Dr. Jawad Nagi

Curriculum Vitae

PERSONAL INFORMATION

Family Name, First Name:	**Nagi, Jawad**
Date of Birth:	**23.03.1985**
Marital Status:	**Married**
Last Affiliation:	**New York University** (NYU), **NY 10003, USA**
Residence:	**Luzern, Switzerland**
E-mail:	**jawad@nagi.ch**
WWW:	**http://www.nagi.ch/**
LinkedIn:	**https://www.linkedin.com/in/jawadnagi**
Citations:	**2300+ (H-Index: 20, I10-Index: 28)** at **Google Scholar**

EDUCATION

2011–2016: **DOCTOR OF PHILOSOPHY IN INFORMATICS (Ph.D.)**
INSTITUTION: **The Swiss Artificial Intelligence Lab** (IDSIA), Faculty of Informatics, **Università della Svizzera Italiana (USI), Lugano (Switzerland)**
DISSERTATION: ***Symbiotic interaction between humans and robot swarms*** [PDF]
ADVISORS: Assoc. Prof. Gianni A. Di Caro (co-advisor), Prof. Luca Gambardella (advisor)

2009–2011: **MASTER OF COMPUTER SCIENCE (M.Sc.)**
INSTITUTION: Faculty of Computer Science and Information Technology (FSKTM), **University of Malaya (UM), Kuala Lumpur (Malaysia)**
DISSERTATION: ***The application of image processing and machine learning techniques for detection and classification of cancerous tissues in digital mammograms*** [PDF]
ADVISOR: Prof. Datin Dr. Sameem Binti Abdul Kareem

2008–2010: **MASTER OF ELECTRICAL ENGINEERING (M.Eng.)**
INSTITUTION: Department of Electronics and Communication Engineering, **Universiti Tenaga Nasional (UNITEN), Putrajaya (Malaysia)**
DISSERTATION: ***An intelligent system for detection of non-technical losses (NTLs) in the Tenaga Nasional Berhad (TNB) low voltage distribution network*** [PDF]
ADVISORS: Prof. Ir. Dr. Tiong Sieh Kiong (co-advisor), Prof. Ir. Dr. Yap Keem Siah (advisor)

2002–2007: **BACHELOR OF ELECTRICAL & ELECTRONICS ENGINEERING (B.Eng. Hons)**
INSTITUTION: Department of Electronics and Communication Engineering, **Universiti Tenaga Nasional (UNITEN), Putrajaya (Malaysia)**
DISSERTATION: ***Pattern recognition of simple shapes in a MATLAB environment: Development of an efficient high-speed face recognition system*** [PDF]
ADVISOR: Mr. Syed Khaleel Ahmed

RESEARCH TOPICS

I have an *interdisciplinary scientific background* which focuses on multiple parallel directions in artificial intelligence and robotics. My research interests and activities include: **pattern recognition and machine learning (with emphasis on deep learning); machine and computer vision; distributed robotic systems (multi-robot systems and swarm robotics); coordination and cooperation in distributed robotic systems; human-robot interaction; optimization methods.**

My *research goal* aims to define robust and scalable solutions for instrumented and uninstrumented interaction with large numbers of distributed and autonomous robots, in application scenarios such as monitoring and surveillance, ambient-assisted living, and search and rescue. *Recent research work* includes algorithms for human-swarm interaction: **bidirectional communication between humans and swarms; distributed cooperative sensing and classification in robot swarms; supervised learning in robot swarms using human feedback; coordinated mobility for deployment of heterogeneous teams of robots; spatial addressing of robots from a swarm**.

ACADEMIC AND RESEARCH POSITIONS

POST-DOCTORAL ASSOCIATE [08/2016 – 08/2017]

INSTITUTION: **Mechatronics & Robotics Lab**, **Department of Mechanical and Aerospace Engineering**, **School of Engineering**, **New York University** (NYU), **New York (USA)**

PROJECT 1: ***DR K-12: Teaching STEM with robotics: Design, development, and testing of a research-based professional development program for teachers*** (2014–2018).

