M1308.001100 Applied Psychology Seminar: Human Factors and Engineering Psychology

Seoul National University, Fall 2018

Instructor: Dr. Sowon Hahn
Phone: 02 880 8618, Email: swhahn@snu.ac.kr, Office: 16-M512
Class Time: Thursdays 2:00-4:50 PM
Class Location: 16-M504

"We need to switch from a technology-centric view of the world to a people-centric one. We should start with people's abilities and create technology that enhances people's capabilities: Why are we doing it backwards? We have our priorities completely wrong." – Don Norman, *Why bad technology dominates our lives.*

Course Description:
Human Factors is a field which is involved in conducting research regarding psychological, social, physical, and biological characteristics of human, and working to apply that information to the design of equipment they use, environments in which they function, and jobs they. This course is designed to provide students of various disciplines with a fundamental understanding of human factors that must be taken into account in the design and engineering of complex systems. We will focus on human capabilities and limitations from sensory, motor, and cognitive sources to include that should be incorporated into human engineering design principles of displays, controls and ergonomics, manual control, the nature of human error, basic experimental design, and human-computer interaction in supervisory control settings.

Class discussion Contribution to class will be worth 50% of your final grade. Students will be required to generate 2-3 discussion questions per article (it should be a full description of the issue instead of a simple question) and major issues from each article prior to each class. Students will also take responsibility for leading the discussion. Leading the discussion will entail the followings: 1) summarizing the key points to be gleaned from the articles, 2) using the discussion questions posted by other students to facilitate in-depth discussion. Leading the discussion (or we can call it presentation) will be worth 20% of your grade.

Final Paper (Proposal) Constituting 30% of the final grade, students will write a paper of their chosen topic within the field of affective science. The paper should have a proposal format, evaluating current body of research and proposing a new study. Papers should be double-spaced with 1-inch margins and 11-pt standard font, and recommended to be about 8-10 pages long.

Tentative Class Schedule Assignment (subject to revision)

Week	Date	Topics and Readings
1	Sep 6	**Technology and Society** • Mitchell, T., & Brynjolfsson, E. (2017). Track how technology is transforming work. *Nature, 544,* 290-292. • Burns, L. D. (2013). A vision of our transport future. *Nature, 497,* 181-182. • Noveck, B. S. (2017). Five hacks for digital democracy. *Nature, 544,* 287-289.
2	Sep13	**Everyday Technology**

		• Gubbi, J., Buyya, R., Marusic, S., & Palaniswami, M. (2013). Internet of Things (IoT): A vision, architectural elements, and future directions. *Future Generation Computer Systems*, *29*(7), 1645-1660. • Kidd, C. D., & Breazeal, C. (2008, September). Robots at home: Understanding long-term human-robot interaction. In *Intelligent Robots and Systems, 2008. IROS 2008. IEEE/RSJ International Conference on* (pp. 3230-3235). IEEE. • Lazer, D., Kennedy, R., King, G., & Vespignani, A. (2014). The parable of Google Flu: Traps in big data analysis. *Science, 343,* 1202-1205.
3	Sep 18	**Humans and Automation** • Floreano, D., & Wood, R. J. (2015). Science, technology and the future of small autonomous drones. *Nature*, *521*(7553), 460. • Lee, J. D., & See, K. A. (2004). Trust in automation: Designing for appropriate reliance. *Human Factors, 46(1),* 50-80. • Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. *Human factors*, *39*(2), 230-253.
4	Sep 27	**Cognitive Engineering** • Norman, D. A. (1986). Cognitive engineering. *User Centered System Design*, *31*, 61. • Norman, D. A. (2004). *Emotional design: Why we love (or hate) everyday things*. Basic Books, New York, NY. Chapter 1. • Parasuraman, R., Sheridan, T. B., & Wickens, C. D. (2008). Situation awareness, mental workload, and trust in automation: Viable, empirically supported cognitive engineering constructs. *Journal of Cognitive Engineering and Decision Making*, *2*(2), 140-160.
5	Oct 4	**Human-Robot Interaction** • Thrun, S. (2004). Toward a framework for human-robot interaction. *Human-Computer Interaction*, *19*(1), 9-24. • Breazeal, C., Kidd, C. D., Thomaz, A. L., Hoffman, G., & Berlin, M. (2005, August). Effects of nonverbal communication on efficiency and robustness in human-robot teamwork. In *Intelligent Robots and Systems, 2005.(IROS 2005). 2005 IEEE/RSJ International Conference on* (pp. 708-713). IEEE. • Waytz, A., Heafner, J., & Epley, N. (2014). The mind in the machine: Anthropomorphism increases trust in an autonomous vehicle. *Journal of Experimental Social Psychology, 52,* 113-117. • Duffy, B. R. (2003). Anthropomorphism and the social robot. *Robotics and Autonomous Systems*, *42*(3-4), 177-190.
6	Oct 11	**Human Factors Engineering and Design** • Hassenzahl, M., & Tractinsky, N. (2006). User experience-a research agenda. *Behaviour & information technology*, *25*(2), 91-97. • Klemmer, S. R., Hartmann, B., & Takayama, L. (2006, June). How bodies matter: five themes for interaction design. In *Proceedings of the 6th conference on Designing Interactive systems* (pp. 140-149). ACM.

