

PERSONAL INFORMATION

Harsha Vardhana Jetti

WORK EXPERIENCE

Jun 2023 - Present

DIRLAB – Direzione Laboratorio Metrologico (Remote work)

H. Pierre Service srl

Responsible for all the lab's technical activities such as: maintenance of all the equipment in the lab according to the technical standards; verifications of the procedures of the lab's provided services; control on the calibrations and the periodic verifications with respect to the designated procedures and the national and international guides and standards.

Feb 2022 - Present

Assegnista di Ricerca

Politecnico Di Milano

Analysis of the data provided by the client for the determination of Power Quality Indices, with the aim to predict the state of the power system and thereby take some preventive actions to improve the overall power quality.

Academic years:
From 2018 - 2019
To Present**Esercitatore**

Politecnico Di Milano

I worked as an Esercitatore for the course 'Digital Signal Processing' by Prof. Alessandro Ferrero in the academic year 2018 - 2019 and for the course 'Smart measurement architectures for electric systems' by Prof. Simona Salicone in the following academic years. I helped in both conducting the experiments in the Laboratory and in taking some frontal lessons and solving numerical exercises.

May 2018 – October 2018

Collaboratore

Politecnico Di Milano

In within a Research contract with a company, whose Responsible was Prof Simona Salicone, I worked on developing a new accurate level measurement sensor, based on microwaves. In particular, I was responsible for the transfer of the technology implemented in a Texas instrument microprocessor to the microprocessor developed in the company itself. I was responsible for the software part.

Aug 2014 – Aug 2015

Assistant system engineer

IBM India Pvt ltd.

I was responsible for testing the software and the web applications developed for various clients. I worked in a team of testing engineers.

EDUCATION AND TRAINING

Nov 1, 2018 - June 16, 2022

PhD in Electrical Engineering – Final score (PhD cum Laude)

Politecnico Di Milano

- I worked with Prof. Simona Salicone and my thesis is on the use of theory of possibility and Random-Fuzzy variables (RFVs) in Kalman filtering and in Industrial conformity analysis. In particular, I developed algorithms for RFV based Kalman filters and developed a modified Bayes' theorem to be used in Industrial conformity analysis. I then applied the developed algorithms in different practical scenarios to prove the effectiveness of them. I published the obtained results in research articles in journals and conferences.
- I also helped to teach master's degree students and mentored some of them for their thesis.

Sep 2015 – Apr 2018

Laurea Magistrale in Electrical Engineering – Final score (105/110)

Politecnico Di Milano

- I worked with Prof. Simona Salicone and my thesis was on developing a program, first in *Windows* and then in *Linux*, to trigger the acquisition in distributed acquisition systems using the computer. The aim was the use of non-expensive acquisition boards for synchronized acquisition. This would facilitate comparatively cheaper measurement systems.

RESEARCH ACTIVITIES

Title

Definition of a new possibilistic Kalman filter using Random-fuzzy variables (RFVs)

Politecnico Di Milano

- I worked on defining a new possibilistic Kalman filter not only capable of predicting the system states (like the standard formulation of the Kalman filter in probability), but also of propagating systematic contributions to uncertainty in an accurate and effective way. This is a promising result since it allows us to accurately know the total uncertainty that is associated with the state predictions provided by the Kalman filter. The results have been summarized in a scientific paper published in the journal *IEEE Transactions of instrumentation and measurement*.

Title

A modified Bayes' theorem for reliable conformity analysis in industrial metrology

Politecnico Di Milano

- The standard formulation of the Bayes' theorem works under the assumption that the distributions attributed to both the measurement and the a priori knowledge are accurate. But, in industries, often, the process or the measuring instrument may deviate. So, I modified the Bayes' theorem formula to include RFVs thus allowing the inclusion of any possible deviations which provides a much more reliable conformity analysis. The initial results have been presented in the *19th International Congress of Metrology (CIM2019)* and published in the conference proceedings. The final results have been published in the journal *Measurement* from Elsevier.

Title

Definition of a possibilistic Kalman filter to reduce the overall uncertainty in presence of uncompensated systematic uncertainty

Politecnico Di Milano

- The possibilistic Kalman filters are able to propagate and evaluate the systematic contributions to uncertainty, but they cannot reduce it. So, a new variation of the Kalman filter to consider the calculated uncertainty and compensate for it has been defined, useful when the direction of the systematic contribution is known. This way, the overall uncertainty is reduced. The results have been published in an article in *Metrology* journal.

