



Mobile Robotic Strawberry Monitoring and Harvesting in Precision Indoor Farms

Abstract

Intelligence driven and empowered agricultural systems (IDEAS) are viewed as one of the key features in modern and futuristic agriculture. Precision indoor farms have high readiness levels for implementing machine capabilities of perception, reasoning/learning, communication, task planning/execution, and systems integration. This presentation describes an IDEAS research project that involves the development of a mobile robotics platform for use in indoor strawberry farms to carry out the tasks of fruit detection, yield monitoring, and harvesting. The key points covered include mobile robotics platform (MRP); MRP navigation; strawberry fruit sensing/detection, yield monitoring, and harvesting. Results from experiments conducted in a commercial indoor farm are also reported. Detailed information can be found in: "Ren, G., Wu, T., Lin, T., Yang, L., Chowdhary, G., Ting, K.C., Ying, Y. (2023) Mobile robotics platform for strawberry sensing and harvesting within precision indoor farming systems. *Journal of Field Robotics*, 1-19. <https://doi.org/10.1002/rob.22207>" and "Ren, G., Wu, H., Bao, A., Lin, T., Ting, K.C., Ying, Y. (2023) Mobile robotics platform for strawberry temporal-spatial yield monitoring within precision indoor farming systems. *Frontiers in Plant Science* 14:1162435, doi: 10.3389/fpls.2023.1162435."

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RESEARCH AREAS AND EXPERTISE

- General area: Agricultural and Biological Engineering
- Specific area: Intelligent Driven and Empowered Agricultural Systems (IDEAS)

AWARDS AND RECOGNITION

- National Taiwan University Bioenvironmental Systems/Agricultural Engineering Distinguished Alumni Award, 2023
- National Taiwan University Biomechanics/Agricultural Machinery Engineering Distinguished Alumni Award 2023
- ASABE Lalit and Aruna Verma Award for Excellence in Global Engagement, 2021
- University of Kentucky Biosystems and Agricultural Engineering Lifetime Achievement Award, 2019
- China National Teaching Achievement Award-2nd class, 2018
- Zhejiang Teaching Achievement Award-1st class, 2016
- ASABE James R. and Karen A. Gilley Academic Leadership Award, 2011
- ASABE Kishida International Award, 2008
- Fellow of ASME, 2002
- Fellow of ASABE, 2001

Professor K.C. Ting is Professor and Head Emeritus, Department of Agricultural and Biological Engineering, University of Illinois at Urbana-Champaign. He was Vice Dean of International Campus, Zhejiang University, China (2017-2020). He served as department head/chair at four U.S. universities. He has been advancing holistic automation and systems informatics & analytics approaches to developing intelligent driven and empowered agricultural systems (IDEAS). He has participated in proposal developments for four large successful research programs funded by NASA, BP, ADM, and USAID. He has delivered over 140 invited presentations in 17 countries. He was an Editor-in-Chief for *Computers and Electronics in Agriculture* (2007-2010). He has participated in and led external committees to review academic and research units and programs, strategy formulation meetings, and workshops on academic leadership in many countries. He has participated in establishing international collaborative education, research, and administrative programs between institutions in the U.S. and countries in Asia, Europe, Middle East, South America, and Africa.