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NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

CURRICULUM VITAE

Xie Ming, PhD (France)
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Notes:

- **Section 1 should be less than 50 pages, Arial font, 11 point.**
- **If needed, additional material can be included as Appendices.**
- **https://ts.ntu.edu.sg/sites/policyportal/new/Policies2/HumanResource/Pages/PerformanceManagement.aspx**

General Summary

Academic Qualifications

1989	PhD (Informatics), University of Rennes, France
1986	MSc (Automation), University of Valenciennes, France
1984	BEng (Hons) in Control Engineering, East China Institute of Textile Technology

Professional Qualifications / Memberships

2010 – Present	Life Member, Robotics Society of Singapore (www.rss.org.sg)	Singapore
2017 – Present	Member, People's Action Party (www.pap.org.sg)	Singapore
2021 – Present	Life Member, Chinese Association for Artificial Intelligence (www.caai.cn)	China

Summary of Working Experience

Jan 1999 – Oct 2027	Associate Professor, School of MAE, NTU
Jan 1998 – Dec 1998	Senior Lecturer, School of MAE, NTU
Feb 1996 – Dec 1997	Lecturer, School of MAE, NTU
Feb 1993 – Jan 1996	Research Fellow, NTU
Oct 1990 – Feb 1993	Expert Engineer, INRIA Sophia-Antipolis, France
Sep 1989 – Sep 1990	R&D Engineer, High-Tech Company in Paris, France
Oct 1986 – July 1989	Research Assistant, INRIA Rennes, France

Academic Honours and Awards

Year	Academic Honour / Award
1984 - 1989	Recipient, National Overseas Scholarship Award, Chinese Government

Research Summary

Key Areas of Research

- Artificial Intelligence
- Humanoid Robotics
- Autonomous Driving

ORCID ID: https://orcid.org/0000-0002-1696-9030

Opinions on Research Appraisals:
A faculty member's abilities and contributions are to be evaluated according to outcome, competence, and leadership in terms of teaching, research, and service. The better ways of assessing the outcome, competence, and leadership of a faculty member's research performance and excellence should be based on KPIs such as:

1. Amount of Outcome (0-5):
    a. The number of published research works in terms of published pages (which is more accurate than the number of the published books/papers/patents, etc).
    b. The amount of revenue received from the sales/licensing of the published works (e.g. books, patents).
2. Level of Competence (0-5):
    a. The number of awards received from published works.
    b. The indicator of the return on investment (i.e., ROI) which is the ratio between the research quantity and the research spending (i.e., project funds spent).
3. Level of Leadership (0-5):
    a. The number of invited speeches and talks delivered in his or her research fields.
    b. The significance of breakthroughs achieved in his or her research fields.

The first KPI is for the determination of annual bonus and salary increment while the second and third KPIs are for the determination of promotion from lower rank to higher rank if applicable.

Research Awards / Recognition

Year	Research Award / Recognition
2026	Second Place Prize in 2023 University-level EID's Home and Living Category by my Mentored Team's Project under the Title of "StockSense".
2024	5th Place Prize (US$4000) from 2024 Maritime RobotX Challenge, Sarasota City, Florida, USA.
2023	First Place Prize in 2023 University-level EID's Home and Living Category by my Mentored Team's Project under the Title of "Rice Tumbler".
2022	Judges' Special Award on Collaboration (US$500), Maritime RobotX Challenge, Sydney, Australia, November 11-17, 2022.
2022	3rd Place Prize (US$1000) from VRX (Virtual RobotX) Competition in 2022 (VRX Competition 2022 - RobotX) (vrx_2022 phase3_results · osrf/vrx Wiki · GitHub) in addition to these special awards received: **Remarkable Video Submission, Biggest Leap in Ranking from Phase 2 to Phase 3, Phenomenal Open-Source Contributor, Fee Waiver for RoboBoat Competition 2023. (www.robotx.org)**
2018	Most Resilient Team Award (US$3500) from 2018 Maritime RobotX Challenge (www.robotx.org), which is an international competition.

2014	Silver Medal from 2014 Dragon Design Foundation, China
2013	Winner of 2013 Singapore A-Star's Call for Ideas Competition (S$5000) for Proposal of "OSMIND: Outstanding Sense-making Mind".
2012	2012 Outstanding Journal Paper Award from Industrial Robot: An International Journal, for the paper of: S. Q. Li, Y. Liu and M. Xie, 2011, Implementation of a single motor driven manipulator with multiple joints, Industrial Robot - An International Journal, Vol. 38, No. 1.
2010	First Prize from 2010 Innovative Business Plan Competition, which was organized by Chinese Ministry of Education.
2009	Second Prize from 2009 Innovative Business Plan Competition, which was organized by Chinese Ministry of Education.
2008	Best Conference Paper Award from 2008 International Conference on Climbing and Walking Robots, Coimbra, Portugal, for the paper of: Xie M, Zhong Z. W., Zhang L., Xian L. B., Wang L., Yang H. J., Song C. S. and Li J., 2008, A Deterministic Way of Planning and Controlling Biped Walking of LOCH Humanoid Robot, 11th International Conference on Climbing and Walking Robots, Coimbra, Portugal.
1998	1998 CrayQuest Grand Champion Prize (S$15,000) which was organized by Silicon Graphics Co. Ltd. The winning project was: Color Segmentation of Road Images.
1997	1997 CrayQuest Gold Prize (S$8,000) which was organized by Silicon Graphics Co. Ltd. The winning project was: Reverse Reconstruction of 3D Scenes.
1996	Best Conference Paper Award from 1996 World Automation Congress, Montpellier, France, for the paper of: Xie M., 1996, Head-Eye Coordination: A Closed-Form Solution, Second World Automation Congress, France, TSI Press, pp. 783-790.

Keynote Presentations

1. Keynote Speaker, 2026, KnowNet: A Large Knowledge Model, International Symposium on Trustworthy AI and Public Safety Infrastructure (ISTA-PSI2026), 2 June, Thailand.
2. Keynote Speaker, 2026, KnowNet: A Large Knowledge Model, 3rd International Conference on Computing, Machine Learning and Data Science (CMLDS2026), 25 April, Singapore.
3. Keynote Speaker, 2026, AI for Manufacturing, International Symposium on Intelligent Manufacturing and Optical Sensing Technology (IMOST2026), 17 January, Zhuhai, China
4. Keynote Speaker, 2025, Science of Mind as New Foundation of Artificial Intelligence, ICNGN2025, 13 December, Singapore.
5. Plenary Speaker, 2025, KnowNet: A Large Knowledge Model, CCRIS2025, August 23, Guangzhou, China.
6. Keynote Speaker, 2025, Science of Mind as New Foundation of Artificial Intelligence, CSAIDE2025, March 8, Johor Bahru, Malaysia.
7. Keynote Speaker, 2024, Science of Mind as New Foundation of Artificial Intelligence, ACAI2024, December 21, Guangzhou, China.
8. Keynote Speaker, 2024, Key Steps Toward Development of Humanoid Robots, ICNGN2024, November 24, Bangkok, Thailand.
9. Keynote Speaker, 2024, Key Steps Toward Development of Humanoid Robots, IAR, October 18, Singapore.
10. Keynote Speaker, 2024, Key Steps Toward Development of Humanoid Robots, RCVE 2024, July 20, Hong Kong, China.
11. Keynote Speaker, 2024, Science of Mind as New Foundation of Artificial Intelligence, RAIIE 2024, July 6, Singapore.

12. Keynote Speaker, 2024, Science of Mind as New Foundation of Artificial Intelligence, EDCS 2024, June 21, China.
13. Keynote Speaker, 2024, Key Steps Toward Development of Humanoid Robots, MEAAC 2024, June 16, Ordos, China.
14. Keynote Speaker, 2024, New Foundation of Artificial Intelligence, International Conference on Computing, Machine Learning and Data Science (CMLDS 2024), April 13, Singapore.
15. Keynote Speaker, 2024, Robot-Integrated Manufacturing, 3rd International Conference on Advances in Automobile, Manufacturing and Mechanical Engineering, Easwari Engineering College, 5 April, Chennai, India
16. Keynote Speaker, 2024, New Foundation of Artificial Intelligence, International Conference on Automation, Robotics, Artificial Intelligence, Mechatronics, Materials and Management, Sivasubramaniya Nadar (SSN) College of Engineering, 28-29 March, Chennai, Tamil Nadu, India.
17. Keynote Speaker, 2023, New Foundation of Artificial Intelligence, 7th International Conference on Technology and Social Science, 3-6 December, Kiryu, Japan.
18. Keynote Speaker, 2023, New Foundation of Artificial Intelligence, International Conference on Advances in Artificial Intelligence and Applications (https://www.aia-conf.com/), 18-20 November 2023, Wuhan, China.
19. Keynote Speaker, 2023, New Foundation of Artificial Intelligence, AIAC 2023, 27-29 October, Xiamen, China.
20. Keynote Speaker, 2023, Green Energy Harvesting Roof, 5th International Conference on Green Energy and Environment (ICoGEE2023), 26-27 September, Indonesia.
21. Keynote Speaker, 2023, Key Technologies Behind Autonomous Vehicles, 2nd International Conference on Energy, Power Engineering and Control Engineering (EPECE), 24-26 February, Changsha, China.
22. Keynote Speaker, 2022, Universal Culture Space and Value Systems, 11th International Science, Social Sciences, Engineering and Energy Conferences (I-SEEC & ICTSS 2022 (e-jikei.org)), 25-28 December, Gunma, Japan.
23. Keynote Speaker, 2022, Key Steps Toward Development of Humanoid Robots, 25th International Conference on Climbing and Walking Robots (https://clawar.org/clawar2022/), 12-14 September, Acores, Portugal.
24. Keynote Speaker, 2022, New Foundation of Artificial Intelligence, 6th International Conference on Mechatronics and Intelligent Robotics (ICMIR 2022 (icmir-conference.com)), May 20-22, Kunming, China.
25. Keynote Speaker, 2022, Key Technologies Behind Autonomous Vehicles, 1st International Virtual Conference on Advances in Automobile, Manufacturing and Mechanical Engineering (ICAAMME 2022), March 11, Chennai, India. Also, delivered at International Conference on Electrical Engineering and Automatic Control, May 27, 2022.
26. Keynote Speaker, 2021, Key Steps Toward Development of Humanoid Robots, 4th International Conference on Applied Engineering (https://icae.polibatam.ac.id/), 13-14 October, Batam, Indonesia.
27. Keynote Speaker, 2021, New Foundation of Artificial Intelligence, ICA 2021 – 7th International Conference on Instrumentation, Control and Automation (icaitb.id), 25-27 August, West Java, Indonesia.
28. Keynote Speaker, 2020, Key Steps Toward Development of Humanoid Robots, 1st International Conference on Engineering, Science and Technology (ICEST 2020), 22nd-23rd February 2020, Kuala Lumpur, Malaysia.
29. Keynote Speaker, 2019, Applications of Control Theory in Engineering to Management of Social Systems, 4th International Conference on Humanities Sciences, Management and Education Technology, Singapore.

30. Keynote Speaker, 2019, Key Technologies Behind Autonomous Vehicles, International Conference on Mechatronic Systems and Robots, Singapore.
31. Keynote Speaker, 2019, Robot-Integrated Manufacturing, Second International Conference on Sustainable Energy Resources, Materials and Technologies (ISERMAT-2019), Chennai, India.
32. Keynote Speaker, 2018, Key Steps Toward Development of Humanoid Robots, 3rd International Conference on Robotics and Automation Engineering, Guangzhou, China.
33. Keynote Speaker, 2018, Key Steps Toward Development of Humanoid Robots, 21th International Conference on Walking and Climbing Robots, Panama.
34. Keynote Speaker, 2018, Robot-Integrated Manufacturing, International Conference on Mechatronic Systems and Robots, Singapore.
35. Keynote Speaker, 2017, Birth of Singapore's Humanoid Robots, 18th International Symposium on Advanced Intelligent Systems, South Korea.
36. Keynote Speaker, 2011, Towards Development of Future Products with Human-like Intelligence, 2011 International Conference on Emerging Engineering Trends, Chennai, India.
37. Keynote Speaker, 2010, Future Trends of Robotics Research and Its Impact on Engineering, 2010 International Conference on Emerging Engineering Trends, Chennai, India.
38. Keynote Speaker, 2007, New Theory of AI and Its Impact on Intelligent Vehicles, Annual SAE Conference of China, Tianjin, China.
39. Keynote Speaker, 2004, Robot Vision: A Holistic View, 7th International Conference on Climbing and Walking Robots, Madrid, Spain.