FUNDING: Project funded by the U.S. National Science Foundation (NSF) under the **Science, Technology, Engineering, and Mathematics (STEM) Computing** and **Discovery Research K-12** programs. [Project Info]

ACTIVITIES:
- Integrated robotics with science and math learning for sustainability in middle school science and math classrooms.
- Conducted a three-week Professional Development (PD) training program in July 2017 for middle school teachers from New York City (NYC) schools.
- Performed weekly classroom visitations to NYC schools throughout the academic year of 2016, to collect observations, obtain feedback from teachers in project, and assist teachers and students with robotics troubleshooting.
- Adopted theoretical constructs of Technological Pedagogical Content Knowledge (TPACK) and Design-Based Research (DBR) tools to evaluate the performance of the PD program, and the performance in of students classrooms.

PROJECT 2: ***Promoting robotic design and entrepreneurship experiences among students and teachers*** (2016–2019).

FUNDING: Project funded by the U.S. NSF under the **Innovative Technology Experiences for Students and Teachers (ITEST)** program. [Project Info]

ACTIVITIES:
- Promoted robotic design and entrepreneurship experiences among high-school students and teachers from a diverse population in NYC schools.
- Developed a curriculum of 16 robotics lessons for the ITEST PD program.
- Formulated robotics curriculum supports science and mathematics content inherent in robotics and engineering design practices, it focuses on the integration of robotics in K-12 STEM Education, and provides practical robotics applications with hands-on activities and entrepreneurship experiences.
- Coordinated and administered resources (students) during PD program curriculum development (lesson contents, activities, and mini-projects).
- Organized the design and preparation of pre- and post-assessment surveys, quizzes, and questionnaires used for collecting information from high-school teachers and students during the four-week PD training program in July 2017.

ACTIVITIES:
- Adopted features from research on Project-Based Learning (PBL) frameworks, robotics, and entrepreneurship in K-12 STEM Education, for pre- and post-evaluation of the learning capacity of teachers and students in the PD program, and to assess the self-efficacy and expectations of training candidates, and receive feedback and reflections from the training candidates.
- Procurement of required equipment and materials for the PD program (VEX ClawBot kits, Booster kits, Arduino microcontrollers, breadboards, sensors etc.) in coordination with the NYU Center for K12 STEM Education.

RESEARCH: **Social and emotional interaction with an expressive mobile humanoid robot.**

ACTIVITIES:
- Designed natural and highly-intuitive artificial intelligence (AI) tools, machine learning and computer vision algorithms, for socio-emotional human-robot interaction (HRI) using a mobile humanoid robot.
- Developed practical applications of a socially expressive humanoid robot for physical and cognitive disabilities (i.e., autism therapy) and senior living.
- Obtained familiarization in designing humanoid robots (mechanical, structural, and electrical components), and control of a sophisticated robot.
- Upgraded and improved humanoid design: replaced 3D printed parts with metal components (e.g., fixed jittering and breaking-off of the eyebrows), mounted a Kinect onto the chest (depth sensing, facial expression recognition, skeletal tracking), built body from the chest down until the legs, and mounted the humanoid onto a Pioneer P3-DX for mobility.
- Employed commercial off-the-shelf tools such as: mechanical, structural, electrical, and electronic components, opensource microcontrollers (i.e., Arduinos, servo hats and controllers), actuators (i.e., Dynamixel and Hobby servos), single-board computers, sensors (i.e., stereo vision, Kinect Xbox One).
- Implemented an easy-to-use MATLAB interface for HRI and navigation to: (a) control the humanoid robot (having 28 servos in the face, head, arms, and hands, and 2 motors of the Pioneer wheelbase) and, (b) retrieve vision-based perception information from the sensors (stereo vision and Kinect).

SUPERVISION: **High-school Internship students, NYU and non-NYU undergraduate students, NYU graduate and PhD students.**

ACTIVITIES:
- Mentored high-school interns, and undergraduate and graduate students, and guided them in performing HRI research using: a swarm of mobile robots, an object manipulation robot, and a socially expressive humanoid robot.
- Supervision of PhD students in their first year of study, assisted in defining their PhD research goals, missions, and objectives.

