

# Shardul Sapkota

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## Education

- May 2020      **Yale-NUS College**, Singapore      GPA: 4.81/5.00  
B.S. in Mathematical, Computational and Statistical Sciences, *Magna Cum Laude*  
Software Engineering Tutor (2019-2020)  
Summer Coursework in Engineering, **Yale University**, New Haven, USA (2017)
- Dec 2018      **Massachusetts Institute of Technology**, Cambridge, USA      GPA: 5.00/5.00  
Coursework in the Department of Electrical Engineering and Computer Science and MIT Media Lab (Exchange Semester)

## Research Experience

- Sept 2019-Present      **NUS-HCI Lab**, National University of Singapore, Singapore  
PI: Shengdong Zhao
- Designed and implemented machine learning models to classify changes in people's attentional states in real-time with an accuracy of up to 81% from physiological data. (*Zhang et al. 2021*)
  - Designed experiments with a novel psychophysics attention task and applied signal processing (non-linear metrics and frequency analysis) on EEG, skin conductance, and heart rate data of 10 participants. (*Zhang et al. 2021*)
  - Developed apps for smart glasses and wrote a first author paper quantifying the intrusiveness of four wearable input techniques for smart glasses. (*Sapkota et al. 2021*)
- May-Aug 2019      **Augmented Human Lab**, University of Auckland, New Zealand  
PI: Suranga Nanayakkara
- Developed a conversational agent (iOS app) that uses heart rate and skin conductance signals to provide context-aware memory training for prospective memory lapses. (*Chan et al. 2020*)
  - Built an interface for cognitive load detection using an eye-tracker and a CNN classifier. (*Kaluarachchi et al. 2021*)
  - Programmed a display driver for an OLED display in a smart-watch designed for those with hearing impairments.
- Sept-Dec 2018      **Fluid Interfaces Group**, MIT Media Lab, Cambridge, USA  
PI: Pattie Maes
- Built a mobile teeth gesture recognition system to collect data to model hands-free interaction for wearable computing. (*Vega et al. 2019*)
  - Applied machine learning models to classify four different teeth gestures with accelerometer and gyroscope data with personalized accuracy rates of up to 100%. (*Vega et al. 2019*)

## Work Experience

- Aug 2020-Present      **Shopee**, Singapore  
Machine Learning Engineer

- Developed deep learning and statistical models to update users' recommendation pool in real-time, providing recommendations personalized to user behavior.
- Improved the recommendation click-through-rate by 3.4% and click-through-conversion-rate by 10% in the product detail page.

## Publications

**Sapkota, S.\***, Ram, A.\* and Zhao, S., 2021. *Ubiquitous Interactions for Heads-Up Computing: Understanding Users' Preferences for Subtle Interaction Techniques in Everyday Settings*. **23<sup>rd</sup> International Conference on Mobile Human-Computer Interaction (MobileHCI'21)**

Kaluarachchi, T., **Sapkota, S.**, Taradel, J., Thevenon, M.A., Matthies, D.J.C. and Nanayakkara, S., 2021. *EyeKnowYou: Detecting Increased Cognitive Load and Actual Screen Time using a DIY Head-Mounted Webcam*. **Extended Abstracts of the 23<sup>rd</sup> International Conference on Mobile Human-Computer Interaction (MobileHCI'21)**

Zhang, S.\*, Yan, Z.\*, **Sapkota, S.**, Zhao, S. and Ooi, W.T., 2021. Moment-to-Moment Continuous Attention Fluctuation Monitoring through Consumer-Grade EEG Device. *Sensors*, **21**(10), pp.3419.

Chan, S.W., **Sapkota, S.**, Mathews, R., Zhang, H. and Nanayakkara, S., 2020. Prompto: Investigating Receptivity to Prompts Based on Cognitive Load from Memory Training Conversational Agent. *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies*, **4**(4), pp.1-23.

Vega Gálvez, T., **Sapkota, S.**, Dancu, A. and Maes, P., 2019. Byte. it: discreet teeth gestures for mobile device interaction. *Extended Abstracts of the 2019 CHI Conference on Human Factors in Computing Systems*, pp. 1-6.

\* Denotes equal contribution.

## Projects

- 2019      **DiaryRack**: Applied constrained optimization with integer programming to automate meeting scheduling in calendars as part of an independent research project.
- 2018      **Yale-NUS Laundry Viewer**: Led a team of 3 students to design, prototype, and develop a platform providing real-time monitoring of laundry machine status using LED sensors.
- 2018      **StandRight**: Programmed force sensitive resistors and a servo motor attached to a shoe to tighten shoelaces during unequal weight distribution for those who have leg injuries.

## Honors and Awards

- 2020      Singapore-HCI Paperthon *Most Promising Paper* Award (for Sapkota et al.)
- 2019      Yale-NUS Student-Initiated Summer Research Fund (S\$5750)
- 2018      JY Pillay Global-Asia Programme Summer Internship Award (S\$1187)
- 2016      Outstanding Cambridge Learner – Top in the World in Mathematics, AS Level.

## Technical Skills

Proficient in **Python**, **Golang**, and **LaTeX**. Experience in **Java**, **Swift**, **JavaScript**, **C**, **HTML**, **CSS**, **MATLAB**, **R**, and **OCaml**.