Invited Presentations

1. Invited Speaker, 2026, Guest Lectures on Advanced Robotics, Hainan University, 3 November, Hainan, China.
2. Invited Speaker, 2026, Guest Lectures on Amazing History of Artificial Intelligence, OST International Week, 13-14 October, Zurich, Switzerland.
3. Invited Speaker, 2026, How to Safeguard Research Integrity as Editor in Engineering Publishing?, MDPI Singapore Engineering Editors' Salon, 17 September.
4. Invited Speaker, 2026, AI Sensors with Built-In Module for Data Privacy Control, MDPI AI Webinar on Governing Trustworthy AI Outputs in a Sensor-Dense Society: Privacy, Auditability and Responsible Deployment, 29 May.
5. Invited Speaker, 2026, Robotics in the Age of AI, Global AI+IoT Industry Ecology Summit, 29 April, Singapore.
6. Invited Speaker, 2025, Artificial Intelligence for Manufacturing, Xuzhou Institute of Technology, 2 December, China.
7. Invited Speaker, 2025, KnowNet: A Large Knowledge Model, AISS2025, 30 November, Kobe, Japan.
8. Invited Speaker, 2025, Science of Mind as New Foundation of Artificial Intelligence, The 2nd China-Singapore InnovateConnect, 30 October, Singapore.
9. Invited Speaker, 2025, Science of Mind as New Foundation of Artificial Intelligence, 5th International Conference on Artificial Intelligence, Automation and Algorithms (ICAI2A2025), 25 October, Singapore.
10. Invited Speaker, 2025, KnowNet: A Large Knowledge Model, 7th International Conference on Control and Computer Vision (ICCCV2025), March 30, China.
11. Invited Speaker, 2024, Science of Mind as New Foundation of Artificial Intelligence, 7th International Conference on Big Data and Education, September 25, Oxford, UK.
12. Invited Speaker, 2024, Key Steps Toward Development of Humanoid Robots, 10th International Conference on Mechatronics and Robotics Engineering, February 28, Milan, Italy.

13. Invited Speaker, 2023, Key Steps Toward Development of Humanoid Robots, July 15, UBTECH Robotics Co. (www.ubtrobot.com), Shenzhen, China.
14. Invited Speaker, 2023, (1) Key Steps Toward Development of Humanoid Robots, (2) New Foundation of Artificial Intelligence, Harbin Institute of Technology, July 13, China.
15. Invited Speaker, 2023, The Essence of Cultural Science, School of Arts and Design, Hai Nan University, May 22, China.
16. Invited Speaker, 2023, Key Steps Toward Development of Humanoid Robots, School of Mechanical Engineering, Hai Nan University, May 22, China.
17. Invited Speaker, 2023, Key Steps Toward Development of Humanoid Robots, School of Mechanical Engineering, Hefei University of Technology, May 16, China.
18. Inviter Speaker, 2023, New Foundation of Artificial Intelligence, School of Electrical Engineering and Automation, Anhui University, May 15, China.
19. Invited Speaker, 2022, Robot-Integrated Manufacturing, SkillsFuture Festival, Singapore.
20. Invited Speaker, 2018, Autonomous Surface Vehicles, Gunma University International Symposium for Collaboration of Research and Education, Japan.
21. Invited Speaker, 2016, Current Advances and Future Trends in Robotics, 9th APEC SME Internet+ Intelligent Manufacturing Forum, Shenzhen, China.
22. Invited Speaker, 2011, Artificial Intelligence: Past, Present and Future, 2011 TradeTech Conference, Singapore.
23. Invited Speaker, 2011, Innovation and Public Service, Knowledge City Park, Guangzhou, China.
24. Invited Speaker, 2009, Intelligent Machine: Vehicles and Robots, NTC/NTU, Singapore.
25. Invited Speaker, 2009, From Unmanned Ground Vehicle to RoboCar: Opportunities and Challenges, Unmanned Systems Asia 2009, Singapore.
26. Invited Speaker, 2008, Cognitively-Intelligent Humanoid Robots for Home Care, Europe-Southeast Asian Forum on ICT, Brussels, Belgium.
27. Invited Speaker, 2008, Roles of Robot in Future Society, NTC/NTU, Singapore.
28. Invited Speaker, 2008, A Design Perspective of Humanoid Robot, Singapore Robotic Game Society.
29. Invited Speaker, 2007, Toward Self-Intelligent Vehicles, Tsinghua University, China.
30. Invited Speaker, 2007, Humanoid Robot: From Good Science to Good Business, NTC/NTU, Singapore.
31. Invited Speaker, 2006, Toward Autonomous Land Vehicles, Tongji University, China.
32. Invited Speaker, 2006, Toward Interactive Media: The Role of Vision and Robotics, NTC/NTU, Singapore.
33. Invited Speaker, 2006, A Design Perspective of Humanoid Robot, Digital Human Research Center, Japan.
34. Invited Speaker, 2005, Toward Cognitively Intelligent Robot, DSO National Laboratories, Singapore.
35. Invited Speaker, 2005, The Essence of Developmental Vision, Orebro University, Sweden.

Research Funding

<For Co-PI grants, or where grants are from larger block grants to NTU, pls indicate both share of grant and total grant amount, e.g. "300,000 (600,000)".>

External Grants

Role	Year	Project Title	Amount (S$)	Source of Grant
PI	2026 - 2027	2026 RobotX Challenge	90,035.34	MINDEF/ PA9026200550
PI	2021 - 2024	Perception, Planning and Control for	210,000.00	MINDEF/ PA9022201473

		Achieving Autonomous Surface Vehicle		
PI	2016 - 2017	Design and Develop USV Autonomy	141,450.00	MINDEF/ PA9016102878
PI	2014 - 2015	Research on Path Planning Algorithms of Autonomous Surface Vehicles	80,000.00	MINDEF-NTU /JPP/14-01-02
PI	2013 - 2014	Perception, Control and Guidance of Autonomous Surface Vehicles	80,000.00	MINDEF-NTU /JPP/13-01-04
PI	2013 – 2016	Translational Research on Medical Robotics	200,000.00	Nanjing Municipal Government's Talent Program
PI	2012 – 2015	Translational Research on Key Technologies of Self-driving Cars	400,000.00	Kunshan Municipal Government's Talent Program
PI	2011 - 2015	Translational Research on Visual Guidance of Self-driving Cars	200,000.00	Shanghai Municipal Government's Talent Program
PI	2009 - 2012	Development of a humanoid robot	999,000.00	MINDEF/ POD0914255
PI	2006 - 2009	Low-cost Android Systems	786,000.00	MINDEF/ DSOCL06255
PI	2006 - 2009	Low-Cost Humanoids	570,000.00	MINDEF/ DSOCL06171
PI	2000 - 2003	Advanced & Intelligent Mechatronics	600,000.00	ST Kinetics Ltd

Internal Grants

Role	Year	Project Title	Amount (S$)	Source of Grant
Co-PI	1999 - 2002	Flexible Snake-like Robot Driven by Singapore Motor	64,000.00	MOE AcRF Tier 1 (RG73/98)
PI	1997 - 2000	Intelligent Mobile Systems	350,000.00	MOE AcRF Tier 2 (ARC15/97)
PI	1997 - 2000	Research on a New Modular Chain Guided by Vision	226,920.00	MOE AcRF Tier 1 (RG72/76)
PI	1994 - 1997	High Performance and Real-time Vision for Robot Guidance	635,500.00	MOE AcRF Tier 2 (ARC1/94)

Citation Summary
(according to the citation report at Appendix 1)

Database	Citation Count		H-index
	without self-citations	with self-citations	
Scopus			
Web of Science (SCI)			

Google Scholar		2615	19

Publications

(in chronological order, starting with the most recent)

Bold	Denotes main author
**	Denotes directly supervised research staff, i.e. POs, RAs, RFs, postdocs, etc.
*	Denotes PhD students (supervised or co-supervised)
##	Denotes Tier 1A papers
#	Denotes Tier 1B papers

Journal Papers

1. **Xie M** and Wang X. H., 2025, Biomimetic Digital Twin of Future Embodied Internet for Advancing Autonomous Vehicles and Robots, Open Access Journal of Biomimetics**.**

2. **Xie M**, Wang X. H. and Li J. H., 2025, A Hybrid Strategy for Achieving Robust Matching Inside the Binocular Vision of a Humanoid Robot, Open Access Journal of Mathematics.

3. Xie F., **Xie M.**, Wang C. and Li D. W., 2025, PDCG-Enhanced CNN for Pattern Recognition in Time Series Data, Open Access Journal of Biomimetics**.**

4. **Xie M.**, **Fang Yuhui and **Lai Tingfeng, 2025, New Solution to 3D Projection in Human-like Binocular Vision, International Journal of Humanoid Robotics.

5. Xiaofeng Wei , Ya Zhang , Shiwei Fan , Wei Gao , Feng Shen , **Xie Ming** , Yu Wang，2025，Low cost IMU attitude estimation algorithm based on measurement adaptive reduced DCM, Vol. 25, Issue 1, IEEE Sensors Journal. (DCM stands for direct cosine matrix)

6. Xiaofeng Wei, Shiwei Fan, Ya Zhang, Wei Gao, Feng Shen, **Xie Ming**, Jian Yang, 2024, A robust adaptive error state Kalman filter for MEMS IMU attitude estimation under dynamic acceleration, Measurement.

7. Jiahao Zhao, Bin Zi, Wei Wang, **Ming Xie**, Huafeng Ding, 2024, Design and tension distribution optimization of a 9-DOF cable-driven parallel spray-painting robot with 3 degrees of redundancy, Mechanism and Machine Theory, Vol. 203.

8. **Xie M**., 2024, Top-down Design of Human-like Teachable Mind, Special Issue in Celebrating IJHR's 20th Year Anniversary, International Journal of Humanoid Robotics.

9. Xie Feng, Lam Soi Hoi, **Xie M.** and Wang Cheng, 2024, Few-Shot Learning in Wi-Fi-Based Indoor Positioning, Open Access Journal of Biomimetics.

10. **Xie M**. **Lai Tingfeng and **Fang Yuhui, 2023, A New Principle Toward Robust Matching in Human-like Stereovision, Open Access Journal of Biomimetics.

11. Xie Feng, **Xie M**., and Wang Cheng, 2023, Using MNL Model in Mobile Device's Indoor Positioning, Open Access Journal of Biomimetics.

12. **Tanmay Samak, **Chinmay Samak, Sivanathan Kandhasamy, Venkat Krovi and **Xie M**., 2023, AutoDRIVE: A Comprehensive, Flexible and Integrated Cyber-Physical Ecosystem for Enhancing Autonomous Driving Research and Education, Open Access Journal of Robotics.

13. Xie Xiaohui, Zhu Chunyu, and **Xie M**., 2022, Visual tracking control of SCARA robot system based on deep learning and Kalman prediction method, International Journal of Hydromechatronics, Vol. 4, No. 4.

14. **Xie M**., 2018, A Concept of Culture Space and Its Possible Application to Achieving Durable Peace, Journal of Technology and Social Sciences, Vol.2, No.3, pp.14-18.

15. **Xie M**., 2018, A Holistic View of University and Its Governance, Journal of Technology and Social Sciences, Vol.2, No.3, pp.1-5.

16. **Xie M**. and **Velamala S., 2018, Maritime Autonomous Vessels: A Review of RobotX Challenge's Works, Journal of Technology and Social Sciences, Vol.2, No.2, pp.7-14.

17. *Wee T. C., Astolfi A., and **Xie M**., 2013, Design and Control of A Bipedal Robot with Sensory feedback, International Journal of Advanced Robotic Systems, pp. 1-12.

18. *Dong Y. C., Hu Z. C. and **Xie M**., 2012, A Model-Based 3D Face Pose and Animation Tracker with Auto-registration Using a Binocular EKF Kernel, International Journal of Humanoid Robotics, Vol. 9, No. 2, pp 1250014-1 / 1250014-31.

