

School/Department:	Rotterdam School of Management Department of Technology & Operations Management
Project Title:	Human-Centered Augmented Reality (AR) using Artificial Intelligence and Knowledge Graphs
Abstract:	<p>We are in an increasing need to access to personalized, adaptive, and dynamic information in real time. Augmented Reality (AR) provides us this possibility by embedding the information in an appropriate time and space, which provides users new ways to interact with both the physical and the virtual world. Being the first choice of the next generation digital display, AR smart glasses have received increasing attention over the last few years and are applied widely in a range of settings, such as smart manufacturing, aviation, healthcare, education, financial service, public security, and entertainment.</p> <p>At present, leading vendors of AR smart glasses have developed platforms that integrate AR with AI recognition, real-time communication, 5G, edge computing and other advanced technologies to provide an end-to-end solution for users. They provide advanced functions, such as AR remote collaboration, AI identification, AR knowledge base to users particularly in B2B settings. Using these AR smart glasses, users can receive not only the information in a desired format (voice, text, picture, video) in real-time, but also the right information at the right moment when it's the most meaningful and impactful for an individual's decision making. This has fundamentally changed the way how the field workers complete their tasks, and solved the problems such as insufficient expert knowledge, high travel costs and late arrival, and further reduced the risk of mistakes and improved the quality of service.</p> <p>The value of AR in real-world businesses can be further enhanced with the development of advanced technologies such as artificial intelligence, multi-media search and information retrieval, and knowledge graphs. Knowledge graphs and semantic web technologies exploit the data increase and web content representation to provide semantically interconnected and interrelated information, while AI technologies (i.e., deep learning) offer novel solutions and applications in various domains. In this PhD research, we will explore example research questions such as:</p> <ul style="list-style-type: none"> • How can we interact with the mixed reality and virtual world?

	<ul style="list-style-type: none"> • Can we better capture users' attention trajectory in both virtual and physical world in order to improve UX design in AR smart glasses? • How to present personalized information in AR to better serve individual's information needs and improve users' experiences in an immersive and interactive environment? • How can we effectively design and develop knowledge graphs to enhance the functionality of augmented reality and improve worker performance in an always-on sensing and monitoring world? • How can we design human-centered AR to improve its value (economic and social) to users and businesses?
<p>PhD Trajectory</p>	<p>We are seeking highly motivated students with demonstrated academic ability, those who possess a commitment to interdisciplinary research on significant information technology and management issues, and those who desire to pursue an academic research career in this field. You will be part of the Business Information Management (BIM) section within the Department of Technology & Operations Management at the Rotterdam School of Management, Erasmus University.</p> <p>Applicants must have strong quantitative training, with preference given to candidates who have earned an MSc, MPhil or Research Master in economics, computer science, econometrics, statistics, or a related field. Successful candidates have proficiency with R, SQL, Python, or other programming languages.</p> <p>As a Ph.D. student, you will gain the training and experience necessary to conduct independent research through course work in information systems, economics, econometrics, machine learning, deep learning, and large-scale data analytics. You will work closely with the advisors to define, develop, and execute your own research. The Ph.D. dissertation will be defined by the student with inputs from the advisors, and thus requires creativity, self-direction, and a passion for scientific inquiry.</p> <p>During the Ph.D., you will work in close collaboration with the advisors to:</p> <ul style="list-style-type: none"> • Identify a consequential phenomenon that is relevant to managers or policy makers, and which has not been fully addressed in prior research; • Obtain data, primary or secondary, that are needed to better understand the phenomenon;

	<ul style="list-style-type: none"> • Use the scientific literature to understand and examine the theoretical foundations of the phenomenon; • Identify the fundamental variables and relationships that are most important to the phenomenon of interest, and formalize these mathematically while relating them to data; • Identify the main assumptions that need to be made in order to solve or estimate the model, and understand their implications; • Develop methods necessary to extract research results from data; • Present research findings at national and international conferences; • Document findings for publication in leading scientific journals, and ultimately, your dissertation. <p>To conduct research, you will be able to take advantage of our strong industry ties, institutional databases, and software development support to gain access to large-scale data sets and have the opportunity to collaborate with leading industry partners in AR and AI.</p>
<p>Literature references</p>	<p>Ting Li, Dimitris Tsekouras, Zherui Yang. 2021. Product Visual Similarity in Recommendations – A Randomized Field Experiment on Dynamic Retargeting. Conference on Information Systems and Technology (CIST 2021), Newport Beach, California, October.</p> <p>Zherui Yang, Ting Li. 2021. Life-Event Targeting and Customer Uncertainty – Evidence from Field and Online Experiments. Decision Sciences Institute 52nd Annual Conference.</p> <p>Rodrigo Belo and Ting Li. 2021. Referral Policies for Optimal Growth: A Randomized Experiment in an Exclusive Online Dating Site. Management Science, Forthcoming.</p> <p>Li, Ting, and van Dalen, Jan. 2018. More than Just Noise? Examining Information Content of Stock Microblogs on Financial Markets. Journal of Information Technology, 33(1), 50-69.</p> <p>Yi, C., Jiang, Z., Li, X., and Lu, X. "Leveraging User-Generated Content for Product Promotion: the Effects of Firm-highlighted Reviews", Information Systems Research, forthcoming</p> <p>Yi, C., Jiang, Z., and Benbasat, I. (2017) "Designing for Diagnosticity and Serendipity: An Investigation of Social Product-Search Mechanisms", Information Systems Research, 28 (2), 413-429</p> <p>Song, T., Yi, C., and Huang, J., (2017) "Whose Recommendations</p>