		• Stanton, N. A., Salmon, P. M., Rafferty, L. A., Walker, G. H., Baber, C., & Jenkins, D. P. (2017). *Human factors methods: a practical guide for engineering and design*. CRC Press. Chapters 1&2
7	Oct 18	**Attention and Performance** • Lavie, N., Hirst, A., De Fockert, J. W., & Viding, E. (2004). Load theory of selective attention and cognitive control. *Journal of Experimental Psychology: General*, *133*(3), 339. • Wickens, C. D. (2002). Multiple resources and performance prediction. *Theoretical issues in ergonomics science*, *3*(2), 159-177. • Hancock, P. A. (1989). A dynamic model of stress and sustained attention. *Human factors*, *31*(5), 519-537.
8	Oct 25	**Socially Intelligent Robots** • Dautenhahn, K. (2007). Socially intelligent robots: dimensions of human–robot interaction. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, *362*(1480), 679-704. • Mumm, J., & Mutlu, B. (2011, March). Human-robot proxemics: physical and psychological distancing in human-robot interaction. In *Proceedings of the 6th international conference on Human-robot interaction* (pp. 331-338). ACM. • Breazeal, C. (2003). Toward sociable robots. *Robotics and Autonomous Systems*, *42*(3-4), 167-175.
9	Nov 1	**Cognitive Ecology and Technology for all** • Charness, N., & Boot, W. R. (2009). Aging and information technology use: Potential and barriers. *Current Directions in Psychological Science*, *18*(5), 253-258. • Czaja, S. J., Rogers, W. A., Fisk, A. D., Charness, N., & Sharit, J. (2009). *Designing for older adults: Principles and creative human factors approaches*. CRC press. Chapter 1. • Hutchins, E. (2010). Cognitive Ecology. *Topics in Cognitive Science 2 (2010)* 705–715.
10	Nov 8	**Selection and Action** • Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74,* 1252−1265. • Rizzolatti, G., & Craighero, L. (2004). The Mirror-Neuron System. Annual Review Of Neuroscience, 27169-192. • Tipper, S. P., Paul, M. A., & Hayes, A. E. (2006). Vision-for-action: The effects of object property discrimination and action state on affordance compatibility effects. Psychonomic Bulletin & Review, 13(3), 493-498.
11	Nov 15	No Class
12	Nov 22	**Machine Ethics**

		• Deng, B. (2015). The robot's dilemma. *Nature*, *523*(7558), 24-26. • Bonnefon, J., Shariff, A., & Rahwan, I. (2016). The social dilemma of autonomous vehicles. *Science, 352,* 1573-1576. • Eubanks, V. (2012). *Digital dead end: Fighting for social justice in the information age*. MIT Press. Chapter 1
13	Nov 29	Student Presentation
14	Dec 6	Student Presentation