19. *Wee T. C., Astolfi A., and **Xie M**., 2012, Robust Control of Bipedal Humanoid (TPinokio), Procedia Engineering (Elsevier), Vol. 41, pp. 643-649.

20. *Xu C., Li S. Q. and **Xie M**., 2012, A Robust O(n) Solution to the Perspective-n-Point Problem, IEEE Transactions on Pattern Analysis and Machine Intelligence, Vol. 34, Issue 7.

21. Li S. Q., *Liu Y. and **Xie M**., 2011, Implementation of a single motor driven manipulator with multiple joints, Industrial Robot - An International Journal, Vol. 38, No. 1. (Recipient of Best Paper Award from Emerald Group Publishing Limited).

22. **Xie M**., 2009, Five Steps of Evolution from Non-life to Life-like Robots, International Journal of Humanoid Robotics, Vol. 6, No. 2, pp.307-327.

23. **Xie M**., **Wang L., **Xian L. B., **Li J., **Yang H. J., **Song C. S. and Zhang L., 2009, Developing Hardware Capability for Mobile Manipulation by Low Cost Humanoid Robot (LOCH), Industrial Robot – An International Journal, Vol. 36, No. 5.

24. **Xie M.**, Zhong Z. W., **Zhang L., **Xian L. B., **Wang L., **Yang H. J., **Song C. S. and **Li J., 2009, A Deterministic Way of Planning and Controlling Biped Walking of Low Cost Humanoid (LOCH) Robot, Industrial Robot – An International Journal, Vol. 36, No. 4, pp. 314-325. (Recipient of Best Paper Award from CLAWAR 2008).

25. *Yin X. M. and **Xie M**., 2007, Finger Identification in hand gesture-based human-robot interaction, Image and Vision Computing, Vol. 25, No. 8, pp. 1291-1300.

26. *Tanumara R. C., **Xie M**. and Au C. K., 2006, Learning Human-like Color Categorization through Interaction, International Journal of Computational Intelligence, Vol. 3, No. 4, pp. 338-345.

27. *Xiong Y. J., Li S. Q. and **Xie M**., 2006, Predictive display and interaction of telerobots based on augmented reality, Robotica, Vol. 24, No. 4, pp. 447-453.

28. Wu Z., **Xie M**., *Liu Q. C. and *Zhang Y., 2006, SXC Control Chart, International Journal of Advanced Manufacturing Technology, Vol. 30, pp. 444-451.

29. Wu Z., **Xie M**., and *Zhang S., 2005, A Virtual System for Vision Based SPC, Quality Engineering, Vol. 17, No. 3, pp. 337-343.

30. **Guo D. and **Xie M**., 2005, Color Clustering and Learning for Image Segmentation based on Neural Networks, IEEE Transactions on Neural Networks, Vol. 16, No. 4, pp. 925-936.

31. **Xie M**., *Jayakumar K. S. and *Chia H. F., 2004, Meaning-centric Framework for Natural Text/Scene Understanding by Robots, International Journal of Humanoid Robotics, Vol. 1, No. 2, pp. 375-407.

32. *Yin Y. M. and **Xie M**., 2003, Estimation of the Fundamental Matrix from Uncalibrated Stereo Hand Images for 3D Hand Gesture Recognition, Pattern Recognition, Vol. 36, No. , pp. 567-584.

33. Wu Z., **Xie M**. and *Tian Y., 2002, Optimization Design of the X & S Charts for Monitoring Process Capability, Journal of Manufacturing Systems, Vol. 21, No. 2, pp. 83-92.

34. Wu Z., **Xie M**. and **Wang Z. G., 2001, Optimum Rectifying Inspection Plans, International Journal of Production Research, Vol. 39, No. 8, pp. 1575-1588.

35. *Yin X. **Guo, D. and **Xie M**., 2001, Hand Image Segmentation Using Color and RCE Neural Network, Robotics and Autonomous Systems, Vol. 34, No. 4, pp. 235-250.

36. **Xie M**., 1997, Robotic Hand-Eye Coordination: New Solutions with Uncalibrated Stereo Cameras, Machine Vision and Applications, Vol. 10, No. 10, pp. 136-143.

37. **Xie M**., 1997, Automatic Feature Matching in Uncalibrated Stereovision Through the Use of Color, Robotics and Autonomous Systems, Vol. 21, No. 21, pp. 355-364.

38. **Xie M**., 1997, Visual Servo Control with Uncalibrated Vision: A Theory and Experiments, IES Journal, Vol. 37, No. 1, pp. 13-21.

39. **Xie M**., 1996, Matching Free Stereovision for Detecting Obstacles on a Ground Plane, Machine Vision and Applications, Vol. 9, No. 1, pp. 9-13.

40. **Xie M.,** 1995, Feature Matching and Affine Transformation for 2D Cel Animation, The Visual Computer, Vol. 11, No. 8, pp. 419-428.

41. **Xie M**., 1995, Trinocular Vision for AGV Guidance: Path Localisation and Obstacle Detection, Computers & Electrical Engineering, Vol. 21, No. 6, pp. 441-452.

42. **Xie M**., 1995, A Cooperative Strategy for The Matching of Multi-level Edge Primitives, Image and Vision Computing, Vol. 13, No. 2, pp. 89-99.

43. **Xie M**., 1994, 3D Dynamic Stereovision: An Unified Approach for Stereo and Motion Matching without Local Constraints, IEICE Transactions on Information and Systems, Vol. E77-D, No. 11, pp. 1259-1261.

44. **Xie M.,** 1994, Stereo and Motion Matching: A Hough Transform Inspired Method, Pattern Recognition Letters, Vol. 15, No. 11, pp. 143-150.

45. **Xie M.,** Gallice J., Alizon L. and Trassoudaine L. 1994, Road Obstacle Detection and Tracking By An Active and Intelligent Sensing Strategy, Machine Vision and Applications, Vol. 7, No. 3, pp. 165-177.

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Good job, Ming!

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3. **Xie M**. and Zhang J. W., (2015), 一种全景图像合成和显示的方法及装置 A Synthesis and Display of On-Vehicle's Sky Vision and Its Apparatus, ZL 2013 1 0019868.1, 授权日期: 2015.12.10, Granted on 10 December 2015, Filed on 2013.1.18

4. **Xie M**. and Zhang J. W., (2015), 一种汽车刹车安全提示控制系统及安全提示控制方法 A Frontal Warning and Safety Alert Systems in Response to Vehicle's Breaking Actions, ZL 2013 1 0163955.4, 授权日期: 2015.10.30, Granted on 30 October 2015, Filed on 7 May, 2013.

5. **Xie M.** and Zhang J. W., (2015), 一种车载标定的方法、设备及其系统 A Calibration Method and Apparatus for On-Vehicle's Sky Vision System, ZL 2012 1 0371256.4, 授权日期: 2015.10.10, Granted on 10 October 2015, Filed on 29 September, 2012.

6. **Xie M**. and Zhang J. W., (2015), 一种便携式行李车, A Portable Wheeled Platform for Personal Mobility, ZL 201520373606.X, 授权日期: 2015.9.30, Granted on 30 September 2015, Filed on 2 June, 2015.

7. **Xie M**. and Zhang J. W., (2014), 一种自动收银装置和系统, An Automatic Payment System for Unmanned Shops, ZL 2014 2 0081138.4, 授权日期: 2014.10.1, Granted on 1 October 2014, Filed on 25 February, 2014.

8. **Xie M**.,(2014), 基于自然语言的人机对话系统 Human-Machine Dialogue Systems Based on Understanding of Texts in Natural Languages, ZL2009 1 0040170.1, 授权日期: 2014.02.12, Granted on 12 February 2014, Filed on 2009.6.11

9. **Xie M**., Zhang J. W. and Li. Q. J., (2013), 可自动/手动调整的车载双目视仪, Automatic Adjustment Apparatus for In-vehicle Stereovision System, ZL 2012 2 0595973.0, 授权日期: 2013.5.29, Granted on 29 May 2013, Filed on 13 November, 2012.

10. **Xie M**., (2012), 便于外置安装、便于手动/自动切换的车辆自动驾驶系统 Augmented Steering Wheels with Automatic Mode and Manual Mode of Driving, ZL 2009 1 0037540.6, 授权日期: 2012.12.12, Granted on 12 December 2012, Filed on 2009.0303

11. **Xie M**., (2011), 自主伺服式太阳能系统 Solar Panel Systems with Automatic Control of Pointing Toward Bright Sky Area, ZL 2007 1 0032896.1, 授权日期: 2011.4.13, Granted on 13 April 2011, Filed on 2007.12.26

12. **Xie M**., (2010), 智能汽车辅助导航和自动兼辅助驾驶系统 A System for Driving Assistance with Autonomous Driving Mode and Manual Driving Mode, ZL 2007 1 0026633.X, 授权日期: 2010.10.13, Granted on 13 October 2010, Filed on 2007.1.30

Patents Licensed

- Nil

Technology Disclosure Filed

- **Xie M**., Ong S. J. and Ju W. B., (2019), Robot Integrated Restaurant, Ref No. 2019-062, NTUitive Office.

- **Xie M**. and Tsui S. M., (2019), Cognitive Dialog System for Restaurants, Ref No. 2019-059, NTUitive Office.

- **Xie M**., Vinod G., Ang K. W., Lim H. Y. and Aliyev T., (2019), Cognitive Vision System, Ref. No. 2019-055.

- **Xie M**., Gupta N. K. and Gracia S., (2019), Cognitive Motion Planar, Ref No. 2019-053, NTUitive Office.

Technology Disclosure Licensed

- Nil

Entrepreneurship

<Please include the following details:
1. *Year*
2. *Company Name*
3. *Industry*
4. *Persons involved*
5. *Short description of product*
6. *Major terms of licensing agreement with NTU (e.g. effective period, royalty/payment, maintenance of patent)*
7. *Investments and/or revenue (e.g. $Xm Series A from XXX, $X annual revenue>*

N.A

ST Engineering Ltd has had the intention of investing S$2.3M to commercialize the patent on Modular Robot Manipulator Apparatus with the following terms: a) to set up a start-up company with the paid-up capital of S$2.0M in which NTU will be given 35% of the total shares, b) to purchase the patent with S$300K from NTU. NTU did not accept the deal due to the lack of one additional offer which was the 1% loyalty from the revenue of annual sales.

So far, I have worked with several entrepreneurship teams and have jointly created several startup companies. Five of them are:

- GT Robots Pte Ltd in Singapore
- Smart Robots Pte Ltd in China
- Nanjing Tech Robotics Pte Ltd in China
- Dragon Flag Robotics Pte Ltd in China
- iCar Electronics Pte Ltd in China

Among the above entrepreneurship initiatives, two of them have received the startup grants from the local governments in China, For example,

- iCar Electronics Pte Ltd has received the local governments' startup grant of RMB 3.6 M.
- Smart Robots Pte Ltd has received the local government's grant of RMB 1.0 M.

The highlights of representative invention and products are shown in the following pages:

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 July 2001 (19.07.2001)

PCT

(10) International Publication Number
WO 01/51259 A2

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(21) International Application Number: PCT/SG00/00002

(22) International Filing Date: 11 January 2000 (11.01.2000)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicants and
(72) Inventors: **ZHU, Hai, Hong** [SG/SG]; Blk 663A #14-287, 65 Jurong West Street, Singapore 641663 (SG). **XIE, Ming** [SG/SG]; Blk 908 #06-209, 91 Jurong West Street, Singapore 640908 (SG). **LIM, Mong, King** [SG/SG]; 34 Toh Tuck Road #02-05, Good Luck Garden, Singapore 596712 (SG).

(74) Agents: NAMAZIE, Farah et al.; Haq & Namazie Partnership, Robinson Road, P.O. Box 765, Singapore 901515 (SG).