DOCTORAL RESEARCHER [03/2011 – 07/2016]

INSTITUTION: **Dalle Molle Institute for Artificial Intelligence** (IDSIA), **University of Applied Sciences of Southern Switzerland** (SUPSI), **Lugano (Switzerland)**

PROJECT: The National Centre of Competence in Research (NCCR) Robotics: **Intelligent robots for improving the quality of life**, Sub-project: ***Symbiotic cooperation between humans and robotic swarms*** (2010–2015). [Project Info]

FUNDING: Project funded by the Swiss National Science Foundation (SNSF) in 3 phases of 4 years (2011–2014, 2015–2018, and 2019-2022), for upto 12 years.

PARTNERS: Project collaborated between four reputable Swiss institutions: EPFL (Lausanne), ETH Zürich, University of Zürich, and IDSIA (Lugano).

ACTIVITIES: Research in the domains of swarm robotics, human-robot interaction (HRI), coordination and cooperation in swarms, assisted living with robots, computer vision, and machine learning with emphasis on deep learning.

PROJECT CONSULTANT **[10/2014 – 03/2015]**

CORPORATION: **Ernst & Young** (EY) **S.R.L., Bucharest (Romania)**

PROJECT: *Development of an intelligent classification system for identifying fraud and abnormal patterns using historical consumption data of customers from a Romanian electric utility company in Bucharest.*

ACTIVITIES:
- Reduction of commercial grid losses for an electric utility company using support vector machines (SVMs) for pattern classification and recognition.
- Regular visitations to E&Y headquarters in Bucharest, to assist E&Y project staff in identifying fraud and abnormal consumption patterns, and to guide on-site teams to perform inspections on suspected customers.

RESEARCH ENGINEER **[07/2010 – 02/2011]**

INSTITUTION: **UNITEN Research and Development** (R&D) **Sdn. Bhd., Putrajaya (Malaysia)**

PROJECT: *Multi-dimensional prediction of gas turbine emissions for Tenaga Nasional Berhad (TNB) Malaysia using Support Vector Machines (SVMs).*

ACTIVITIES: Multivariate prediction using regression-based statistical learning methods.

RESEARCH SCIENTIST **[10/2009 – 06/2010]**

INSTITUTION: **Clarify Consulting Sdn. Bhd., Petaling Jaya (Malaysia)**

PROJECTS:
- *Classification of objectivity and subjectivity (facts and opinions) in sentences for Natural Language Processing (NLP) and text mining applications.*
- *Development of an image recognition system for a mobile augmented reality solution (mobile applications).*

ACTIVITIES: Application of machine learning for the semantic classification of text, and computer vision and scale-invariant feature transform (SIFT) for object recognition.

PROJECT ENGINEER **[09/2009 – 06/2010]**

INSTITUTION: **UNITEN Research Management Centre** (RMC), **Putrajaya (Malaysia)**

PROJECTS:
- *Design and development of an intelligent system for detection of electricity theft and abnormalities by large power consumers in Tenaga Nasional Berhad (TNB) high voltage transmission and distribution network.*
- *Predicting PVT properties in crude oil reservoirs using statistical learning.*

ACTIVITIES: Modeling historical data from high power consumers (correlation analysis, event inspection), and pressure-volume-temperature (PVT) analysis for oil reservoirs.

GRADUATE RESEARCH ASSISTANT **[01/2008 – 08/2009]**

INSTITUTION: **UNITEN Power Engineering Centre** (PEC), **Putrajaya (Malaysia)**

PROJECTS:
- *Development of an intelligent classification system for detection of electricity theft and fraud activities by ordinary power consumers in Tenaga Nasional Berhad (TNB) low voltage transmission and distribution network.*
- *Design and development of a mid-term load forecasting model for power utilities using a hybrid supervised and semi-supervised learning approach.*
- *An intelligent system for recognition and classification of dual-tone multi-frequency (DTMF) signals in telecommunication applications.*
- *Case study on the efficiency of palm biodiesel in compression ignition engines to meet the energy demands of the future.*

ACTIVITIES: Data mining, pattern recognition, and statistical learning using SVMs for high-dimensional classification and regression.

