

Vincent W.-S. Tseng

607-379-0290 | weshtseng@gmail.com | Google Scholar

Personal Profile

A data scientist with deep knowledge in machine learning, signal processing, and human-computer interaction and extensive experience in interdisciplinary collaboration. Passionate about leveraging machine learning and wearable data to enable more personalized health care.

Education

Cornell University

Ph.D. in Information Science

- Advisor: Tanzeem Choudhury
- Concentrations: Information Systems and Human Computer Interaction (HCI)
- Minor: Computer Science

New York, USA

August 2014 - December 2020

National Taiwan University

B.S. in Electrical Engineering

Taipei, Taiwan

September 2009 - June 2013

Work Experience

Verily

Data Scientist

- Built large-scale data pipelines that analyzed continuous wearable and phone sensor data, enabling assessment of depression severity and prediction of treatment responses in multi-year clinical studies.
- Developed digital biomarkers to assess quality of life and identify patient sub-types of depression, with the research published in a high-impact journal (*Psychiatry Research*).

Boston, USA

March 2021 - Present

Google Research

Research Intern

- Developed gaze-based digital biomarkers and machine learning algorithms to assess cognitive functioning and mental fatigue using smartphone cameras.
- Developed Android app prototypes and conducted user studies to validate the novel digital biomarkers for assessing user fatigue during mentally demanding tasks. The unobtrusive fatigue assessment method achieved a high performance score of 0.81, with the research published in a high-impact journal (*npj Digital Medicine*).

Mountain View, USA

May 2019 - January 2020

FX Palo Alto Laboratory

Research Intern

- Designed and built a conversational website-blocking system that helped people ease back into work after a break.
- Deployed the system in-the-wild and conducted a user study that demonstrated the system's effectiveness in boosting worker productivity, evidenced by both objective and subjective metrics. The research was published in a prestigious peer-reviewed conference (*the ACM Conference on Human Factors in Computing Systems*).

Palo Alto, USA

June 2018 - August 2018

Bell Labs

Research Intern

- Designed and implemented binary neural network architectures leveraging on-the-fly binary filter generation that achieved significant reduction in memory and compute footprint by 75% for image classification, with minimal accuracy loss.
- The proposed novel neural network architectures were published in a top-tier peer-reviewed conference (*International Joint Conference on Artificial Intelligence*) article, and the system implementation has been awarded three international patents.

Cambridge, UK

June 2017 - September 2017

Skills

Programming	Python, Java, C++, C, Android, Objective-C, Swift, Matlab, R.
Machine Learning	Deep Learning, Deep Generative Models, TensorFlow, Keras, Model Serving.
Data Engineering	Cloud Computing, Apache Beam, Google Dataflow, Big Query.
Data Analysis	Signal Processing, Statistical Analysis, Bayesian Statistics, Data Visualization, SQL.
UX Research	Study Design, Rapid Prototyping, Surveys.

Patents

System implementing generative adversarial network adapted to prediction in behavioral and/or physiological contexts

Daniel A Adler, Tanzeem Choudhury, Vincent W-S Tseng, Gengmo Qi

US Patent App. 18/026,371, 2024

Methods and apparatuses for inferencing using a neural network

Vincent W-S Tseng, Sourav Bhattacharya, Nicholas D Lane

US Patent 11,645,520, 2023

System implementing encoder-decoder neural network adapted to prediction in behavioral and/or physiological contexts

Daniel A Adler, Tanzeem Choudhury, Vincent W-S Tseng

US Patent App. 17/551,994, 2022

Publications

JOURNAL ARTICLES

Identifying a stable and generalizable factor structure of major depressive disorder across three large longitudinal cohorts

Vincent W.-S. Tseng, Jordan A Tharp, Jacob E Reiter, Weston Ferrer, David S Hong, P Murali Doraiswamy, Stefanie Nickels

Psychiatry Research p. 115702. Elsevier, 2024

Identifying mobile sensing indicators of stress-resilience

Daniel A Adler, **Vincent W-S Tseng**, Gengmo Qi, Joseph Scarpa, Srijan Sen, Tanzeem Choudhury

Proceedings of the ACM on interactive, mobile, wearable and ubiquitous technologies pp. 1–32. ACM New York, NY, USA, 2021

Digital biomarker of mental fatigue

Vincent W-S Tseng, Nachiappan Valliappan, Venky Ramachandran, Tanzeem Choudhury, Vidhya Navalpakkam

NPJ digital medicine p. 47. Nature Publishing Group UK London, 2021

Predicting early warning signs of psychotic relapse from passive sensing data: an approach using encoder-decoder neural networks

Daniel A Adler, Dror Ben-Zeev, **Vincent W-S Tseng**, John M Kane, Rachel Brian, Andrew T Campbell, Marta Hauser, Emily A Scherer, Tanzeem Choudhury

JMIR mHealth and uHealth e19962. JMIR Publications Toronto, Canada, 2020

Using smartphone sensor data to assess inhibitory control in the wild: Longitudinal study

Vincent W-S Tseng, Jean Dos Reis Costa, Malte F Jung, Tanzeem Choudhury

JMIR mHealth and uHealth e21703. JMIR Publications Inc., Toronto, Canada, 2020

Using behavioral rhythms and multi-task learning to predict fine-grained symptoms of schizophrenia

Vincent W-S Tseng, Akane Sano, Dror Ben-Zeev, Rachel Brian, Andrew T Campbell, Marta Hauser, John M Kane, Emily A Scherer, Rui Wang, Weichen Wang

Scientific reports p. 15100. Nature Publishing Group UK London, 2020

CrossCheck: Integrating self-report, behavioral sensing, and smartphone use to identify digital indicators of psychotic relapse.