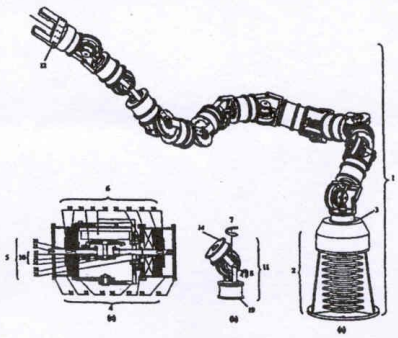
(81) Designated States *(national)*: CA, CN, JP, KR, SG, US.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MODULAR ROBOT MANIPULATOR APPARATUS



(57) Abstract: The present invention provides an apparatus (1) for carrying various types of tools (12) for the purpose of undertaking welding, painting, manipulation, assembly, material handling, inspection and any desired motions. The apparatus includes a base system (2) having a standardized mechanical and electric interface and providing the output of motion with sufficient power (3), a series of serially connected flexible housing frames (4) enabling the apparatus to execute various configurations (ie, motions), a series of independent motion transmission units (5) enabling the transmission of the single motor's motion along all the motion transmission units, and a series of serially connected motion distribution units (6) enabling the output of motion from a motion transmission unit to its corresponding link. Each flexible housing frame (4) has two degrees of freedom (DOF): one for twisting rotation (7) and the other for pivoting rotation (8). Each motion transmission unit includes two shafts (20 and 25) and a special bevel-gear mechanism (10). The triple (flexible housing frame, motion transmission unit, motion distribution unit) forms a modular entity (11) of the apparatus enabling the apparatus to be easily scaleable (ie, to add or remove modular entities according to the requirement of tasks).

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Interactive Humanoid Robots for Tour-Guiding in Museums

Educational Humanoid Robots for Interactive Learning in School and Home

Industrial Humanoid Robots for Robot-Integrated Automation in Production Line

Industrial Robots for Robot-Integrated Automation in Production Line

Teaching Summary

Opinions on Teaching Appraisals:
A faculty member's abilities and contributions are to be evaluated according to outcome, competence, and leadership in terms of teaching, research, and service. The better ways of assessing the outcome, competence, and leadership of a faculty member's teaching performance and excellence should be based on KPIs such as:

1. Amount of Outcome (0-5):
    a. The number of student-hours devoted to teaching (i.e., each course's student-hours = number of students taught x number of teaching hours + hours of setting exam/quiz papers + hours of marking exam/quiz papers).
    b. The amount of AUs (Academic Unit) earned by the students taught (i.e., each course's AUs earned = number of students taking the course x number of AUs assigned to the course).
    c. The amount of revenues generated from the courses taught (i.e., amount of revenues = amount of AUs earned x unit revenue per AU) (NOTE: A student must obtain X amount of AUs before being qualified for graduation. If the total revenue received from The Ministry of Education is Y dollars per graduated student, the unit revenue per AU should be Y/X).
2. Level of Competence (0-5):
    a. The total score (not the average score per student) received from students' feedback and the number of awards received from internal teaching activities.
    b. The number of invited lectures and seminars delivered to external learners.
3. Level of Leadership (0-5):
    a. The number of courses taught at various levels.
    b. The challenge level of courses taught at various levels.

The first KPI is for the determination of annual bonus and salary increment while the second and third KPIs are for the determination of promotion from lower rank to higher rank, if applicable.

Key Courses Taught
(Current Year and Last Few Years)

Course Code	***Course Title***	***Academic Year***	***Course Level***	***Type*** *(Lecture, Tutorial, etc.)*	***Semester***
MA3005	Control Theory	AY23 – AY24 AY24 – AY25 AY25 – AY26	UG	Tutorial	1, 2
MA4822	Measurement and Sensing Systems	AY23 – AY24 AY24 – AY25 AY25 – AY26	UG	Lecture, Course Coordinator	1, 2
MA4825	Robotics	AY23 – AY24 AY24 – AY25 AY25 – AY26	UG	Lecture, Course Coordinator	1
MA4829	Machine Intelligence	AY23 – AY24 AY24 – AY25 AY25 – AY26	UG	Lecture	2
MA4832	Microprocessor Systems	AY23 – AY24 AY24 – AY25 AY25 – AY26	UG	Lecture, Course Coordinator	1
MA6501	Manufacturing Automation and Control	AY23 – AY24 AY24 – AY25 AY25 – AY26	PG	Lecture	1

Academic Supervision and Mentoring

PhD students

No.	PhD Student	Period	Role *(PIs. indicate if Main/Sole or Co-supervisor)*	Thesis/ Project Title	Current Status
Currently Supervising					
7	Ni Xiang	2026.8.26-2027.8.25	Co-Supervisor	Motion Intent Recognition for Wearable Robots	
6	Chen Yixiao	2026.6.11-2027.6.10	Co-Supervisor	Research on Virtual Accelerated Testing Methods for Autonomous Vehicle	
5	Jia Fusheng (CSC Scholar)	2026.6.8 – 2027.6.7	Co-Supervisor	Interaction Design Research for Explainable Cooperative Driving in Mixed Traffic Environments	
4	Chen Yong Kang (CSC Scholar)	20263.12 – 20263.11	Co-Supervisor	Research on the design of human-machine collaborative interface for autonomous vehicles based on cognitive load perspective	
3	Yuan Binkun (CSC Scholar)	2026.2.21 – 2027.2.20	Co-Supervisor	Autonomous Vehicle Morphology Generation: A Cognitive Design Framework Incorporating Brand Semantics	
2	Zhou Xiaoren (CSC Scholar)	2026.1.6 – 2027.1.5	Co-Supervisor	In-Motion Initial Alignment for MEMS-IMU/GPS Integrated Systems	
1	Qiao Yusong (CSC Scholar)	2025.12.3 – 2026.12.2	Co-Supervisor	Machine Intelligence Applications Based on New Generation	

				of Artificial Intelligence	
Graduated					
12	Li Ziwei (CSC Scholar)	2025.10 – 2026.11	Co-Supervisor	Collaborative Exploration and Mapping by Multiple Unmanned Ground Vehicles in Complex 3D Unknown Environments	
11	Wang Xiaohui (CSC Scholar)	2024.11 – 2025.10	Co-Supervisor	Research on Model-Based Vision	
10	Liu Yizhou (CSC Scholar)	2024.3 - 2025.2	Co-supervisor	Research on Robust Control of Aircraft with Uncertainties in Learn-to-Fly	
9	Yin Shicai (CSC Scholar)	2024.2-2024.2	Co-supervisor	Research on Fault Detection and Control for High-Speed Train Wheelsets	Faculty Member Nantong University China
8	Zhao Jiahao (CSC Scholar)	2023.11-2024.11	Co-supervisor	Research on Cable-Driven Robots	
7	Yang Wenbiao (CSC Scholar)	2023.10-2024.10	Co-supervisor	Research on Learning and Understanding of One-Dimensional Time-Domain Signals	Faculty Member Guangzhou University China
6	Wei Xiaofeng (CSC Scholar)	2023.10-2024.10	Co-supervisor	Research and Development of Inertial Sensor for Vehicle Guidance	
5	Dong Haotian (CSC Scholar)	2023.9-2024.3	Co-supervisor	Learning, Planning and Control of Complex Behaviors of Land Vehicles	High-Tech Company in Beijing
4	Xu Jin	2013 - 2021	Supervisor	Fault Detection Based on High-Level Feedback and Reconstruction for	CEO of Black Sesame Technology Pte Ltd

				Image Recognition	
3	Jayakumar S Kandhasmy	2006 - 2009	Supervisor	Organized Memory for Natural Text Understanding and Its Meaning Visualization by Machine	Associate Professor in India
2	Li Mingjian	2003 - 2006	Supervisor	Toward Single Motor Driven Biped Robot	Working In China
1	Yin Xiaoming	1998 - 2001	Supervisor	Recognition of Human Hand Gestures and Its Application to Human-Robot Interaction	Senior Research Fellow in Singapore

Master students (By Research Only)

No.	Masters Student	Period	Role	Thesis/ Project Title	Current Status
Currently Supervising					
1	Nil	-	-	-	-
Graduated					
8	Ang Wei Teck	1997-1999	Supervisor	Design and Implementation of Human-type Mobile Modular Manipulator Guided by Vision	Faculty Member in NTU
7	Fong Chee Kong	1997-1999	Supervisor	Real Time Head-Eye Coordination With Robotic Systems	-
6	Wong Swee Meng	1998-2000	Supervisor	Integrated Vision Functions for the Guidance of Smart Vehicle	-
5	Goh Kian Liong	1998-2000	Supervisor	Numeric Solution for 3D Reconstruction Using Multiple Cameras	-

4	Lee Kin Kok	1998-2000	Co-Supervisor	Development of Man-Vehicle Interface Incorporating Proximity System	-
3	Seo Chin Heng	2000-2002	Supervisor	Development of A Visual Programming Tool for A Flexible Robot Arm Manipulator	ST-Engineering
2	Hendra Purnawali	2003-2005	Supervisor	Design and Analysis of Single-Motor-Driven Robot Having Independent Degrees of Freedom	-
1	Wang Lei	2008-2010	Co-Supervisor	Design of human-like hand-arm for human-assisted manipulation	-

Master Students (By Coursework) & Undergraduate Students

	No. Currently Supervising (Intakes)			**No. Graduated** (Outbounds)		
	MSc#	**FYP**	**URECA**	**MSc#**	**FYP**	**URECA**
2022/23	2	17	4	0	10	4
2023/24	6	15	6	2	17	6
2024/25	3	11	5	6	15	5
2025/26	12	9+1	6	12	9+1	6

 # MSc students (by coursework), include those taking either dissertation or Independent Study Module. Final year students include full-time and part-time students.

Post-doctoral fellows

No.	**Post-doc Fellow**	**Appointment**	**Period**	**Thesis/ Project Title**	**Current Status**
In employment (as at Current Year)					
1	Nil	-	-	-	-
Left service					
7	Dr. Alexis Scheuer	Research Fellow			Working In France
6	Dr. Lu Jiangzhou	Research Fellow			Senior Manager at ST Kinetics Ltd. Co.

5	Dr. Xiong Wei	Research Fellow			
4	Dr. Qin Bin	Research Fellow			CEO of a High-Tech Company
3	Dr. Zhang Guoqing	Research Fellow			Working In China
2	Dr. Xia Zeyang	Research Fellow			Professor in China
1	Dr. Guo Dong	Research Fellow			Senior Manager at Huawei Co.

Teaching Awards / Recognition

Year	Teaching Award / Recognition
1998	Mentor of the Best Project Team from NTU-APBE Technology & Engineering Research Programme (TERP).

Teaching Grants

Role	Year	Amount (S$)	Source of Grant
PI	2024	13K	Award of College of Engineering Dean's Teaching Fund

Students' Assessments on Teaching

Students' Opinions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Scale: 1 to 5	[5, 4]	[4, 3]	[3, 2]	[2, 1]	[1, 0]
Scale: 20 to 100	[100, 80]	[80, 60]	[60, 40]	[40, 20]	[20, 0]

	MA4822	MA4825	MA4829	MA4832	MA6501	MA3005 (1)	MA3005 (2)	MA3005 (3)	MA3005 (4)	Sum / Average
2022S1	3.87 (32/169)	3.40 (11/59)	N.A	3.34 (12/45)	4.62 (22/42)	4.22 (5/26)	4.37 (7/24)	3.90 (1/24)	4.60 (5/25)	382 / 4.02
2022S2	N.A	N.A	4.00 (14/90)	N.A	N.A	4.67 (3/11)	4.42 (7/16)	4.00 (4/16)	4.35 (8/28)	152 / 4.22
2023S1	3.77 (35/225)	3.03 (12/57)	N.A	3.16 (10/48)	4.62 (22/67)	4.45 (6/29)	4.25 (10/30)	3.57 (6/30)	N.A	393 / 3.89
2023S2	N.A	4.50 (2/14)	4.10 (19/99)	N.A	N.A	4.60 (5/26)	4.10 (3/26)	4.52 (5/28)	4.50 (2/26)	143 / 4.02
2024S1	4.01 (41/195)	3.75 (20/55)	N.A	3.63 (6/20)	4.62 (27/65)	4.73 (6/26)	N.A	N.A	N.A	414 / 4.14
2024S2	N.A	N.A	3.96 (20/75)	N.A	N.A	4.13 (6/19)	N.A	N.A	N.A	103/ 4.00
2025S1	4.19 (44/203)	3.94 (8/45)	N.A	3.85 (12/47)	4.69 (111/183)	4.01 (7/17)	N.A	N.A	N.A	811 / 4.45
2025S2	N.A	N.A	4.07 (43/93)	N.A	4.51 (15/49)	3.88 (7/28)	4.29 (2/10)	N.A	N.A	278 / 4.16
2026S1			N.A			N.A	N.A	N.A	N.A	

Service Summary

Opinions on Service Appraisals:
A faculty member's abilities and contributions are to be evaluated according to outcome, competence, and leadership in terms of teaching, research, and service. The better ways of assessing the outcome, competence, and leadership of a faculty member's service performance and excellence should be based on KPIs such as:

1. Amount of Outcome (0-5):
    a. The number of service hours spent within the university (e.g., time spent as office holders, time spent as supervisors to undergraduate students, graduate students (PhD and Master), and research staff, etc).
    b. The number of service hours spent outside the university (e.g., time spent to serve as Government Advisor, Journal's Editor-in-Chief, Society's President, Company's Consultant, Conference's Chair, etc).
2. Level of Competence (0-5):
    a. The number of key initiatives undertaken (setup of new school, setup of new centre, setup of new program, setup of new society/association, setup of new journal, startup of new companies, etc).
    b. The number of awards received from service activities.
3. Level of Leadership (0-5):
    a. The number of key roles served within the university (e.g., President, Dean, Chair, Director, Coordinator, etc).
    b. The number of key roles served outside the university (e.g., Government Advisor, Editor-in-Chief, Director, Chairman, etc).

