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PERSONAL INFORMATION

Full Name : Dannangoda Gamage Kanishka Madusanka

Date of birth : 24th October 1989

Nationality : Sri Lanka

Gender : Male

Designation : Lecturer

Profiles,

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TEACHING AND RESEARCH INTERESTS

Machine Design
Control Systems
Soft Robotics
Path Planning

Mechanics of Machines
Biomechanics
Prosthetic Control
Robot Kinematics

Mechatronics
Rehabilitation Robotics
Visual Servoing
Bio-signal Processing

EDUCATION

May 2018 **PhD**, in Biomedical Engineering,
Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka.

March 2014 **BSc. Eng. (Hons)** (2nd Class Upper Division)
in Mechanical Engineering,
University of Moratuwa, Sri Lanka.

Jan. 2014 **BIT** (2nd Class Upper Division)
in Information Technology,
University of Colombo, Sri Lanka.

PROFESSIONAL MEMBERSHIPS

Jan. 2015 - Present	Member, Institute of Electrical and Electronics Engineers (IEEE)
Dec. 2014 - Present	Associate Member, The Institution of Engineers Sri Lanka (IESL)

TEACHING EXPERIENCE

July 2019 – Present	Lecturer, Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka. Modules: Design of Machine Elements, Mechanics of Machines, Fundamentals of Mechatronics.
June 2014 – Present	Visiting Lecturer, Faculty of Engineering, Kotelawala Defense University, Sri Lanka. Modules: Mechatronics, Mechatronics System Design, Simulation of Mechatronics Systems, Industrial Automation.
Nov. 2017 – Aug. 2018	Lecturer (On Contract), Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka. Modules: Robotics, Control Systems & Instrumentation, Biomedical Engineering Applications, Machine Design Projects, Virtual Instrumentation.
Feb. 2018 – Aug. 2018	Visiting Lecturer, Faculty of Technology, University of Sri Jayewardenepura, Sri Lanka. Modules: Measurements and Instrumentation.
May 2015 – May 2016	Visiting Lecturer, Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka. Modules: Robotics, Object Oriented Programming

RESEARCH EXPERIENCE

2019 – Present	Supervisor, Postgraduate research projects. <ul style="list-style-type: none">▪ MSc - Development of a Vision Aided EMG Based Grasping Pattern Classification System (2019-ongoing).
Oct. 2018 – May 2019	Post-Doctoral Fellow, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China. <ul style="list-style-type: none">▪ Soft Robotics Bending Actuator design▪ Development of a Soft Robotics Rehabilitation Glove
2018 – Present	Supervisor, Undergraduate Design/Research Projects, Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka. <ul style="list-style-type: none">▪ Development of a soft robotic glove for hand rehabilitation of stroke patients. (2020/2021)▪ Automated Ball Collecting Mobile Robot for Tennis. (2018/2019)

- Development of an anthropomorphic Prosthetic Hand with Finger Abduction/Adduction. (2018/2019)

2014 – Present

Co-Supervisor, Undergraduate Design/Research Projects, Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka.

- Development of a Quadrotor-Wireframe Platform for Air and Ground Locomotion of a Drone. (2020/2021)
- Development of a Robotic Face for Human- Robot- Interactions (HRI) Applications. (2020/2021)
- Design and Development of a Robotic Manipulator for Laparoscopic Uterine Surgeries (2019/2020)
- Hybrid Knee Exoskeleton for Sitting and Walking Assistance. (2018/2019)
- Development of a Trans-Tibial Ortho-Prosthesis. (2018/2019)
- Design and Development of a Hybrid Trans-radial Prosthesis. (2016/2017)
- Development of a 5DOF Trans-humeral Prosthesis. (2015/2016)
- Development of an EMG Based control for a trans-radial prosthetic arm. (2014/2015)
- Development of an Upper Limb Exoskeleton Robot for Rehabilitation. (2014/2015)
- Development of a Trans-Femoral Prosthesis. (2014/2015)

Feb. 2018 – Dec. 2018

External Supervisor, Undergraduate Projects, Dept. of Mechanical Eng., Kotelawala Defense University, Sri Lanka

- Luggage Carrier with Smart Wheel Chair Operator.
- Metal Detection Machine Room Modification.

June 2014 – Oct. 2017

Research Scholar (PhD Candidate), Dept. of Mechanical Eng., University of Moratuwa, Sri Lanka.

- Development of EMG-Force Proportional and Moment Balance (EFPMB) model for elbow motion prediction.
- Development of a vision aided path planning method for reach-to-grasp motions of the trans-humeral prosthesis.
- Development of spatial path following method for the trans-humeral prosthesis, compensating shoulder motions.
- Implementation of an improved dynamic path tracking scheme based on a Model Predictive Controller (MPC) for the trans-humeral prosthesis.

