

MIE 1412H (2018)

Human-Automation Interaction

Instructor:

Greg A. Jamieson
Office: RS 306
Telephone: (416) 946-8504
E-mail: jamieson@mie.utoronto.ca

Meetings:

Times: Wednesdays: 14:00-16:00
Dates: January 10 – April 11, 2018
Location: AB114

Grading:

Reading Quiz	40%
Individual Seminar Module or Relevance Assignment	50%
Seminar Participation	10%

Research Study:

All persons enrolled in the course will be invited to participate in a research study related to the course material (G.A. Jamieson, PI). Participation in the study will be entirely voluntary and will not be considered in course evaluation. That is, students will experience no consequences in terms of course evaluation based on their decision to participate or not participate in the study.

Reading List:

Date	Topic	Readings
1/10	Course Overview	Kelly, K. (2013). Better Than Human: Why Robots Will — And Must — Take Our Jobs. <i>Wired</i> . http://www.wired.com/gadgetlab/2012/12/ff-robots-will-take-our-jobs/all/
1/17	Automating Work	Bainbridge, L. (1983). Ironies of automation. <i>Automatica</i> , 19, 775-779. Kelley, C. R. (1968). The role of man in automatic control processes. In C. Kelley, <i>Manual and Automatic Control</i> (pp. 232-254). New York: Wiley. Zuboff, S. (1988). Office technology as exile and integration. In S. Zuboff, <i>In the Age of the Smart Machine: The Future of Work and Power</i> (pp. 124-173). New York: Basic Books.
1/24	Function Allocation I	Fitts, P. M., Ed. (1951). <i>Human Engineering for an Effective Air Navigation and Traffic Control System</i> (Chapter 3). Washington: National Research Council. Jordan, N. (1963). Allocation of functions between man and machines in automated systems. <i>Journal of Applied Psychology</i> , 47, 161-165. Fuld, R. B. (1993) The fiction of function allocation. <i>Ergonomics in Design</i> , 1, 20-24. Hancock, P.A. & Scallen, S. F. (1996). The future of function allocation. <i>Ergonomics in Design</i> , 4, 24-29.
1/31	Function Allocation II	Fuld, R. B. (2000). The fiction of function allocation, revisited. <i>International Journal of Human-Computer Studies</i> , 52, 217-233. Sheridan, T. B. (2000). Function allocation: algorithm, alchemy or apostasy? <i>International Journal of Human-Computer Studies</i> , 52, 203-216. De Winter, J. C. F., & Dodou, D. (2014). Why the Fitts list has persisted throughout the history of function allocation. <i>Cognition, Technology & Work</i> , 16, 1-11.

Date	Topic	Readings
2/7	Unintended Consequences of Automated Aids	Kirlik, A. (1993). Modeling strategic behavior in human-automation interaction: Why an “aid” can (and should) go unused. <i>Human Factors</i> , 35, 221–242. Roth, E. M., Bennett, K. B., & Woods, D. D. (1987). Human interaction with an “intelligent” machine. <i>International Journal of Man Machine Studies</i> , 27, 479–526.
2/14	Types and Levels of Automation;	Parasuraman, R., Sheridan, T. B., & Wickens, C. D. (2000). A model for types and levels of human interaction with automation. <i>IEEE Transactions on Systems, Man & Cybernetics: Part A: Systems and Humans</i> , 30, 286-297. Onnasch, L., Wickens, C., Li, H., & Manzey, D. (2014). Human performance consequences of stages and levels of automation: An integrated meta-analysis. <i>Human Factors</i> , 56, 476–488.
2/21	Reading Week	
2/28	Reading Quiz	
	Supervisory Control	Sheridan, T. B. (2012). Human Supervisory Control. In G. Salvendy (Ed.), <i>Handbook of Human Factors and Ergonomics</i> (pp. 990-1015). Hoboken, NJ: John Wiley & Sons, Inc. Cummings, M. L. & Guerlain, S. (2007). Developing Operator Capacity Estimates for Supervisory Control of Autonomous Vehicles. <i>Human Factors</i> , 49, 1-15.
3/7	Automation Transparency	TBA
	Student-selected modules	
3/14	Student-selected modules	
3/21	Student-selected modules	
3/28	Student-selected modules	
4/4	Student-selected modules	
4/11	Student-selected modules	

Suggested Module Topics and Seed Articles

Topic	Seed Article
Mode Awareness and Error	Sarter, N. & Woods, D. D. (1995). How in the world did we ever get into that mode? Mode error and awareness in supervisory control. <i>Human Factors</i> , 37, 5-19.
Trust	Lee, J. D., & See, K. A. (2004). Trust in automation: Designing for appropriate reliance. <i>Human Factors</i> , 46, 50-80.
Etiquette	Parasuraman, R. & Miller, C. M. (2004). Trust and etiquette in high-criticality automated systems. <i>Communications of the ACM</i> , 47, 51-55.
Formal Methods of Evaluation	Bolton, M. L., Bass, E. J., & Siminiceau, R. I (2013). Using formal verification to evaluate human-automation interaction: A review. <i>IEEE Transactions on Systems, Man & Cybernetics: Systems</i> , 43, 488-503.
Representation Aiding	Guerlain, S., Jamieson, G., Bullemer, P., & Blair, R. (2002). The MPC Elucidator: A case study in the design of representational aids. <i>IEEE Transactions on Systems, Man, and Cybernetics</i> , 32, 25-40.
Adaptive Automation	Feigh, K. M., Dorneich, M. C. & Hayes, C. (2012). Toward a Characterization of Adaptive Systems: A Framework for Researchers and System Designers. <i>Human Factors</i> , 54, 1008-1024.
Assisted Driving, Highly Automated Driving	Merat N. & Lee, J. D. (2012). Preface to the Special section on human factors and automation in vehicles: Designing highly automated vehicles with the driver in mind. <i>Human Factors</i> , 54, 681-686.
Automation as Team Player	Christoffersen, K. & Woods, D. D (2002). How to make automated systems team players. In E. Salas (Ed.), <i>Advances in human performance and cognitive engineering research</i> (vol. 2, pp. 1–12). Amsterdam: Elsevier
Warnings	Meyer, J. & Bitan, Y. (2002). Why better operators receive worse warnings. <i>Human Factors</i> , 44, 343-353.
Human-Robot Interaction	Goodrich, M. A. & Schultz, A. C. (2007). Human–robot interaction: A survey. <i>Foundations and Trends in Human-Computer Interaction</i> , 1, 203-275.
Culture of Automation	Hodgson, A., Siemieniuch, C. E., & Hubbard, E. M. (2013). Culture and the safety of complex automated sociotechnical systems. <i>IEEE Transactions on Human-Machine Systems</i> , 43, 608-619.
Empirical Methods	Parasuraman, R. & Manzey, D. H. (2010). Complacency and bias in human use of automation: An attentional integration. <i>Human Factors</i> , 52, 381-410.