The first KPI is for the determination of annual bonus and salary increment while the second and third KPIs are for the determination of promotion from lower rank to higher rank, if applicable.

Service Awards / Recognition

Year	Role
-	-

Service to School

Period of appointment	Role
2021 – 2026	Course Coordinator, MA4832 Microprocessor Systems
2015 – 2026	Course Coordinator, MA4822 Measurement and Sensing Systems
1997 – 2026	Course Coordinator, MA4825 Robotics
2012 – 2019	Course Coordinator, MA4829 Machine Intelligence
2000 – 2003	Co-Founder and Co-Director of STK-NTU Advanced & Intelligent Mechatronics Laboratory, which was later upgraded into STE-NTU Centre for Intelligent Systems.
1998 – 2023	Director, Vision and Control Research Programme

Service to University

Period of appointment	Role
2026	Trainer, PACE@NTU's Course on Robotics, Automation and IoT (15 hours) (August 11 – 14, 2026)
2026	Trainer, PACE@NTU's Course on The Power and Possibilities of AI (15 hours) (July 13 – July 17, 2026)
2026	Trainer, PACE@NTU's Course on Robotics, Automation and IoT (15 hours) (February 9 – 13, 2026)
2026	Research Advisor to NTU Global Connect Fellows (GCF): GIANNOLI DARIUS DAYU, Feb – Mar, 2026
2025	Research Advisor to NTU Global Connect Fellows (GCF): Ege Doganay and Kamron Soltani, July – August, 2025
2025	Trainer, PACE@NTU's Course on The Power and Possibilities of AI (15 hours) (July 14 – July 18, 2025)
2025	Trainer, PACE@NTU's Course on The Power and Possibilities of AI (15 hours) (July 7 – July 11, 2025)
2025	Trainer, PACE@NTU's Course on Robotics, Automation and IoT (15 hours) (June 30 – July 4, 2025)
2025	Trainer, PACE@NTU's Course on Advanced Robotics (15 hours) (16-24 June, 2025)
2024	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (20 hours) (July – August, 2024)
2024	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (20 hours) (Jan – February, 2024)
2023	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (13 hours) (14 August – 18 August, 2023)
2023	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (18 hours) (16 January – 10 February, 2023)
2022	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (18 hours) (28 July – 26 August, 2022)
2022	Research Advisor to NTU-India Connect Program's Internship Students: PRANAV SHARMA, MANJUNADH KANDAVALLI, JIGYASA KUMARI, HARSHITA NAGARAJAN, SRI SIDDARTH CHAKARAVARTHY P., VENKATA MANIVANNAN, NISHITHA, Harsh Mandalia, ANKITA JAISWAL, HRISHIKESH GOKHALE, PRAKANSHUL, PARIKSHIT KUMAR, Urja Jain.
2022	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (18 hours) (17 January – 18 February, 2022)
2021	Trainer, PACE@NTU's SkillsFuture Singapore Course on Robot Motion Planning and Control (14 hours)
2021	Trainer, PACE@NTU's Seminar on Industrial Robotics in Castrol Royals E-Colloquium, September 6-8, India (3 hours)
2021	Trainer, PACE@NTU's Course on Robotics, Automation and Internet of Things (18 hours)
2021	Research Advisor to NTU-India Connect Program's Internship Students: Swapnil Ghosh, Soorya Sriram, Pabbichetty Nimisha, Nirmal Dipakbhai Rajpopat, Junare Pranay Gopal, Aarish Shah.
2020	Research Advisor to NTU-India Connect Program's Internship Students: Tanmay Goyal, Shravan Anand, Samak Tanmay Vilas, Samak Manmeet Alias Chinmay Vilas, Manjunadh Kandavalli.
2019	Research Advisor to NTU-India Connect Program's Internship Students: SATYAM BHAWSINGHKA, SAMARTH GUBRELE, ARJUN BHARDWAJ, ADDEPALLI VENKATA BHANU PRANAV.
2018	Research Advisor to NTU-India Connect Program's Internship Students: Rajas Poorna, Jagadeesh Shanmugam H, GUPTA

	NAVEEN KUMAR, Gautham Vinod, Devendra Patil, DENNIS RONALDI.
2004	Co-Initiator for the Setup of STE-NTU Centre for Intelligent Systems which took over STK-NTU Advanced & Intelligent Mechatronics Laboratory.
2000 – 2006	Deputy Director (2000-2006), Wireless and Positioning Center, NTU.
2000 – 2022	Fellow (2000-2002), Singapore-MIT Alliance

Service to Academic Community

Period of appointment	Role
2004 – present	Editor-in-Chief, International Journal of Humanoid Robotics
2010 – present	President, Robotics Society of Singapore
2025	Guest Editor, Special Issue on Robotics and Intelligent Systems: New Mathematical Challenges and Algorithmic Innovations, Open Access Journal of Mathematics.
2025	Guest Editor, Special Issue on Artificial Intelligence for Autonomous Robots, Fourth Edition, Open Access Journal of Biomimetics.
2024	Guest Editor, Special Issue on Artificial Intelligence for Autonomous Robots, Third Edition, Open Access Journal of Biomimetics.
2021 – 2023	Volunteer Judge, The Global Undergraduate Awards (Global Undergraduate Awards (awardsplatform.com))
2015	Associate Editor, IEEE Transactions on Cognitive and Developmental Systems
2014 – 2016	Dean, College of Electrical Engineering and Control science, Nanjing Tech University, Jiangsu Province, China
2014 – 2016	Professor, Nanjing Tech University, Jiangsu Province, China
2006 – 2008	Guest Professor, Huazhong University of Science and Technology, China
2005	PhD Opponent, Orebro University, Sweden (7 April)
2005	Member, Board of Selection Panel, Italian Institute of Technology, Italy.
2002 – 2004	Guest Professor, Huazhong University of Science and Technology, China

Service to Others

Period of appointment	Role
2027	Conference Chair, International Conference on Machine Learning and Autonomous Agents (ICMLAA2027), 23-25 July, Tokyo, Japan.
2027	Chair, Technical Program Committee, 7th International Conference on Computer, Remote Sensing and Aerospace (CRSA2027), 16-18 April, Xiamen, China.
2027	Conference Chair, 1st International Conference on Advanced Computing and Visual Intelligence (ACVI2027), 9-10 January, Bangkok, Thailand.
2026	Conference Co-Chair, 12th International Conference on Mechatronic Systems and Robotics (ICMSR2026), 6th International Conference on Robotics, Automation and Artificial Intelligence (RAAI2026), 18-20 December, Singapore.

2026	Program Committee Co-Chair, 10th International Conference on Education and Multimedia Technology (ICEMT2026), 26-28 September, Macau.
2026	Conference Co-Chair, 4th International Conference on Control and Robot Technology (ICCRT2026), 18-20 August, Hiratsuka, Japan.
2026	Program Committee Co-Chair, 3rd International Conference on Computing, Machine Learning and Data Science (CMLDS2026), 24-26 April, Singapore
2026	Publicity Committee Co-Chair, International Conference on Multi-scale Artificial Intelligence (MAI2026), 24-26 April, Shenyang, China.
2026	Program Committee Co-Chair, 15th International Conference on Information and Electronics Engineering (ICIEE2026), 20-22 March, Tokyo, Japan.
2026	TV Interview by Channel News Asia on "Inside China's Plan To Lead The World In Advanced Robotics" (Video Shared on YouTube), 6 March, Singapore.
2026	Advisory Committee Member, 7th International Conference on Current Advancement in Science and Technology (Spectrum2026), 20-22 February 2026, Kolkata, India.
2026	Program Committee Co-Chair, 10th International Conference on Artificial Intelligence, Automation and Control Technologies (AIACT2026), 2-6 February 2026, Sydney, Australia.
2025	Conference Chair, 3rd International Conference on Advance in Artificial Intelligence and Applications (AAIA2025), 20-22 December, Wuhan, China.
2025	Conference Chair, 5th International Conference on Robotics, Automation and Artificial Intelligence (RAAI2025), 18-20 December, Singapore.
2025	Conference Co-Chair, 4th International Conference on Intelligent Computing and Next Generation of Network (ICNGN2025), 12-14 December, 2025, Singapore.
2025	Program Committee Co-Chair, 9th International Conference on Computing and Data Analysis (ICCDA2025), 14-16 November 2025, Chengdu, China.
2025	Publicity Co-Chair, 5th International Conference on Artificial Intelligence, Robotics and Communication (ICAIRC2025), 7-9 November 2025, Xiamen, China.
2025	Program Committee Co-Chair, 8th International Conference on Big Data and Education (ICBDE2025), 25-27 October, Beijing, China.
2025	Organizing Committee Co-Chair, 5th International Conference on Artificial Intelligence, Automation and Algorithms (AI2A2025), 24-26 October 2025, Singapore.
2025	Program Committee Co-Chair, 6th International Conference on Control, Robotics and Intelligent System (CCRIS2025), 22-24 August, Guangzhou, China.
2025	Conference Co-Chair. 5th International Conference on Control and Intelligent Robotics (ICCIR2025), 20-22 June 2025, Tianjin, China.
2025	Conference Co-Chair, 5th International Conference on Control and Robot Technology (ICCRT2025), 16-18 April 2025, Singapore.
2025	Program Committee Co-Chair, 9th International Conference on Artificial Intelligence, Automation and Control Technologies (AIACT 2025), 17-21 February 2025, Sapporo, Japan.

2025	Chairman of Final Competition, APAI Youth Science and Technology Innovation Competition, 18-19 January 2025, NUS & China Cultural Center, Singapore.
2024	Organizing Committee Chair, 7th International Conference on Algorithms, Computing and Artificial Intelligence (ACAI2024), 20-22 December, Guangzhou, China.
2024	Conference Chair, 10th International Conference on Mechatronics System and Robots (ICMSR2024), and 4th International Conference on Robotics, Automation and Artificial Intelligence, 19-21 December 2024, Singapore
2024	Conference Chair, 7th Asia Conference on Cognitive Engineering and Intelligent Interaction (CEII2024), 14-16 December, Singapore.
2024	Conference Co-Chair, 3rd International Conference on Intelligent Computing and Next Generation Networks (ICNGN2024), 23-25 November, Bangkok, Thailand.
2024	Conference Co-Chair, 9th International Conference on Robotics and Automation Engineering (ICRAE2024), 15-17 November 2024, Singapore.
2024	Program Committee Chair, 7th International Conference on Big Data and Education (ICBDE2024), 24-26 September 2024, Oxford, United Kingdom.
2024	Conference Co-Chair, 3rd International Symposium on Robotics, Artificial Intelligence and Information Engineering (RAIIE2024), 5-7 July 2024, Singapore.
2024	Conference Co-Chair, 4th International Symposium on Intelligent Robotics and Systems (ISoIRS2024), 24-26 May 2024, Changsha, China.
2024	Conference Co-Chair, 4th International Symposium on Intelligent Robotics and Systems (ISoIRS2024), 14-16 June, 2024, Changsha, China.
2023	Conference Chair, 9th International Conference on Mechatronics System and Robots (ICMSR2023), 3rd International Conference on Robotics, Automation and Artificial Intelligence (RAAI2023), 14-16 December 2023, Singapore.
2023	Conference Chair, 6th Asia Conference on Cognitive Engineering and Intelligent Interaction (CEII2023), 15-16 December 2023, Hong Kong, China.
2023	Conference Chair, International Conference on Advances in Artificial Intelligence and Applications (https://www.aia-conf.com/), 18-20 November 2023, Wuhan, China.
2023	Conference Co-Chair, 8th International Conference on Robotics and Automation Engineering (ICRAE2023), 17-19 November 2023, Singapore.
2023	Steering Committee Co-Chair, 6th International Conference on Computing and Big Data (www.iccbd.org), 27-29 October 2023, Shanghai, China.
2023	International Scientific Committee Member, 26th International Conference on Climbing and Walking Robots (https://clawar.org/clawar23/), 02-04 October 2023, Florianópolis, Brazil.
2023	Conference Co-Chair, 3rd International Conference on IoT and Machine Learning (http://www.iotml.cn), September 15-17, Singapore.