Title

Use of possibilistic Kalman filter for a secure PTP network

Politecnico Di Milano

- When there are asymmetric delays in a PTP network, there is a bias introduced in the offset calculated by the slave clock. This is made use of in certain malicious attacks on the PTP network where the timestamps are delayed by the attacker deliberately or the time stamps are modified so that the slave falls out of synchronization. I used the possibilistic Kalman filter to propagate the systematic uncertainty from the legitimate asymmetries in the network traffic. Using this uncertainty, it is possible to validate the correctness of the timestamps received by the slave thereby making the network more secure. The results have been summarized in an article that is to be submitted to the journal *IEEE transactions of instrumentation and measurement*.

Title

A software trigger-based synchronization for multipurpose distributed acquisition systems

Politecnico Di Milano

- I worked on developing a program to trigger the acquisition in distributed acquisition systems using the computer. This facilitates the use of non-expensive acquisition boards for synchronized acquisition in distributed sensor networks. This would facilitate comparatively cheaper measurement systems. The results have been published in the proceedings of the conference *IEEE International Conference on Innovation and Intelligence for Informatics, Computing and Technologies*, 2020.

Title

Deconvolution-based methods to extract uncertainty components

Politecnico Di Milano

- I worked on using the theory of possibility to develop a novel mathematically efficient algorithm to perform the deconvolution between probability distributions. This could potentially have a huge impact on how to perform calibrations. Currently, an instrument that is much more accurate than the process is recommended to be employed to calibrate the process; in fact, that way, the uncertainty contribution of the instrument, even if added to the overall uncertainty contribution of the calibration, can be negligible. But, if we could perform deconvolution of probability distributions, theoretically, any instrument could be used to make a calibration, since the uncertainty contribution of the instrument could be separated from the total uncertainty of the measurement process, thereby giving the uncertainty of just the process.

Title

Optimization of PV MPPT performance and DC link voltage ripples compensation using a duty cycle modifier

Indian Institute of Technology (Indian School of Mines), Dhanbad.

- In this project, I studied the various PV MPPT techniques like perturb and observation, Incremental conductance, hill climbing method, constant voltage method etc. and I simulated the photovoltaic module and perturb and observe MPPT with the help of MATLAB SIMULINK and incorporated another block in series with the MPPT algorithm called the duty cycle modifier block which considers the output voltage of the converter and modifies the duty cycle supplied by the MPPT algorithm. This greatly improves the stability of the MPPT algorithms with respect to sudden load transients and with respect to the MPP tracking time of the algorithm when operating a resistive load. The researches related to this project has been summarized in a paper in the conference proceeding of *IEEE International conference on Recent Advances and Innovations in Engineering (ICRAIE-2014)*.

PERSONAL SKILLS

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Mother tongue(s)

Telugu, Hindi

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	Full proficiency	Full proficiency	Full proficiency	Full proficiency	Full proficiency
	Toefl score – 112/120				
Italian	Good	Good	Intermediate	Intermediate	Intermediate

Communication skills

- As the head of the laboratory of H.Pierre services srl, I have to communicate with the personnel in the lab on a daily basis to keep everything in order. This requires great communication skills especially since I work remotely from the lab.
- During my experience as an Esercitatore in Politecnico di Milano, I had to teach to a class of more than 100 students in each semester. As a part of this, I significantly enhanced my presentation skills, both in verbal and written communication.
- During my work experience as a Collaboratore in Politecnico Di Milano, I worked with the research team in the Company and interacted with the company employees on a daily basis. Effective communication was necessary for the successful completion of the project. I also had to coordinate the tasks of the team. So, my project management skills have also been polished.
- During my work experience in IBM, I had to interact daily with the team located in the UK to get an idea of the requirements for the testing of the software. Good communication was particularly important since the meetings were remotely done.

Organisational / managerial skills

- As the head of the laboratory of H.Pierre services srl, I have to maintain the laboratory in order and manage the personnel and the technical activities such as the calibrations and periodic verifications performed. This helps me polish my organisational and managerial skills.
- During the course of my PhD, I mentored a few master's degree students for their thesis. From this, I developed good leadership and managerial skills to get the work done according to the schedule.
- I had been the organizer of gaming competitions in my university during my bachelor's degree. I had to take care of both the financial part and the part of coordinating people for the successful organization of the competitions.
- I also organize various treks and activities in the mountains for free for large groups during the weekends. So, I have to plan the excursion, coordinate among everyone for the entire duration singlehandedly.