TRAINEE ENGINEER [04/2006 – 06/2006]

CORPORATION: **PSI Incontrol Sdn. Bhd.** (formerly, **VA TECH SAT**), **Sungai Buloh (Malaysia)**
TASK: *Internship during Bachelor of Electrical and Electronics Engineering* (B.Eng.).
ACTIVITIES:
- Assisting engineers with the revision and amendment of schematic diagrams and circuit designs using AutoCAD Electrical.
- Providing support with installation of voltage switchgear components and electrical wiring for: medium to ultra high voltage (MV/HV/UHV) substations, large and medium network management systems (SCADA), substation control and automation systems (SCS, SAS), remote terminal units (RTU), control relay panels (CRP), protection and control management systems.

TEACHING AND LECTURING POSITIONS

TRAINING PROGRAM INSTRUCTOR [07/2017]

INSTITUTION: **New York University** (NYU), **New York (USA)**
COURSE: **Professional Development (PD) program for middle school teachers from New York City (NYC) schools (DR K-12 project).** Conducted by NYU School of Engineering and NYU Steinhardt Department of Teaching, Learning and Education.
- Three-week PD training program for 25 middle school teachers.
- Familiarizing teachers with LEGO Mindstorm EV3 robots, to enable them to successfully conduct STEM lessons and activities in classrooms using Lego robots.
- Assisting candidates in programming the EV3 brick, sensors, and actuators.
- Illustrating appropriate practices for teaching science (e.g., force, energy, ratio and proportion, velocity etc.) and mathematics (e.g., fractions, least common multiples, graphing etc.) concepts and principles using Lego robots.
- Providing audio/visual materials for motivating students in classrooms.
- Conducting numerous programming challenges to identify the problem-solving and decision-making capabilities, and programming skills of training candidates.
- Brainstorming with candidates for planning new lessons and activities, and revising previously built lessons and activity worksheets.
- Evaluating the self-efficacy and prior- and post-knowledge of the teachers before and after the PD program, using surveys, quizzes, and questionnaires.

TEACHING ASSISTANT [02/2012 – 06/2013]

INSTITUTION: **Università della Svizzera Italiana** (USI), **Lugano (Switzerland)**
COURSES: Grading student assignments, providing feedback to students regarding assignments, and assisting course instructors with teaching activities.
- Modeling, Simulation, Optimization Lab (Spring 2012)
- Information Knowledge Management (IKM) I: Databases (Spring 2013)

LECTURER [10/2009 – 02/2011]

INSTITUTION: **Asia Pacific Institute of Information Technology** (APIIT), **Kuala Lumpur (Malaysia)**
COURSES: Conducting full semester courses for students in B.Sc. and M.Sc. programmes at APIIT, including class projects and assignments, and final year projects.
- Introduction to Artificial Intelligence (Level 1)
- Artificial Intelligence Methods (Level 2)
- Further Artificial Intelligence (Level 3)
- Imaging and Special Effects (Level 2)
- Image Processing, Computer Vision & Pattern Recognition (Level 3)

GRADUATE TEACHING ASSISTANT **[05/2008 – 02/2009]**

INSTITUTION: **Universiti Tenaga Nasional** (UNITEN), **Putrajaya (Malaysia)**

COURSES: Tutorial classes of core electrical and electronics subjects for undergraduate and postgraduate programmes, conducting quizzes, grading assignments and tests.