2023	Technical Committee Member, 7th International Conference on Education and Multimedia Technology (http://icemt.org), August 29-31, 2023, Tokyo, Japan.
2023	Program Committee Member, IEEE International Conference on Mechatronics and Automation (http://2023.ieee-icma.org/Home/Home.aspx), August 6-9, 2023, Harbin, China.
2023	Conference Co-Chair, 8th Asia-Pacific Conference on Intelligent Robot Systems (ACIRS 2023) (www.acirs.org), and 10th International Conference on Electronics Engineering and Technology (www.iceet.org), July 7-9, 2023, Xi'An, China.
2023	Poster Session Chair, 6th International Conference on Big Data and Education (http://www.icbde.org/index.html), June 16-18, 2023, Jinan, China.
2023	International Program Committee Member, IEEE International Conference on Autonomous Robot Systems and Competitions (https://www.icarsc.pt/), April 26-27, 2023, Tomar, Portugal.
2023	Session Chair and International Program Committee Member, the 7th International Conference on Artificial Intelligence, Automation and Control Technologies (https://www.aiact.net/), February 24 to 26, 2023, Kunming, China.
2022	Conference Chair, 8th International Conference on Mechatronics System and Robots (http://icmsr.org/), December 9-11, 2022, Singapore.
2022	Conference Chair, 2nd International Conference on Robotics, Automation and Artificial Intelligence (http://raai.net/), April 14-16, 2022, Singapore.
2022	Conference Co-Chair, 7th Asia-Pacific Conference on Intelligent Robot Systems (http://acirs.org), July 1-3, 2022, Tianjin, China.
2022	Technical Committee Chair, the 5th International Conference on Computing and Big Data (http://www.iccbd.org/), October 28-30, 2022, Shanghai, China.
2022	Technical Committee Co-Chair, 2022 International Conference on E-Education, E-Business and E-Technology (http://www.icebt.org/index.html), 25-27 June, Beijing, China.
2022	International Program Committee Member, International Conference on Autonomous Robot Systems and Competitions (https://www.festivalnacionalrobotica.pt/icarsc/), April 29-30, Santa Maria da Feira, Portugal.
2022	International Program Committee Member, 2022 IEEE International Conference on Mechatronics and Automation (Home - IEEE ICMA 2022 (ieee-icma.org)), August 7 to 10, Guilin, China.
2022	International Program Committee Member, the 6th International Conference on Artificial Intelligence, Automation and Control Technologies (https://www.aiact.net/), April 22 to 24, 2022, Xiamen, China.
2022	Session Chair and Technical Program Committee Member, the 5th International Conference on Big Data and Education (http://www.icbde.org/index.html), February 26 to 28, 2022, Shanghai, China.
2021	Program Committee, Member International Conference on Information Technology and Biomedical Engineering (http://www.icitbe.org), December 24 to 26, 2021, Nanchang, China.

2021	Conference Chair, International Conference on Robotics and Automation Engineering (http://icrae.org/) with workshop of ICRAI (http://icrai.org/), Nov. 19-22, 2021, Guangzhou, China.
2021	International Scientific Committee Member, International Conference on Climbing and Walking Robots (CLAWAR), 30 August – 1 September, 2021, Takaraduka, Japan.
2021	Publication Chair, International Conference on Control, Robotics, Intelligent Systems, (http://www.ccris21.net/), Aug. 20-22, Qingdao, China.
2021	International Program Committee Member, IEEE International Conference on Mechatronics and Automation, August 8 – 11, Takamatsu, Japan.
2021	Conference Co-Chair, 6th Asia-Pacific Conference on Intelligent Robot Systems (www.acirs.org), July 16-18, Tokyo, Japan.
2021	International Technical Committee Member, The 8th International Conference on Automation and Logistics (ICAL 2021), http://www.ical21.org/index.html, Chongqing, China.
2021	International Program Committee Member, The 20th IEEE International Conference on Autonomous Robot Systems and Competitions (IEEE ICARSC'2021), April 15-17, Portugal.
2021	International Program Committee Member, 5th International Conference on Artificial Intelligence, Automation and Control Technologies (http://www.aiact.net/), Shanghai, China.
2021	International Program Committee Member, The 5th International Conference on Robotics and Machine Vision (http://www.icrmv.org), Seoul, South Korea.
2021	International Program Committee Member, IFSA Winter Conference on Automation, Robotics & Communications for Industry 4.0 (http://www.arci-conference.com/), Chamonix-Mount-Blanc, France.
2020 - 2022	Guest Professor (Entrepreneurship), Jiangsu Provincial Government, China
2020	Conference Co-Chair, 5th Asia-Pacific Conference on Intelligent Robot Systems (ACIRS 2020), Singapore.
2020	Conference Chair, International Conference on Robotics and Automation Engineering (ICRAE 2020), Singapore.
2020	Publication Chair, International Conference on Control, Robotics and Intelligent System (CCRIS 2020), Xiamen, China.
2020	International Technical Committee Member, 2nd International Conference on Frontiers of Systems, Process and Control (FSPC 2020 www.icfspc.org), Thailand.
2020	International Technical Committee Member, 3rd International Joint Conference on Robotics and Artificial Intelligence (JCRAI 2020 www.jcrai.org), Japan.
2020	International Technical Committee Member, International Workshop on Service Robotics (IWoSR 2020 www.iwosr.org), October 11-13, Tokyo, Japan.
2020	International Technical Committee Member, 5th International Conference on Control, Robotics and Cybernetics (CRC 2020), http://www.iccrc.org/, China.
2020	International Program Committee Member, 5th International Conference on Robotics and Machine Vision, Seoul, Korea. http://www.icrmv.org/

2020	International Program Committee Member, IEEE International Conference on Mechatronics and Automation, August 2-5, Beijing, China.
2020	International Program Committee Member, The 20th IEEE International Conference on Autonomous Robot Systems and Competitions (IEEE ICARSC'2020), Portugal, April 15-17.
2020	International Scientific Committee Member, International Conference on Climbing and Walking Robots (CLAWAR), Moscow, Russian, 24-26 August.
2020	International Technical Committee Member, International Conference on Frontiers of Artificial Intelligence and Statistics (CFAIS 2020 www.cfais.org), Seoul, South Korea.
2019	Conference Chair, International Conference on Robotics and Automation Engineering (ICRAE 2019), Singapore.
2019	Conference Chair, International Conference on Robotics and Artificial Intelligence, 2019, Singapore.
2019	Conference Co-Chair, International Conference on Mechatronic Systems and Robots, 2019, Singapore.
2019	International Program Committee Member, IEEE International Conference on Robotics and Biomimetics.
2019	International Scientific Committee Member, International Conference on Climbing and Walking Robots.
2019	International Program Committee Member, IEEE International Conference on Mechatronics and Automation.
2019	International Program Committee Member, 6th International Conference on Control, Decision and Information Technologies, Paris, France.
2018	Conference Co-Chair, International Conference on Mechatronic Systems and Robots, Singapore.
2018	International Program Committee Member, IEEE International Conference on Robotics and Biomimetics.
2018	International Advisory Committee Member, International Conference on Climbing and Walking Robots.
2018	International Program Committee Member, IEEE International Conference on Mechatronics and Automation.
2017	International Program Committee Member, IEEE International Conference on Mechatronics and Automation (IEEE ICMA 2017)
2017	International Advisory Committee Member, International Conference on Climbing and Walking Robots
2016	International Advisory Committee Member, International Conference on Climbing and Walking Robots
2015	International Advisory Committee Member, International Conference on Climbing and Walking Robots
2014	International Advisory Committee Member, 17th International Conference on Climbing and Walking Robots.
2014	International Program Committee Member, IEEE International Conference on Mechatronics and Automation.
2013	International Program Committee Member, IEEE International Conference on Mechatronics and Automation
2013	International Advisory Committee Member, 16th International Conference on Climbing and Walking Robots.

2012	Project Consultant on “Smart Power Grid Technologies” (S$8000.0), Singapore Power Co. Ltd. Singapore
2012	International Advisory Committee Member, 15th International Conference on Climbing and Walking Robots
2011	International Advisory Committee Member, 14th International Conference on Climbing and Walking Robots.
2011	International Advisory Committee Member, 4th International Conference on Intelligent Robotics and Applications.
2010	International Program Committee Member, IEEE MED 2010
2010	International Advisory Committee Member, Third International Conference on Intelligent Robotics and Applications.
2010	International Program Committee Member, Decade of Minds 2010 (DOM 2010)
2010	International Advisory Committee Member, 13th International Conference on Climbing and Walking Robots
2009	General Chair, 2nd International Conference on Intelligent Robotics and Applications (16-18 December), Singapore
2009	International Advisory Committee Member, 12th International Conference on Climbing and Walking Robots, Singapore
2009	International Program Committee Member, IEEE International Conference on Robotics and Biomimetics
2008	Session Chair, 1st International Conference on Intelligent Robotics and Applications (15-17 October)
2008	International Program Committee Member, IEEE International Conference on Humanoid Robots.
2008	International Advisory Committee Member, 11th International Conference on Climbing and Walking Robots
2007	General Chair, 10th International Conference on Climbing and Walking Robots (16-18 July)
2007	Course Trainer on “Probability and Statistics”, Murata Electronics (Singapore) Pte Ltd, Singapore
2007	Project Consultant on “Positioning and Control of an Indoor Mobile Robot” (S$7000.0), SONY Electronics (Singapore) Pte Ltd, Singapore
2007	International Program Committee Member, IEEE International Conference on Advanced and Intelligent Mechatronics
2006	Project Consultant on “Image-Guided Control of Pan-tilt Platform on Flying Robot” (S$6000.0), ST Aerospace Ltd, Singapore
2006	International Program Committee Member, International Conference on Pattern Recognition.
2006	International Program Committee Member, European Conference on Computer Vision.
2006	International Program Committee Member, IEEE International Conference on Robotics and Biomimetics
2006	International Program Committee Member, IEEE International Conference on Humanoid Robots
2006	International Program Committee Member, IEEE International Conference on Intelligent Robots and Systems
2005	International Program Committee Member, Asian Conference on Computer Vision.
2005	International Program Committee Member, IEEE International Conference on Computer Vision.