Dror Ben-Zeev, Rachel Brian, Rui Wang, Weichen Wang, Andrew T Campbell, Min SH Aung, Michael Merrill, **Vincent W-S Tseng**, Tanzeem Choudhury, Marta Hauser

Psychiatric rehabilitation journal p. 266. Educational Publishing Foundation, 2017

Talking less during social interactions predicts enjoyment: A mobile sensing pilot study

Gillian M Sandstrom, **Vincent W-S Tseng**, Jean Costa, Fabian Okeke, Tanzeem Choudhury, Elizabeth W Dunn

Plos one e0158834. Public Library of Science San Francisco, CA USA, 2016

iCAN: A tablet-based pedagogical system for improving communication skills of children with autism

Miao-En Chien, Cyun-Meng Jheng, Ni-Miao Lin, Hsien-Hui Tang, Paul Taele, **Vincent W-S Tseng**, Mike Y Chen

International Journal of Human-Computer Studies pp. 79–90. Elsevier, 2015

CONFERENCE PROCEEDINGS

Social sensing: assessing social functioning of patients living with schizophrenia using mobile phone sensing

Weichen Wang, Shayan Mirjafari, Gabriella Harari, Dror Ben-Zeev, Rachel Brian, Tanzeem Choudhury, Marta Hauser, John Kane, Kizito Masaba, Subigya Nepal, Akane Sano, Emily Scherer, **Vincent W-S Tseng**, Rui Wang, Hongyi Wen, Jialing Wu, Andrew Campbel

Proceedings of the 2020 CHI conference on human factors in computing systems, 2020

Overcoming distractions during transitions from break to work using a conversational website-blocking system

Vincent W-S Tseng, Matthew L Lee, Laurent Denoue, Daniel Avrahami

Proceedings of the 2019 CHI conference on human factors in computing systems, 2019

BinaryCmd: Keyword Spotting with deterministic binary basis

Javier Fernández-Marqués, **Vincent W-S Tseng**, Sourav Bhattachara, Nicholas D Lane

Conference on Machine Learning and Systems (MLSys), 2018

Deterministic binary filters for keyword spotting applications

Javier Fernández-Marqués, **Vincent W-S Tseng**, Sourav Bhattachara, Nicholas D Lane

Proceedings of the 16th Annual International Conference on Mobile Systems, Applications, and Services, 2018

On-the-fly deterministic binary filters for memory efficient keyword spotting applications on embedded devices

Javier Fernández-Marqués, **Vincent W-S Tseng**, Sourav Bhattachara, Nicholas D Lane

Proceedings of the 2nd international workshop on embedded and mobile deep learning, 2018

AlertnessScanner: what do your pupils tell about your alertness

Vincent W-S Tseng, Saeed Abdullah, Jean Costa, Tanzeem Choudhury

Proceedings of the 20th International Conference on Human-Computer Interaction with Mobile Devices and Services, 2018

Deterministic binary filters for convolutional neural networks

Vincent W-S Tseng, Sourav Bhattachara, Javier Fernández-Marqués, Milad Alizadeh, Catherine Tong, N Lane

Assessing mental health issues on college campuses: Preliminary findings from a pilot study

Vincent W-S Tseng, Michael Merrill, Franziska Wittleder, Saeed Abdullah, Min Hane Aung, Tanzeem Choudhury

Proceedings of the 2016 ACM international joint conference on pervasive and ubiquitous computing: adjunct, 2016

CrossCheck: toward passive sensing and detection of mental health changes in people with schizophrenia

Rui Wang, Min SH Aung, Saeed Abdullah, Rachel Brian, Andrew T Campbell, Tanzeem Choudhury, Marta Hauser, John Kane, Michael Merrill, Emily A Scherer, **Vincent W-S Tseng**, Dror Ben-Zeev

Proceedings of the 2016 ACM international joint conference on pervasive and ubiquitous computing, 2016

Seeing through the expression: Bridging the gap between expression and emotion recognition

Lun-Kai Hsu, **Vincent W-S Tseng**, Li-Wei Kang, Yu-Chiang Frank Wang

2013 IEEE International Conference on Multimedia and Expo (ICME), 2013

iSpine: a motion-sensing edutainment system for improving children's spinal health

Sheng-Jhe Hsu, **Vincent W-S Tseng**, Fu-Chieh Hsu, Yung-Ying Lo

CHI'13 Extended Abstracts on Human Factors in Computing Systems, 2013

Cross-view action recognition via low-rank based domain adaptation

Vincent W-S Tseng, Lun-Kai Hsu, Li-Wei Kang, Yu-Chiang Frank Wang

2013 IEEE International Conference on Image Processing, 2013