- Electrical Machines & Drives (Semester 1, 2008/2009)
- Control Systems (Semester 2, 2008/2009)

TECHNICAL AND COMPUTING SKILLS

Programming Languages	C/C++/C#, .NET/VB, MATLAB, SQL, Python, R, HTML, Java
Software & Libraries	Visual Studio, Eclipse, ROS, OpenCV, OpenGL, Boost, SAP
Platforms & Microcontrollers	ARM and embedded platforms, Arduino, Single-board
Operating Systems	UNIX/Linux (GNU, compilers, shell, git), MS Windows
Networking	Cross-platform TCP/IP and UDP/IP sockets

AWARDS AND ACHIEVEMENTS

ITEX SILVER MEDAL **[05/2009]**

EVENT: **International Invention & Innovation Exhibition** (ITEX), **Kuala Lumpur (Malaysia)**

PROJECT: *Intelligent detection and classification system for non-technical losses* (M.Eng.)

PRESIDENT OF THE INTERNATIONAL STUDENTS SOCIETY (ISS) **[10/2007 – 09/2008]**

INSTITUTION: **Universiti Tenaga National** (UNITEN), **Putrajaya (Malaysia)**

ACTIVITIES:

- Reporting to the Assistant Registrar, International Relations Office, UNITEN.
- Overlooking a committee of two vice presidents, one treasurer, and approximately 1000 international UNITEN students.
- Conducting general meetings, writing proposals for activities and excursions, managing society's funds and materials, organizing recreational field trips, and coordinating the international students cultural night.

HEAD OF TESTING AND DIAGNOSIS (UNITEN CANSAT TEAM) **[07/2007 – 01/2008]**

EVENT: **Malaysian SiswaSAT Program Competition**

ORGANIZER: **National Space Agency of Malaysia** (ANGKASA)

ACTIVITIES: Performing in-flight tests of electrical and mechanical systems on-board CanSat.

INDEC BRONZE MEDAL **[07/2007]**

EVENT: **Innovation & Invention Design Competition** (INDEC), **UNITEN (Malaysia)**

PROJECT: *A fast and efficient face recognition system* (B.Eng. Hons)

ACADEMIC AND PROFESSIONAL SERVICES

Journal Reviewer: IEEE Transactions on Systems, Man, and Cybernetics, IEEE Transactions on Power Delivery, IEEE Transactions on Cybernetics, IEEE Robotics and Automation Letters, Applied Soft Computing, Swarm Intelligence Journal, Autonomous Robots, Engineering Applications of Artificial Intelligence, ACM Transactions on Interactive Intelligent Systems, Robotics and Autonomous Systems, Machine Learning, Artificial Intelligence.

Conference Reviewer: NCTT-MCP 2008, ICIMU 2010-2012, ICSIPA 2012-2015, PECON 2011-2016, BIONETICS 2012, IEEE SMC 2013-2014, RO-MAN 2014, IJCNN 2014, DARS 2014, IROS 2014-2015, CSPA 2015, ICIP 2016, IROS 2016, ICRA 2017.

Invited Talks, Workshops, and Short Courses:

- INVITED TALK: **Interaction between humans and robotic swarms,** Cognitive Computing & Industry Solutions, **IBM Research, Zurich, Switzerland,** September 27, 2017.
- INVITED TALK: **Human-swarm interaction and cooperation,** Computer-human Interaction in Learning and Instruction (CHILI) Lab, **École Polytechnique Fédérale de Lausanne** (EPFL), **Lausanne, Switzerland,** March 23, 2015.
- INVITED TALK: **Application of machine learning for identification of fraud and abnormal consumption patterns in electric utility data,** Faculty of Computer Science and Information Technology, **University of Malaya** (UM), **Kuala Lumpur, Malaysia,** February 8, 2011.
- WORKSHOP: **Applying neural networks with MATLAB,** Asia Pacific Institute of Information Technology (APIIT), **Kuala Lumpur, Malaysia,** June 12 and 26, 2010.
- WORKSHOP: **Introduction to MATLAB and its use for effective data analysis,** Asia Pacific Institute of Information Technology (APIIT), **Kuala Lumpur, Malaysia,** May 15-16, 2010.