	<p>Do You Follow? An Investigation of Tie Strength, Shopping Stage, and Deal Scarcity”, Information & Management, 54 (8), 1072-1083</p> <p>Tan, C.C., Yi, C.*, and Chan, H.C., (2015) “Deliberation without Attention: The Latent Benefits of Distracting Website Features for Online Purchase Decisions,” Information Systems Research, 26 (2), 437-455</p> <p>Yi, C., Jiang, Z., and Benbasat, I. (2015) “Enticing and Engaging Consumers via Online Product Presentations: The Effects of Restricted Interaction Design,” Journal of Management Information Systems, 31 (4), 213-242</p> <p>Yang, S., Li, Ting, and van Heck, E. 2015. Information Transparency in Prediction Markets. Decision Support Systems, 78, 67-79.</p> <p>Li, Ting, Kauffman, R.J., van Heck, E., Vervest, P., and Dellaert, B. 2014. Consumer Informedness and Firm Information Strategy. Information Systems Research, 25(2), 345-363.</p> <p>Li, Ting, and Meshkova, Z. 2013. The Influence of Interactive Media on Consumer Willingness to Pay in Online Stores. Electronic Commerce Research and Application, 12(6), 449–461.</p> <p>Lovric, M., Li, Ting, and Vervest, P. 2013. Sustainable Revenue Management: A Smart-Card Enabled Agent-Based Modeling Approach. Decision Support Systems, 54(4), 1587-1601.</p> <p>Li, Ting, and Kauffman, R.J. 2012. Adaptive Learning in Service Operation. Decision Support Systems, 53(2), 306-319.</p>
Expected output	<p>Scholarly publications. You will develop research papers that can be published in top-tier information systems, management, and computer science journals, such as Management Science, MIS Quarterly, Information Systems Research, INFORMS Journal of Computing, IEEE Transactions on Knowledge and Data Engineering. BIM faculty at RSM has a strong publication record in these journals. The final results of the Ph.D. are also published in a Ph.D. dissertation. Most BIM Ph.D. students will be able to publish multiple papers in these top journals.</p> <p>Placement record. In the past five years, our graduates have accepted faculty positions at top business schools all around the world, including MIT, Northwestern University, George Washington University, Copenhagen Business School, IE Business School, University of Amsterdam, and VU Amsterdam.</p>

Requirements of candidate:	<ul style="list-style-type: none">• Passionate about understanding the impact of digital technologies on individuals, organizations, markets, system design, public policy, and society;• Enthusiasm for quantitative analysis, data, programming, and science;• Experience in conducting and completing a research project;• MSc or MPhil in Econometrics, Statistics, Computer Science, Economics or a related discipline;• Experience developing and estimating econometric or statistical models in R, SAS, Stata, and Python;• Programming skills, and in particular, prior exposure to or experience with scraping structured content structured web content (HTML, XPATH, CSS, etc.) from web sites;• Openness, intellectual curiosity, eagerness to learn, and a willingness to be proved wrong;• Ambition to work towards an academic career as a world-class researcher and instructor;• Willingness and motivation to formulate your own research projects and carry those through to the end (i.e., publication in a top journal);• Eagerness to ask and answer novel questions;• Experience in writing scientific papers.• ERIM/EUR admission requirement for English: IELTS 7.5 (min 6.0 for all subs.); TOEFL: 100 (internet) or 600 (paper); GMAT or GRE: 85%
Supervisor information:	<p>The Ph.D. student will develop research topics in close collaboration with the advisors: Prof. Ting Li and Dr. Cheng Yi.</p> <p>Prof. Ting Li (tli@rsm.nl)</p> <p>https://www.rsm.nl/people/ting-li/</p> <p>Prof. Ting Li is the Professor of Digital Business at Rotterdam School of Management (RSM), Erasmus University. She is the academic director of Digital Business of the Erasmus Centre for Data Analytics. Ting's research interest focuses on the understanding of the strategic use of information technology (digital, social, mobile, AR/VR, AI) and its economic impacts on consumer behavior and organization strategy. Her interdisciplinary research on this subject has been recognized with best paper</p>

	<p>awards and nominations, and sponsored by multiple grants from NWO and multinational companies. Her current work spans digital platforms, AR/VR, privacy, and decision making in AI. Prior to joining academia, Ting worked for General Electric and IBM in the area of e-business in supply chains and grid computing. She obtained her Ph.D. in Management Science at the Erasmus University and MSc in Computational Science at the University of Amsterdam.</p> <p>Dr. Cheng Yi (yich@sem.tsinghua.edu.cn) http://www.sem.tsinghua.edu.cn/en/yich</p> <p>Dr. Cheng Yi is an Associate Professor at the Department of Management Science and Engineering in the School of Economics and Management, Tsinghua University. She received her Ph.D. in Information Systems from National University of Singapore in 2011 and B.Comp in Information Systems from National University of Singapore in 2006. Her research interests focus on Electronic Commerce, Human-Computer Interaction, Online Consumer Behaviour, and Internet Marketing. Some of her research work has appeared in premier Information Systems journals such as Information Systems Research and Journal of Management Information Systems.</p>
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English requirements: Please refer to Erasmus University China Center official website for your information www.eur.nl/eucc

Erasmus University China Center -> CSC Scholarship -> "I am a prospective CSC PhD Candidate" -> Table 1

Please note that each institute requires difference level of English, make sure to find the right institute. 2022 CSC-PhD programme information will be shared and updated soon!