AWARDS AND GRANTS

Oct. 2020

Principal Investigator, Soft Robotic Hand Movement Function Rehabilitation Glove, Senate Research Committee (SRC) financial grant for research (Grant No. SRC/CAP/2020/04), 4.99M LKR

Oct. 2020	Co-Investigator , Understanding spatial considerations and user behaviors in handling objects by intelligent robotic wheelchair, Senate Research Committee (SRC) financial grant for research (Grant No. SRC/CAP/2020/02), 4.996M LKR
Jan. 2020	Principal Investigator , Development of a Vision aided EMG based Grasping pattern classification System for Hand Prostheses, Senate Research Committee (SRC) financial grant for research (Grant No. SRC/ST/2020/13), 0.3M LKR
April 2019	Post-doctoral Research Grant , Soft Biomimetic Actuator for A Robotic Hand Movement Function Rehabilitation Glove, Shenzhen government research allowance, 60 000 RMB
Feb, 2018	Publication Grant to publish in IEEE Access , Funding the page charges of publications of Sri Lankan scientists, National Science Foundation, Sri Lanka, 135,712.50 LKR
Oct. 2016	Best Technical Paper , Manufacturing and Industrial Engineering Symposium (MIES 2016), Colombo, Sri Lanka.
June 2014 – Oct. 2017	Research Scholar , Vision Aided Task Planning and Control of a Robotic Prosthetic Arm, Senate Research Committee (SRC) financial grant for research (Grant No. SRC/LT/2013/07).
Jan. 2014	Dean's List , Semester 08, BSc.Eng., University of Moratuwa.
2008 / 2009	Mahapola Merit Scholarship for Undergraduates.

PROFESSIONAL ASSIGNMENTS AND ACTIVITIES

Jul. 2020 – Present	Secretary , IEEE Engineering in Medicine and Biology Society (EMBS) Sri Lanka Section Chapter.
2020	Technical Program committee Member , SLAAS / SLIC Conference on From Innovation To Impact (FITI 2020)
2020	Reviewer , IEEE International Conference on Intelligent Robots and Systems (IROS 2020).
Mar. 2020 - Present	Reviewer , IEEE Transactions on Industrial Electronics.
2020	Co-Chair , Biomedical Engineering and Instrumentation Track, Moratuwa Engineering Research Conference (MERCon 2020).
Sep. 2019	Chief Guest , Quiz Day, Sri Sumangala Vidyalaya, Panadura.
2019	Program Committee Member , IEEE International Conference on Real-time Computing and Robotics (RCAR 2019)
2019	Session Chair , Moratuwa Engineering Research Conference (MERCon 2019).

2019	Reviewer , IEEE/RAS-EMBS International Conference on Rehabilitation Robotics (ICORR 2019)
Nov 2019 - Present	Reviewer , Journal of National Science Foundation, Sri Lanka.
Mar 2019 - Present	Review Editor , Frontiers in Robotics and AI.
Mar. 2019 - Present	Reviewer , IEEE Access.
Jan. 2019 - Present	Reviewer , IEEE Transactions on Human-Machine Systems.
Feb. 2018	Panel Member , Mechatronics and Mechanical Engineering Track, International Research Symposium, Uwa Wellassa University (IRSUWU 208), Sri Lanka.
2018	Reviewer , International Research Conference of General Sir John Kotelawala Defence University (IRC-KDU 2018)
2018	Reviewer , Moratuwa Engineering Research Conference (MERCon 2018).
2018	Reviewer , IEEE International Conference on Robotics and Automation (ICRA 2018).
2018	Registration Co-Chair , IEEE Region 10 (Asia Pacific) Humanitarian Technology Conference (R10-HTC 2018).
Feb. 2017 – Present	Committee Member , IEEE Robotics and Automation Society (RAS) Sri Lanka Section Chapter.
Dec. 2016 – Present	Reviewer , Mechatronics Systems and Control (formerly Control and Intelligent Systems), ACTA Press.
2016	Reviewer , Moratuwa Engineering Research Conference (MERCon 2016).
2014	Organizing Committee Member , International Conference on Information and Automation for Sustainability (ICIAfS 2014).

PUBLICATIONS

Journals and Articles

1. **D.G.K. Madusanka**, R.A.R.C. Gopura, Y.W.R. Amarasinghe, and G.K.I. Mann, MPC based Spatio-temporal Path Tracking Method for Trans-humeral Prostheses, in International Journal of Medical Robotics and Computer Assisted Surgery, pp. e1980, 2019, doi: 10.1002/rcs.1980.
2. C.L. Semasinghe, **D.G.K. Madusanka**, R.K.P.S. Ranaweera, and R.A.R.C. Gopura, “Transradial Prostheses: Trends in Development of Hardware and Control Systems,” in International Journal of Medical Robotics and Computer Assisted Surgery, vol. 15, pp. e1960, 2019, doi: 10.1002/rcs.1960.