SPOKEN LANGUAGES

Fluent (Written & Spoken)	English
Elementary Level	German and Italian
Mother Tongue	Urdu, Hindi and Punjabi

SCIENTIFIC PUBLICATIONS

BOOKS

[1] J. Nagi, **Detection of Nontechnical Losses in Power Utilities: Ordinary Power Consumers in Tenaga Nasional Berhad (TNB) Malaysia Distribution Network**, LAP LAMBERT Academic Publishing, 2010, ISBN: 978-3838397276.

PATENTS

[1] J. Nagi, S. K. Tiong, K. S. Yap, S. P. Koh. ***A System for Detection and Classification of Utility Loses***. Malaysian Patent No: PF2009040025, Filed: 13 May 2009.

REFEREED JOURNAL ARTICLES

[1] J. Nagi, B. Aksoy, V. Kapila. **Recognition and Expression of Emotional Intensities Using a Mobile Humanoid Robot for Socio-Emotional Interaction**. *IEEE Access*, 2017 (submitted).

[2] H. Ngo, M. Luciw, N. Vien, J. Nagi, A. Forster, J. Schmidhuber. **Efficient Interactive Multiclass Learning from Binary Feedback**. *ACM Transactions on Interactive Intelligent Systems*, vol. 4, no. 3, 2014, pp. 1–25.

[3] F. Nagi, A. K. Ramasamy, J. Nagi. **Brushless DC Motor Driver Interfacing with the eZdsp-F2812 Fuzzy Controller**. *Australian Journal of Electrical & Electronics Engineering* (AJEEE), vol. 11, no. 1, 2014, pp. 127–136.

[4] F. Nagi, A. T. Zulkarnain, J. Nagi. **Tuning Fuzzy Bang–bang Relay Controller for Satellite Attitude Control System**. *Aerospace Science and Technology*, vol. 26, no. 1, 2013, pp. 76–86.

[5] F. Nagi, H. Saleh, J. Nagi. **Sugeno-type Fuzzy Time-optimal Controller for Nonlinear Systems**. *Fuzzy Sets and Systems*, vol. 212, 2013, pp. 1–20.

[6] K. S. Yap, S. K. Tiong, J. Nagi, J. S. P. Koh, F. Nagi. **Comparison of Supervised Learning Techniques for Non-technical Loss Detection in Power Utility**. *International Review on Computers and Software* (IRECOS), vol. 7, no. 2, 2012, pp. 626–636.

[7] J. Nagi, K. S. Yap, S. K. Tiong, S. K. Ahmed, F. Nagi. **A Computational Intelligence Scheme for Prediction of the Daily Peak Load**. *Applied Soft Computing*, vol. 11, no. 8, 2011, pp. 4773–4788.

[8] F. Nagi, S. K. Ahmed, A. T. Zulkarnain, J. Nagi. **Fuzzy Time-optimal Controller (FTOC) for Second Order Nonlinear Systems**. *ISA Transactions*, vol. 50, no. 3, 2011, pp. 364–375.

[9] J. Nagi, K. S. Yap, S. K. Tiong, S. K. Ahmed, F. Nagi. **Improving SVM-based Nontechnical Loss Detection in Power Utility Using Fuzzy Inference System**. *IEEE Transactions on Power Delivery*, vol. 26, no. 2, 2011, pp. 1284–1285.

[10] F. Nagi, A. Z. Abidin, A. T. Zulkarnain, J. Nagi, A. Marwan. **Tuning of a New Fuzzy Bang–bang Relay Controller for Attitude Control System**. *International Journal of Automation and Control*, vol. 5, no. 2, 2011, pp. 97–118.

[11] J. Nagi, K. S. Yap, S. K. Tiong, S. K. Ahmed, M. Mohammad. **Nontechnical Loss Detection for Metered Customers in Power Utility Using Support Vector Machines**. *IEEE Transactions on Power Delivery*, vol. 25, no. 2, 2010, pp. 1162–1171.

[12] F. Nagi, L. Perumal, J. Nagi. **A New Integrated Fuzzy Bang–bang Relay Control System**. *Mechatronics*, vol. 19, no. 5, 2009, pp. 748–760.

