing map (SOM)
- Data analytics
  - One-class support vector machine
  - Logistic Regression
- Comparison of models
  - Confusion matrix (Accuracy & Precision)

Prototype Demonstration

The end

Thank you!!