3. C.L. Semasinghe, R.K.P.S. Ranaweera, J.L.B. Prasanna, H.M. Kandamby, **D.G.K. Madusanka**, and R.A.R.C. Gopura, "HyPro: A multi-DoF Hybrid Powered Transradial Robotic Prosthesis," in *Journal of Robotics, Special Issue on Robotic Prosthetic Limbs*, vol. 2018, doi: 10.1155/2018/8491073
4. **D.G.K. Madusanka**, R.A.R.C. Gopura, Y.W.R. Amarasinghe and G.K.I. Mann, "Hybrid Vision Based Reach-to-Grasp Task Planning Method for Trans-Humeral Prostheses," in *IEEE Access*, vol. 5, pp. 16149-16161, 2017. doi: 10.1109/ACCESS.2017.2727502

Book Chapters

1. H.A.G.C. Premachandra, K.M. Thathsarana, H.M.A.N. Herath, D.L.F.M. Liyanage, Y.W.R. Amarasinghe, **D.G.K. Madusanka**, M.A.M.M. Jayawardane, "Design and Simulation of a Robotic Manipulator for Laparoscopic Uterine Surgeries," In: *Innovation in Medicine and Healthcare*, vol 192, Smart Innovation, Systems and Technologies, Y.W. Chen, S. Tanaka, R. Howlett, L. Jain, Ed. Springer, 2020, pp. 67–79. doi: 10.1007/978-981-15-5852-8_7
Presented in: The KES International Conference on Innovation in Medicine and Healthcare (KES-InMed-20)

International Conferences

1. R.A.M. Abayasiri, R. S. T. Abayasiri, R. A. G. M. Gunawardhana, R. M. C. Premakumara, Sanjaya Mallikarachchi, R.A.R.C. Gopura, T.L. Lalitharatne, **D.G.K. Madusanka**, "An Under-Actuated Hand Prosthesis with Finger Abduction and Adduction for Human Like Grasps," *International Conference on Control, Automation and Robotics*, Singapore, 2020, pp. 574-580.
2. D.M. Perera, G.M.D. Menaka, W.V.K.M. Surasinghe, **D.G.K. Madusanka**, T.D. Lalitharatne, "Development of a Vision Aided Automated Ball Retrieving Robot for Tennis Training Sessions," *International Conference on Industrial and Information Systems*, Kandy, Sri Lanka, 2019, pp. 378-383.
3. P.S. Gunasekara, A.M.N.R. Rathnayake, U.L.T.H. Ratnayake, D.M.H.T. Dasanayake, S. Fernando, **D.G.K. Madusanka**, "Novel Design and Implementation of Automated Luggage Carrier for an Airport System," *IEEE International Conference on Control System, Computing and Engineering*, Penang, Malaysia, 2019, pp. 136-141.
4. I. D. Wijegunawardana, M.B.K. Kumara, H.H.M.J. De Silva, P.K.P. Viduranga, R.K.P.S. Ranaweera, R.A.R.C. Gopura, **D.G.K. Madusanka**, "ChairX: A Robotic Exoskeleton Chair for Industrial Workers," *IEEE International Conference on Rehabilitation Robotics*, Toronto, ON, Canada, 2019, pp. 587-592.
5. **D.G.K. Madusanka**, R.A.R.C. Gopura, Y.W.R. Amarasinghe, and G.K.I. Mann, Spatial Trajectory Following Scheme for A Trans-humeral Prosthesis, in *IEEE International Conference on Robotics and Biomimetics*, Macau, China, pp. 737 – 742, 2017.
6. R.A.M. Abayasiri, **D.G.K. Madusanka**, N.M.P. Arachchige, A.T.S. Silva, and R.A.R.C. Gopura, MoBio: A 5DOF Trans-humeral Prosthesis, in *IEEE Conference on Rehabilitation Robotics*, London, UK, pp. 1627-1632, 2017.

7. **D.G.K. Madusanka**, R.A.R.C. Gopura, Y.W.R. Amarasinghe, and G.K.I. Mann, IBVS And EMG based Reach-to-Grasp Task Planning Method for a Trans-humeral Prosthesis, in IEEE/SICE International Symposium on Systems Integration, Sapporo, Japan, pp. 447-452, 2016.
8. C.L. Semasinghe, J.L.B. Prasanna, H.M. Kandamby, R.K.P.S. Ranaweera, **D.G.K. Madusanka**, and R.A.R.C. Gopura, Transradial Prostheses: Current Status and Future Directions, in Manufacturing & Industrial Engineering Symposium, Colombo, Sri Lanka, pp. 1-7, 2016.
9. **D.G.K. Madusanka**, R.A.R.C. Gopura, Y.W.R. Amarasinghe, and G.K.I. Mann, Imulation Environment for simulating transhumeral Prosthetic Control Algorithms, in Int. conf. on Emerging Trends in Mechanical Engineering, cochin, India, pp. 190-196, 2015.
10. **D.G.K. Madusanka**, L.N.S. Wijayasingha, R.A.R.C. Gopura, Y.W.R. Amarasinghe, and G.K.I. Mann, A Review on Hybrid Myoelectric Control Systems for Upper Limb Prosthesis, in Moratuwa Engineering Research Conference, Colombo, Sri Lanka, pp. 136-141, 2015.
11. **D.G.K. Madusanka**, L.N.S. Wijayasingha, K. Sanjeevan, M.A.R. Ahamed, J.C.W. Edirisooriya, and R.A.R.C. Gopura, A 3DOF Transtibial Robotic Prosthetic Limb, in Int. conf. on Inform. and Automation for Sustainability, Colombo, Sri Lanka, pp. 1-6, 2014.

REFERENCES

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