IMWUT 2024 November 2024 - submission 2151

Comments to Authors

(none)

Reviews

Reviewer	Role	Review	Action
Reviewer 2	1AE	review 2	
Reviewer 1	2AE	review 1	
Reviewer 3	Reviewer	review 3	
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All reviews on one page

Submission

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The submission is incomplete:

- Required by November 1, 2024:
  - The Revised Submission and List of Revisions
  - The Clean Version of the Revised Submission
  - Word Count of Revised Submission
  - Page Count of Revised Submission

HT-Auth: Unobtrusive VR Headset Authentication via Subtle Head Tremors

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Abstract

While Virtual Reality (VR) applications have gained popularity in recent years, efficiently identifying users on VR devices remains challenging. Current solutions, such as passwords and digital PINs, relying on handheld controllers or in-air hand gestures, are time-consuming and far less convenient than typing on touchscreens or physical keyboards. Even worse, the entry process can be observed by others in proximity, raising security concerns. In this paper, we propose HT-Auth, a novel authentication method for VR devices based on subtle head tremors. These tremors, naturally occurring during active force exertion, are intrinsic and inevitable for human beings, which can be easily captured by inertial sensors built-in commodity VR headsets. We thus derive neck muscular biometrics from the tremor signal for unobtrusive VR device authentication. Our experiments, conducted with both standalone and mobile VR headsets, achieve a commendable balanced accuracy of 97.22% with just 10 registration samples, proving its efficacy and resilience against potential threats. Our dataset and source codes are available at https://anonymous.4open.science/r/HT-OpenSource-10C3/.

Contribution area

Interactive Technologies ; Mobile Computing ; Wearables

Dataset contributions

This submission includes one or more datasets as part of its contributions

Methodological Transparency & Reproducibility Appendix

This submission does not include a META

Ethics

This submission is in compliance with IMWUT's and other applicable policies on Ethics

The Revised Submission and List of Revisions

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The Clean Version of the Revised Submission

(no file)

Word Count of Revised Submission

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Page Count of Revised Submission

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Most relevant IMWUT publications

Wang, Zi, Yilin Wang, and Jie Yang. "EarSlide: a Secure Ear Wearables Biometric Authentication Based on Acoustic Fingerprint." Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 8.1 (2024): 1-29.
DOI: 10.1145/3643515

Zhu, Huadi, et al. "Blinkey: A two-factor user authentication method for virtual reality devices." Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 4.4 (2020): 1-29.
DOI: 10.1145/3432217

Gao, Yang, et al. "EarEcho: Using ear canal echo for wearable authentication." Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies 3.3 (2019): 1-24.
DOI: 10.1145/3351239

The Submission

[The file](#) (18.4 MB)

Word Count

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17

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Supplemental video

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Supplemental file(s)

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