



Open paid position in Engineering (with possibility of Master/PhD thesis)

Total Aquatic Process Monitoring and Control with Edge-AI Electrochemical Perception

Description

Integrated microanalytical systems are poised to enable ubiquitous (bio)chemical fluid assessment, and to have a revolutionary impact on the prevention of key health and sustainability threats of our time. In these systems, the use of electrochemical sensor arrays stands out due to their capability to generate multivariate data from liquid samples, enlarging the number of chemical properties that can be determined simultaneously. To manufacture the arrays, microsensors fabricated in semiconductor technologies offer advantages such as miniaturization, robustness, mass fabrication, and ease of integration with electronic circuits for embedded artificial intelligence, making them particularly suitable for advanced monitoring at the point of interest.



In this project, you will collaborate with a multidisciplinary team with expertise in neuroscience, computer science, chemistry, biology and

microelectronics to deliver innovative intelligent solutions for total aquatic process monitoring and control. Your specific objective will be to develop deep neural network algorithms to fuse dynamic microsensor readings so as to monitor, predict, evaluate, and control critical parameters in real aquaculture settings. The neural networks will be deployed on the <u>Loihi</u> neuromorphic computing platform, the latest generation of AI processors created by Intel.

Background & skills

- Degree or MSc in Computer Science, Computer/Electrical Engineering, Artificial Intelligence, or a related field;
- Knowledge of Deep Neural Network training/inference in accelerated computing environments (TensorFlow and/or PyTorch libraries);
- Experience with FPGA/embedded systems programming. Knowledge of computational neuroscience is a plus.

Tasks

- Develop DNN implementations to achieve high performance on neuromorphic hardware such as Intel's Loihi (use of e.g. conversion tools and quantization-aware training);
- Explore few-shot and online learning of new scenarios/sensors;
- Run the network on the edge using a USB neuromorphic computing stick and study its implementation on FPGA;
- Characterize performance in terms of accuracy, latency, and power.

What we offer

- Engineering contract in a stimulating, multidisciplinary, and dynamic environment;
- Flexible working hours and location (teleworking);
- Personalized hands-on training on cutting-edge technology topics with links to industry;
- Opportunity to submit your work as an academic thesis, and to join the ongoing startup project as entrepreneur.

Contact

To apply, please send a copy of your CV with subject "IAQUA Job Offer" to:

Dr. Josep Maria Margarit josepmaria.margarit@csic.es With CC to Dr. Cecilia Jiménez cecilia.jimenez@csic.es; Dr. Paco Serra paco.serra@imb-cnm.csic.es