REFEREED CONFERENCE PAPERS, VIDEOS, AND ABSTRACTS

[1] J. Nagi, B. Aksoy, J. A. Frank, G. A. Di Caro, V. Kapila. **CAESAR: A Socially Expressive Mobile Humanoid Robot that Expresses Emotions With Intensities**. *IEEE Robotics and Automation Letters* (RA-L) and *IEEE International Conference on Robotics and Automation* (ICRA), 2018 (submitted).

[2] J. Nagi, B. Aksoy, V. Kapila. **Generating Emotional Expressions and Behaviors for Autism Therapy Using a Mobile Humanoid Robot**. *IEEE International Conference on Robotics and Automation* (ICRA), 2018 (submitted).

[3] J. Nagi, H. Ngo, L. M. Gambardella, G. A. Di Caro. **Wisdom of the Swarm for Cooperative Decision-making in Human-swarm Interaction**. In Proceedings of the *IEEE International Conference on Robotics and Automation* (ICRA), Seattle, USA, 2015, pp. 1802–1808.

[4] J. Nagi, G. A. Di Caro, A. Giusti, L. M. Gambardella. **Learning Symmetric Face Pose Models Online Using Locally Weighted Projectron Regression**. In Proceedings of the *IEEE International Conference on Image Processing* (ICIP), Paris, France, 2014, pp. 1400–1404.

[5] J. Nagi, A. Giusti, L. M. Gambardella, G. A. Di Caro. **Human-swarm Interaction Using Spatial Gestures**. In Proceedings of the *IEEE/RSJ International Conference on Intelligent Robots and Systems* (IROS), Chicago, USA, 2014, pp. 3834–3841.

[6] J. Nagi, A. Giusti, F. Nagi, L. M. Gambardella, G. A. Di Caro. **Online Feature Extraction for the Incremental Learning of Gestures in Human-swarm Interaction**. In Proceedings of the *IEEE International Conference on Robotics and Automation* (ICRA), Hong Kong, China, 2014, pp. 3331–3338.

[7] J. Nagi, A. Giusti, G. A. Di Caro, L. M. Gambardella. **Human Control of UAVs using Face Pose Estimates and Hand Gestures**. In Proceedings of the *ACM/IEEE International Conference on Human-robot Interaction* (HRI) (Late Breaking Report), Bielefeld, Germany, 2014, 252–253.

[8] J. Nagi, H. Ngo, J. Schmidhuber, L. M. Gambardella, G. A. Di Caro. **Human-robot Cooperation: Fast, Interactive Learning from Binary Feedback**. In Proceedings of the *ACM/IEEE International Conference on Human-robot Interaction* (HRI) (Video Session), Bielefeld, Germany, 2014, pp. 107.

[9] G. A. Di Caro, A. Giusti, J. Nagi, L. M. Gambardella. **A Simple and Efficient Approach for Cooperative Incremental Learning in Robot Swarms**. In Proceedings of the *International Conference on Advanced Robotics* (ICAR), Montevideo, Uruguay, 2013, pp. 1–8.

E. Feo, M. Kudelski, J. Nagi, L. M. Gambardella, G. A. Di Caro. **Link Quality Estimation–A Case Study for On-line Supervised Learning in Wireless Sensor Networks**. In Proceedings of the *Workshop on Real-world Wireless Sensor Networks* (REALWSN), Como, Italy, 2013, pp. 97–101.

[11] G. A. Di Caro, M. Kudelski, E. Feo, J. Nagi, I. Ahmed, L. M. Gambardella. **Online Supervised Incremental Learning of Link Quality Estimates in Wireless Networks**. In Proceedings of the *IEEE/IFIP Annual Mediterranean Ad Hoc Networking Workshop* (Med-Hoc-Net), Ajaccio, France, 2013, pp. 69–76.