Computer skills

- Microsoft office.
- MATLAB, Simulink.
- LABVIEW
- C
- Latex

Other skills and hobbies

- In my school, I participated in a lot of writing and elocution competitions, and I have won a few of them.
- I am also good at volleyball, Lawn tennis, Table tennis, Chess, Badminton.
- I also learned Wu shu, a Chinese martial art and I served as the Vice-captain of the university team during my undergraduate studies in India.
- I go hiking and trekking regularly.
- I also go rock climbing, skiing and now starting to learn alpinism.

ADDITIONAL INFORMATION

Publications

- Alessandro Ferrero, Simona Salicone, Harsha Vardhana Jetti. *Bayesian approach to uncertainty evaluation: is it always working?*, 19th International Congress of Metrology (CIM2019), <https://doi.org/10.1051/metrology/201916002>.
- Alessandro Ferrero, Harsha Vardhana Jetti, Simona Salicone. *The Possibilistic Kalman Filter: Definition and Comparison With the Available Methods*, IEEE Transactions on instrumentation and measurement, 1 <https://doi.org/0.1109/TIM.2020.3010193>.

- Harsha Vardhana Jetti, Simona Salicone. *A possibilistic Kalman filter for the reduction of the final measurement uncertainty, in presence of unknown systematic errors*, Metrology, <https://doi.org/10.3390/metrology1010003>.
- Harsha Vardhana Jetti, Alessandro Ferrero, Simona Salicone. *A modified Bayes' theorem for reliable conformity assessment in industrial metrology*, Measurement, Elsevier, <https://doi.org/10.1016/j.measurement.2021.109967>.
- Simona Salicone, Harsha Vardhana Jetti. *A General Mathematical Approach Based on the Possibility Theory for Handling Measurement Results and All Uncertainties*, Metrology, <https://doi.org/10.3390/metrology1020006>.
- S Salicone, S Corbellini, HV Jetti, S Ronaghi. *Low-cost real-time motion capturing system using inertial measurement units*, Acta IMEKO, https://doi.org/10.21014/acta_imeko.v11i3.1290.
- Alessandro Ferrero, Simona Salicone, Harsha Vardhana Jetti and Sina Ronaghi. *Deconvolution-based methods to extract uncertainty components*, Measurement Science and Technology, [10.1088/1361-6501/ad0519](https://doi.org/10.1088/1361-6501/ad0519).
- A Ferrero, HV Jetti, S Ronaghi, S Salicone. *A method to consider a maximum admissible risk in decision-making procedures based on measurement results*, Acta IMEKO, [10.21014/actaimeko.v12i2.1518](https://doi.org/10.21014/actaimeko.v12i2.1518).
- Sina Ronaghi, Alessandro Ferrero, Simona Salicone, Harsha Vardhana Jetti. *Novel Algorithms for Filtering and Event Detection in Non-Intrusive Load Monitoring*, 2023 IEEE 13th International Workshop on Applied Measurements for Power Systems (AMPS), <https://doi.org/10.1109/AMPS59207.2023.10297257>.
- A Ferrero, HV Jetti, S Ronaghi, S Salicone. *A general Monte-Carlo approach to consider a maximum admissible risk in decision-making procedures based on measurement results*, Acta IMEKO, [10.21014/actaimeko.v12i4.1602](https://doi.org/10.21014/actaimeko.v12i4.1602).
- Simona Salicone, Harsha Vardhana Jetti. *A software trigger based synchronization for multipurpose distributed acquisition systems*, 2020 International Conference on Innovation and Intelligence for Informatics, Computing and Technologies (3ICT), <https://doi.org/10.1109/3ICT51146.2020.9311973>.
- Harsha Vardhana Jetti, B. Krishna Naick. *Optimization of PV MPPT performance and DC link voltage ripples compensation using a duty cycle modifier*, International Conference on Recent Advances and Innovations in Engineering (ICRAIE-2014), <https://doi.org/10.1109/ICRAIE.2014.6909121>.

Conferences and schools attended

- 21st International Congress of Metrology (CIM2019).
- Italo Gorini summer school 2018-2020.
- 19th International Congress of Metrology (CIM2019).
- GME National congress 2019.