2005	International Program Committee Member, IEEE International Conference on Advanced and Intelligent Mechatronics.
2004	International Program Committee Member, European Conference on Computer Vision.
2004	International Program Committee Member, 7th International Conference on Climbing and Walking Robots.
2004	International Program Committee Member, IEEE International Conference on Humanoid Robots.
2001	Course Trainer on “Applied Machine Vision”, Delphi Automotive Systems (Singapore) Pte Ltd, Singapore
1999	Program Co-Chair, Singapore-Europe Symposium on Intelligent Transportation Systems (29-30 November)
1994	Project Consultant on “Automatic Guidance of Wheeled Gantry” (S$16,000.0), Port of Singapore Authority, Singapore
1994	Project Consultant on “Visual Inspection on Quartz Resonator’s Fork” (S$3000.0), Asia Electronics Pte Ltd, Singapore

APPENDIX 1: Biography (English)

Ming XIE has received his Bachelor degree in control and automation engineering from the East-China Institute of Textile Technology, Shanghai, China in 1984. Subsequently, as a recipient of the prestigious overseas scholarship from the Chinese government, he has completed both postgraduate studies and doctorate research works. Then, he has received his Master degree (known as DEA in French) in automation science from the University of Valenciennes (France) in 1986 as well as his PhD degree in informatics from the University of Rennes (France) in 1989. He has worked as Research Assistant (1986-1989) with IRISA-INRIA Rennes, Expert Engineer (1990-1993) with INRIA Sophia-Antipolis, Research Fellow (1993-1996) / Lecturer (1996-1997) / Senior Lecturer (1998) / Associate Professor (since Jan 1999) with Nanyang Technological University, Singapore. Also, he was a Fellow (2000-2002) with the Singapore-MIT Alliance (Affiliated with Innovation in Manufacturing Systems and Technology Program), a Guest Professor (2002-2004, 2006-2008) with the Huazhong University of Science and Technology (Wuhan, China), a University Professor (since 2014) awarded by China's Jiangsu Provincial Government, an Entrepreneurship Professor (2020-2022) awarded by China's Jiangsu Provincial Government, and the Dean (2014-2016) of the College of Electrical Engineering and Control Science at Nanjing Tech University, China. In terms of social services, Ming XIE is a Founding Editor-in-Chief of the International Journal of Humanoid Robotics (IJHR which is SCI/SCIE indexed), the Founding President of Robotics Society of Singapore (RSS), the Founding President of Science-Technology Alliance between Singapore and China (STASC), and a Founding Member of GD-HK-MC Greater Bay Area International Chamber of Commerce (Macau) (GHMBIC). He was the General Chair of the 2007 International Conference on Climbing and Walking Robots (CLAWAR), and the General Chair of the 2009 International Conference on Intelligent Robotics and Applications (ICIRA). When he was the Dean at the College of Electrical Engineering and Control Science of Nanjing Tech University, he undertook a holistic reform of undergraduate education program as well as postgraduate education program. In addition, he has also reformed the governance and reward systems at the same college. In terms of industrial services, he has worked as Assistant Engineer (internship) at Renault Automation in Paris, Application Engineer attached to Development Center of Renault Automobile in Paris, Technical Consultant for project of Asia Electronics Pte Ltd, Technical Consultant for projects of the Port of Singapore Authority, Technical Consultant for the training of engineers of Delphi Automotive Systems Pte Ltd, Technical Consultant for the training of engineers of ST Aerospace Ltd, Technical Consultant for the training of engineers of MuRata Electronics Pte Ltd, Technical Consultant for projects of Sony Electronics Pte Ltd, and Technical Consultant of Singapore Power Ltd. In terms of high education, he has taught the courses such as Robotics, Artificial Intelligence, Applied Machine Vision, Measurement and Sensing Systems, Microprocessor Systems, and University Physics. In terms of scientific research, Ming XIE has published three authored books in English, two authored books in Chinese, two edited books in English, several book chapters in English, over 10 patents of invention, over 40 research papers in international scientific journals and over 100 research papers in international conferences. Ming XIE has been a recipient of the best conference paper award from World Automation Congress, a recipient of the best conference paper award from CLAWAR, a recipient of the outstanding paper award from International Journal of Industrial Robot, a recipient of the Gold Prize (S$8K) from CrayQuest, a recipient of the Grand Champion Prize (S$15K) from CrayQuest, a recipient of the A-Star's Best Research Idea Prize (S$5K), a recipient of the Silver Medal from Dragon Design Foundation. Ming XIE was the lead co-founder of the Laboratory of Intelligent Vehicle (now known as the Intelligent Systems Center) at Nanyang Technological University, and the lead co-founder of the Institute of Intelligent Systems and Robotics at Nanjing Tech University. Ming XIE's research interests include machine intelligence (cognitive vision, natural language understanding), humanoid robotics (design, control, biped walking, mobile manipulation) and autonomous vehicles (perception, planning, and control). In terms of techno-entrepreneurship, Ming XIE was co-founder of several start-ups, a recipient of the Second Prize from the 2009 Spring Techno-entrepreneurship Competition organized by the Chinese Ministry of Education, a recipient of the First Prize from the 2010 Spring Techno-entrepreneurship Competition organized by the Chinese Ministry of Education, and a recipient of the Thousand Elite Plan’s Expert Title awarded by Shanghai's Municipal Government.

APPENDIX 2: Biography (Chinese)

谢明，字垂运（名垂青史之运）（根据家族排行：道 德 文 章 光，祖 垂 世 泽 长），男，祖籍江西省瑞金市合龙乡，1963 年生于江西南昌，炎帝 165 世孙，古代齐国始主姜太公 114 世孙，谢氏始祖申伯（西周宣王之母舅，东周平王之外高祖）103 世孙，谢氏重阳族 17 世孙，东晋名将谢玄（东晋北府军的创始人，东晋著名政治家太傅谢安的侄子）之后，山水田园诗鼻祖谢灵运（爷爷是东晋名将谢玄，母亲是东晋著名书法家书圣王羲之的外孙女）之后。1978 年，谢明初中毕业于南昌市第十四中学。1980 年，谢明高中毕业于南昌市第十中学（重点中学，前身是美国教会设立的南昌葆灵女子书院，创办于 1902 年），并以 413 分（满分是 500 分）的高考成绩，首选进入了当年中国国务院纺织部排名第一的华东纺织工学院（谢明的母亲及外祖母都是民间裁缝），就读自动化专业，获本科学士学位。大学毕业前夕，考取中国政府公派留法研究生，1986 年获法国瓦朗西大学自动化专业硕士学位，1989 年获法国雷恩大学信息学博士学位。谢明博士自 1986 年起，先后担任和担任过：法国国立计算机与自动化研究院 IRISA-INRIA 的科研助理，法国国立计算机与自动化研究院 INRIA 的专家工程师 (1990-1993)，新加坡南洋理工大学的讲师 (1996-1997)、高级讲师 (1998)、副教授 (1999.1-至今)，新加坡-麻省理工大学联盟会士（SMA Fellow, 2000-2002）（隶属其中的制造系统与技术创新计划），华中科技大学客座教授（2002, 2006），江苏省高校教授（2014），南京工业大学电气工程与控制科学学院院长（2014-2016），上海中海龙高新技术研究院副院长（2019-2024），江苏省产业教授（2020-2022）。谢明博士的社会服务包括：担任 CLAWAR2007 大会总主席，担任 ICIRA2009 大会总主席，共同创办国际人形机器人学术期刊（IJHR）（SCI 刊源）并担任创刊主编，共同创办新加坡机器人学专业协会（RSS）并担任创会会长，共同创办了新中科技联盟(STASC)并担任首届委员会主席，共同创办了粤港澳大湾区（澳门）国际商会（GHMBIC），联合创办了新加坡南洋理工大学的智能汽车实验室，创办了南京工业大学的智能系统与机器人研究所，全面改革了南京工业大学电气工程与控制科学学院的本科生培养计划、研究生培养计划、教师成果考评及奖励计划。谢明博士的工业服务包括：担任过欧洲智能汽车项目（Eureka-PROMETHEUS）的专家工程师，担任过亚洲电子公司的技术顾问，担任过新加坡港务局项目的技术顾问，担任过新加坡宇航公司的技术顾问，担任过索尼公司的技术顾问，担任过日本村田公司的培训老师，担任过新加坡电力公司的技术顾问, 担任过上海中海龙智城科技股份有限公司首席专家。谢明博士的高等教育能力包括：首创以系统论为主轴的机器人理论专著，首创以自然语言为核心基础的人工智能理论教材，承担机器人学课程，承担人工智能课程，承担应用视觉课程，承担微处理机系统课程，承担测量与传感器系统课程，承担大学物理学课程。谢明博士的科研成果包括：获美国硅谷图形公司举办的 CrayQuest 大赛中的一届金奖和一届大冠军奖，获新加坡科技局的最佳研究方案奖，获世界自动化峰会（World Automation Congress）的最佳论文奖，获国际步行与爬行机器人大会 CLAWAR 的最佳论文奖，获光华龙腾设计奖银质奖牌，首创头眼协调的确定性算法，首创基于常量矩阵的双目视觉三维坐标及位移投影公式，首创双目视觉的三维重建逆向算法，首创并行泊车的运动轨迹逆向规划方法（比日本 Toyota 汽车公司早四年），首创基于自然语言学习与理解的人工智能理论，首创快速更换电池技术和换电为主充电为辅的新能源汽车商业化模式（比美国 Tesla 汽车公司早两年），首创单个电机独立驱动 N 个关节的机器人设计技术，首创视觉引导的太阳能板追光技术 （与美国 IBM 公司的聚光技术并驾齐驱），首创全景图像合成的投影技术，首创内含多关节的机器人标准连杆模块，首创图像无变形的鱼眼摄像头的复合技术，独自完成国际上受欢迎的英文版的专著两部，独自完成中文版的专著两部，带领博士生合著英文版的专业书本一部，编著英文版的会议论文集三部，获发明专利多项，发表国际期刊论文四十多篇，发表国际会议论文一百多篇。谢明博士的创业成果包括：联合创办了江苏南工机器人研究院有限公司，联合创办了浙江五蕴动力科技有限公司，获中国教育部和科技部举办的春晖杯大赛中的一届二等奖和一届一等奖，获首批上海市千人计划专家称号，获首批南京市 321 计划专家称号，获昆山市创新创业计划专家称号。在社会科学领域，谢明博士针对文化学、经济学、管理学、金融学、道德论等多个重要方向，用中文在网络上发表了十多篇独树一帜的理论阐述。有史以来，谢明博士率先解释清楚了德的科学内涵，并率先解释清楚了普世文化的三维价值空间的实质（它是对李光耀资政最先提出的双文化概念的理性延伸）。简而言之，谢明博士以凡人的心态和独有的能力，勇于站在众巨人们的肩膀上，做出了划时代的贡献，例如：2003 年率先以系统论的思维拓展了机器人学学科的理论基础，2009 年率先以语言学的内涵奠定了第三代人工智能学学科的理论基础，2013 年率先以设计论的视角提出了文化学这门新学科的三大普世价值标准，2019 年率先以宗学的框架呼吁世界上各派宗教的统一并以此去构建正统的全球德育教学体系，2021 年率先以智理学（Science of Mind）这个名称去归纳统一人工智能旗下的各类片碎的知识点。

APPENDIX 3: Teaching Statement

Philosophy of Teaching

Educating the mind without educating the heart is no education at all, said by Aristotle. The greatest enemy of knowledge is not ignorance, but illusion of knowledge, said by Stephen Hawk. One important task of teaching is to facilitate learners to master complex knowledge and skills in science and engineering. Hence, the primary role of professors should be the facilitator of making knowledge and skills easily accessible to learners of different capabilities. As shown in the Figure below, I concur that a good educational system should include a) video-based self-learning, b) classroom-based interaction learning, and c) experiment-based live learning. In fact, all my teaching materials do include a) recorded videos of lectures/tutorials, b) slides for classroom lectures/tutorials, and c) hand-on sessions for learnt knowledge.

In order to help students to adjust their mindsets to match with any specific course, I always remind students to position themselves into one of the following two roles, which are: a) to become future designers of products or systems in which the knowledge and skills will be covered by a course to be learnt, or b) to become future users of products or systems in which the knowledge and skills will be covered by a course to be learnt. In general, the learning objective of any course should be a weighted sum of both roles.

Portfolio of Teaching

My contributions toward teaching include

- Design, refinement and lecture of "MA4825 Robotics" course as course coordinator.
- Design, refinement and lecture of "MA4822 Measurement and Sensing Systems" course as course coordinator.
- Design, refinement and lecture of "MA4832 Microprocessor Systems" course as course coordinator.
- Design, refinement and lecture of "MA4829 Machine Intelligence" course as course coordinator (subsequently the role has been transferred to another faculty member due to my heady works).

In parallel, I also contribute to the teaching of "MA3005 Control Theory" course and the lecture of "MA6501 Manufacturing Automation and Control" course.

In addition, I have regularly conducted short courses for external learners. These short courses include:

- PACE@NTU Course on Robotics, Automation and Internet of Things
- PACE@NTU Course on the Power and Possibilities of Artificial Intelligence.