[12] J. Nagi, G. A. Di Caro, A. Giusti, F. Nagi, L. M. Gambardella. **Convolutional Neural Support Vector Machines: Hybrid Visual Pattern Classifiers for Multi-robot Systems**. In Proceedings of the *International Conference on Machine Learning and Applications* (ICMLA), Boca Raton, Florida, USA, 2012, pp. 27–32.

[13] A. Giusti, J. Nagi, L. M. Gambardella, G. A. Di Caro. **Cooperative Sensing and Recognition by a Swarm of Mobile Robots**. In Proceedings of the *IEEE/RSJ International Conference on Intelligent Robots and Systems* (IROS), Vilamoura, Portugal, 2012, pp. 551–558.

[14] J. Nagi, H. Ngo, A. Giusti, L. M. Gambardella, J. Schmidhuber, G. A. Di Caro. **Incremental Learning using Partial Feedback for Gesture-based Human-swarm Interaction**. In Proceedings of the *IEEE International Symposium on Robot and Human Interactive Communication* (RO-MAN), Paris, France, 2012, pp. 898–905.

[15] A. Giusti, J. Nagi, L. M. Gambardella, G. A. Di Caro. **Distributed Consensus for Interaction Between Humans and Mobile Robot Swarms**. In Proceedings of the *International Conference on Autonomous Agents and Multiagent Systems* (AAMAS) (Demonstration Track), Valencia, Spain, 2012, pp. 1503–1504.

[16] A. Giusti, J. Nagi, L. M. Gambardella, S. Bonardi, G. A. Di Caro. **Human-swarm Interaction through Distributed Cooperative Gesture Recognition**. In Proceedings of the *ACM/IEEE International Conference on Human-robot Interaction* (HRI) (Video Session), Boston, USA, 2012, pp. 401–402.

[17] E. Feo Flushing, J. Nagi, and G. A. Di Caro. **A Mobility-assisted Protocol for Supervised Learning of Link Quality Estimates in Wireless Networks**. In Proceedings of the ***International Workshop on Mobility and Communication for Cooperation and Coordination* (MC^3)** at the *International Conference on Computing, Networking and Communications* (ICNC), Hawaii, USA, 2012, pp. 137–143.

[18] J. Nagi, F. Ducatelle, G. A. Di Caro, D. Ciresan, U. Meier, A. Giusti, F. Nagi, J. Schmidhuber and L. M. Gambardella. **Max-pooling Convolutional Neural Networks for Vision-based Hand Gesture Recognition**. In Proceedings of the *IEEE International Conference on Signal and Image Processing Applications* (ICSIPA), Kuala Lumpur, Malaysia, 2011, pp. 342–347.

[19] J. Nagi, K. S. Yap, F. Nagi, S. K. Tiong, S. P. Koh, S. K. Ahmed. **NTL Detection of Electricity Theft and Abnormalities for Large Power Consumers in TNB Malaysia**. In Proceedings of the *IEEE Student Conference on Research and Development* (SCOReD), Putrajaya, Malaysia, 2010, pp. 1–5.

[20] J. Nagi, S. A. Kareem, F. Nagi, S. K. Ahmed. **Automated Breast Profile Segmentation for ROI Detection Using Digital Mammograms**. In Proceedings of the *IEEE Conference on Biomedical Engineering and Sciences* (IECBES), Kuala Lumpur, Malaysia, 2010, pp. 1–6.

[21] J. Nagi, S. K. Tiong, S. K. Ahmed, F. Nagi. **Prediction of PVT Properties in Crude Oil Systems Using Support Vector Machines**. In Proceedings of the *International Conference on Energy and Environment* (ICEE), Malacca, Malaysia, 2009, pp. 1–5.

[22] J. Nagi, K. S. Yap, S. K. Tiong, A. M. Mohammad, S. K. Ahmed. **Non-technical Loss Analysis for Detection of Electricity Theft using Support Vector Machines**. In Proceedings of the *IEEE International Power and Energy Conference* (PECon), Johor Bahru, Malaysia, 2008, pp. 907–912.

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VIDOES AND DEMONSTRATIONS

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