



PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 40th cycle

Research Area n. 2 - Electronics

THEMATIC Research Field: EMBEDDING NEURAL NETWORKS INTO CPUS AND NPUS FOR SMART EYEWEAR

Monthly net income of PhDscholarship (max 36 months)
€ 1400.0
In case of a change of the welfare rates during the three-year period, the amount could be modified.

Context of the research activity	
Motivation and objectives of the research in this field	The PhD research will focus on conceiving, implementing and porting neural networks into hardware platforms with strict constraints on dimensions, power consumption and processing time, in order to fit into electronics hardware demonstrators inside smart wearables such as smart glasses. The research will aim at embedding processing and algorithms into very compact hardware board to be designed within the research, in order to optimize the integration of algorithms and electronics, exploiting various sensors and sensor fusion techniques, such as cameras 2D and 3D imagers and event-cameras, Inertial Measurement Units, thermal and time-of flight imagers, and so on.
Methods and techniques that will be developed and used to carry out the research	The PhD student will employ circuitual simulators for designing electronic processing boards, programming languages for firmware and real-time systems, and tools for neural network design, training, tests, aiming at embedding algorithms to recognize and categorize objects, user's actions, environments, contexts and to enable Augmented Reality.
Educational objectives	The PhD student will acquire in-depth skills for conceiving, designing, simulating, training, validating neural networks, circuits, electronic boards, and electronic sensors to be



	embedded and demonstrated into wearable hardware, for smart eyewear.
Job opportunities	The research will open the way to broad career opportunities in the field of circuit design neural networks and development of embedded systems in the field of wearables.
Composition of the research group	1 Full Professors 3 Associated Professors 1 Assistant Professors 3 PhD Students
Name of the research directors	Prof. Franco ZAPPA

Contacts	
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Additional support - Financial aid per PhD student per year (gross amount)	
Housing - Foreign Students	--
Housing - Out-of-town residents (more than 80Km out of Milano)	--

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
<p><u>EDUCATIONAL ACTIVITIES</u> (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student. 5.707,20 Euro per student</p> <p><u>TEACHING ASSISTANTSHIP</u>: availability of funding in recognition of supporting teaching activities by the PhD student. There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.</p> <p><u>COMPUTER AVAILABILITY</u>: 1st year: Yes 2nd year: Yes</p>



3rd year: Yes

The research will be developed within the Smart Eyewear Lab (SEL), the joint research laboratory between POLIMI and ESSILOR-LUXOTTICA.