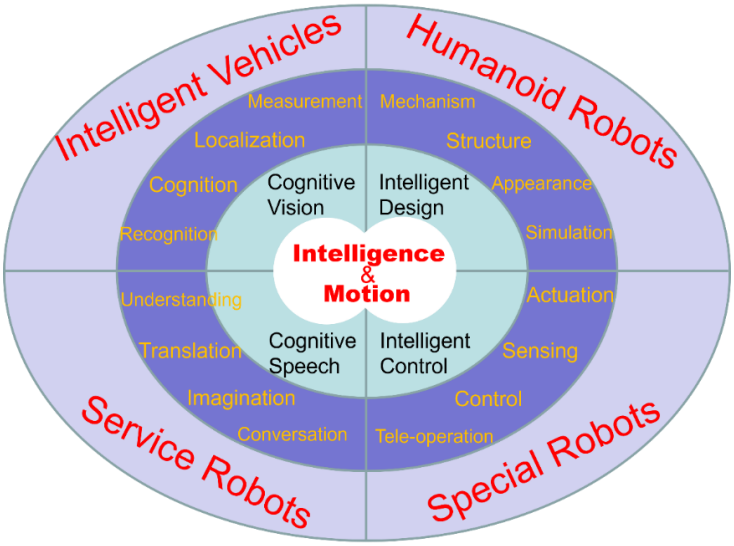
APPENDIX 4: Research Statement

Philosophy of Research

Research is to make progress, but not to make production. Research is to discover better theories, but not to distort existing theories. Research is to invent better technologies, but not to engineer existing technologies. Research is to innovate better products, but not to imitate existing products. There are two driving forces behind research. One is the scientific problems which still look for better solutions. The other is the social needs which still look for better answers. Scientific problems propel basic research while social needs nurture applied research and product innovation.

Focuses of Research

As shown in the Figure below, my research is centred around two keywords which are: intelligence and motion. My basic research is focused on artificial intelligence while my applied research is focused on both humanoid robots and autonomous driving.



My applied research toward humanoid robots with intelligence inside was funded by MINDEF, which has enabled us to develop the first full-sized humanoid robot in Singapore. The developed humanoid robot has 42 degrees of freedom for motion related bipedal walking, grasping and manipulation. It has also a rich set of sensors such as monocular vision, binocular vision, distance sensor, laser range finder, force/torque sensors, etc.

My applied research toward autonomous driving has received the financial support from both ST Kinetics Ltd and MINDEF, which has enabled us to develop many first-of-its-kind technologies in the areas of perception and planning for autonomous vehicles. For example, we have developed the inverse strategy of motion planning which helps to solve the problem of parallel parking for the first time in history. We have proved, for the first time in history, the solution of projective equation in binocular vision which makes today's machine vision to be closer to human vision in terms of response time as well as response accuracy.

Currently, I am focusing on mind-centric approaches for achieving authentic Artificial Intelligence which will enable future robots to demonstrate human-like mental capabilities in response to signals such as visual signals, audio signals and touch signals, etc. Some important challenges include image understanding and photo interpretation. We have made an important breakthrough in this direction. In short, sense-making from live signals will open the door for many exciting applications of embodied AI in future.

Through the Robotics Society of Singapore, I am in constant contact with the corporate members which undertake all kind of robotics-related industrial projects in sectors such as healthcare, logistics, construction, and general services, etc.

In parallel, I like to encourage students to venture into startups with the use of robots and AI. Also, I am very keen to be involved in startups as consultant or co-founder.

Research Achievements

My research achievement in motion-centric research includes the invention of the independent actuation of any complex robot systems by a single motor.

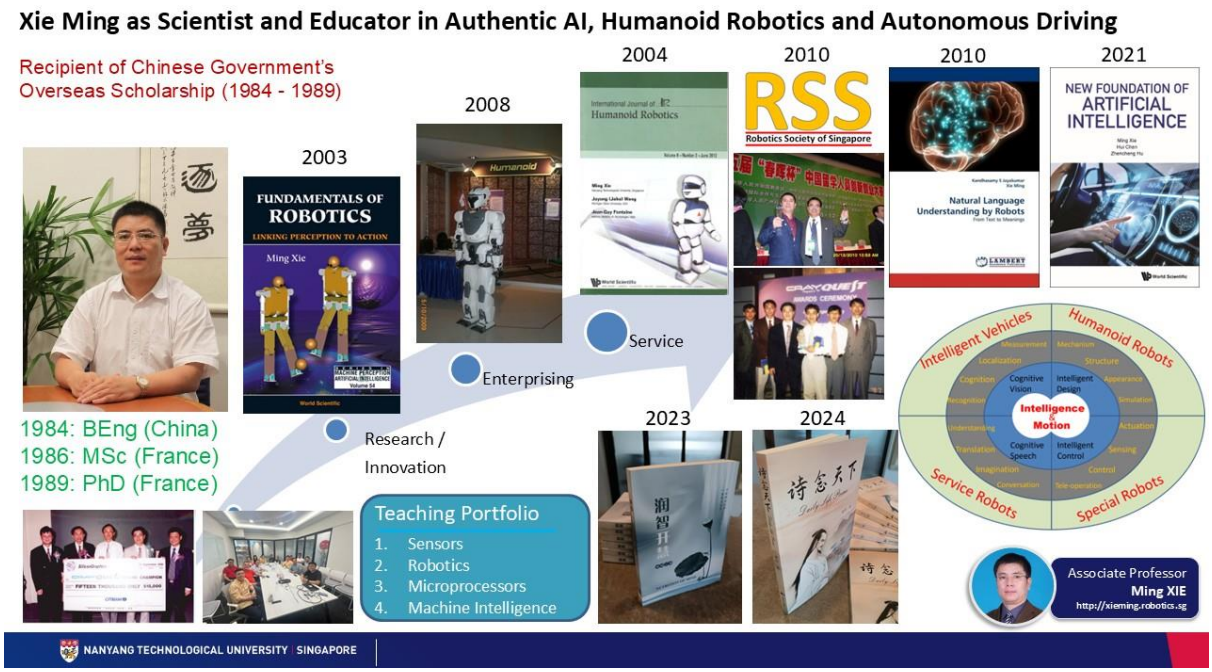
My research achievements in intelligence-centric research include:

- The discovery and proof of the 3D projective equation in binocular vision. This finding has resulted in the general solution for X-Eye coordination in autonomous robots.
- The inverse strategy of 3D reconstruction in binocular vision.
- The inverse strategy of undertaking the operations of matching in binocular vision.
- The inverse strategy of undertaking motion planning in any robot/vehicle systems.
- A deterministic solution underlying the transformation from image or photo to 3D scene.
- The large knowledge model which embraces both symbolic representations and numeric representations.
- The formulation of the true foundation of artificial intelligence which must be Mind-Centric.

My accumulated achievements over the years have contributed to the unprecedent publication of:

- One book in robotics which links perception to action in 2003.
- One book in artificial intelligence which establishes the true foundation of AI in 2021.

The illustration below summarizes the above description:



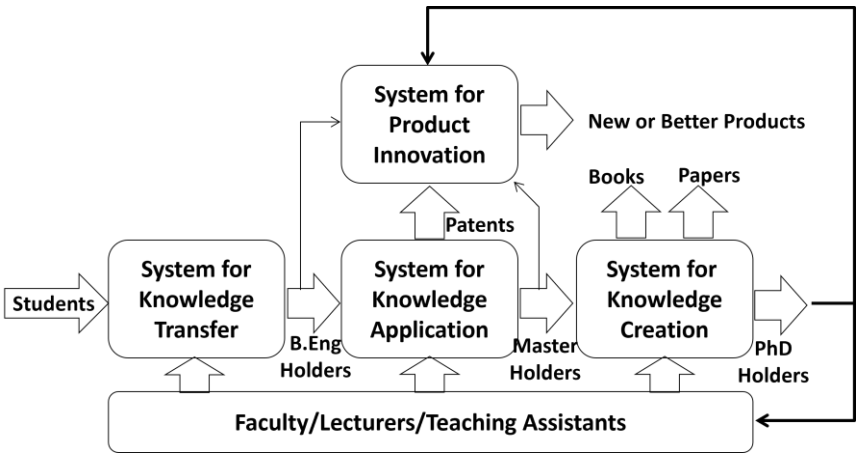
APPENDIX 5: Service Statement

Philosophy of Service

People don't care how much you know until they know how much you care, said John C. Maxwell. Don't use your people to build great work, use your work to build great people, said Jack Hyles. A leader must be competent enough in managing a system by putting in place fair processes. A leader must be competent enough in defending the principle of maximizing a system's output while minimizing its expenses. A leader must be competent enough in augmenting a system's efficiency by growing the ratio of return (output) over investment (input). A leader must be competent enough in steering a system toward the right direction of journey.

In addition, a leader must be compassionate enough to build a great people inside a system by unleashing the creativity of its people. Also, a leader must be compassionate enough to build an ecosystem for a system and its people to thrive. A leader must be compassionate enough to glorify the success which are to be rooted in meaningful and constructive KPIs (i.e., key performance indicators). A leader must be compassionate enough to defend the justice for the people in a system.

As shown in the figure below, a university is a complex system which includes four major sub-systems such as: the educational system for knowledge transfer (e.g., to undergraduate students), the educational system for knowledge applications (e.g., by postgraduate students), the research system for knowledge creation (e.g., by faculty members and their research assistants (i.e., PhD students)), and the system for product innovation leading to technological joint-ventures and startups.



Experiences of Service

I have had the opportunity to serve as the Dean of the College of Electrical Engineering and Control Science, NanjingTech University, China, between 2014 and 2016. This position has given me the hand-on experiences in reforming the educational systems, research systems and innovation system within the college.

Also, I have jointly launched the International Journal of Humanoid Robotics (www.editorialmanager.com/ijhr) in 2004 and have served as the lead Editor-in-Chief until today. This platform has greatly contributed to today's advance and achievements of humanoid robots in the world. Obviously. this historical journal has already witnessed its global impact in scientific community as well as in economic field.

In 2010, I have jointly established the national platform of the Robotics Society of Singapore (rss.org.sg). This association is dedicated to promoting robotics in Singapore and beyond. For example, the Robotics Society of Singapore is one of the founding members of the Pacific-Asian Robotics Society Union (https://www.asian-robotics.org/).

Last but not the least, from 2014 until today, I am serving as the technical advisor to the University's team for the Maritime RobotX Challenges (www.robotx.org) which promote the development of autonomous robots including surface vehicles, drones and underwater robots.

APPENDIX 6: Executive Summary

The weaknesses faced by Ming Xie include:

1. Incompetence in feeding learners with illusions of knowledge and superficial facts.
2. Incompetence in wasting lots of research funds for producing tons of results with little significance.
3. Incompetence in prioritizing self-interest as well as violating public trust and justice.

The strengths demonstrated by Ming Xie include:

1. Competence in delivering in-depth understanding of knowledge with the most accurate narratives which reveal the deepest truths in science and engineering. The wide range of teaching portfolio include these extremely important courses such as MA4825 Robotics as Course Coordinator, MA4832 Microprocessor Systems as Course Coordinator, MA4822 Measurement and Sensing Systems as Course Coordinator, MA4829 Machine Intelligence as Main Instructor (50% of teaching load among the three instructors), MA3005 Control Theory as Tutor, and many popular short courses to international audiences.
2. Competence in spending less while producing many world-class results in terms of discovery and innovation. The remarkable achievements with global impact include the publications such as one unprecedent book on Fundamentals of Robotics, one unprecedent book on New Foundation of Artificial Intelligence, one unprecedent journal paper on Top-Down Design of Teachable Mind, one unprecedent paper on 3D Projection in Binocular Vision, and many other outstanding papers which disseminate important research findings in the areas of Artificial Intelligence, Humanoid Robotics and Autonomous Driving.
3. Competence in providing leadership to various organizations such as the College of Electrical Engineering and Control Science as Dean (China), the International Journal of Humanoid Robotics as Editor-in-Chief, and the Robotics Society of Singapore as President.

Thank You for Viewing My CV!

Serving You at http://xieming.robotics.sg

Looking Forward to Serve You!