POLITECNICO DI MILANO

PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 38th cycle

Research Area n. 4 - Telecommunications

PARTENARIATO PNRR Research Field: AI ORCHESTRATION OF EDGE-COMPUTING INFRASTRUCTURE

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	This research project is in the framework of RESTART PARTENARIATO ESTESO RESEARCH AND INNOVATION ON FUTURE TELECOMUNICATION SYSTEMS AND NETWORKS TO MAKE ITALY MORE SMART CUP D43C22003080001 Decreto di Concessione D.D. 1549 del 11/10/2022 The evolution of Cloud computing from the centralized model to the distributed Edge computing model is a recent trend and a hot topic in research. The advantages in terms of performance of shifting computation towards the edge, closer to the users, are clear and paramount for several applications. The proposed research activity will have the objectives of developing algorithms and techniques to control and orchestrate an edge computing infrastructure, covering several aspects, such as: optimized routing and function placement, IoT support, network protection, network security.The infrastructure will rely on different network technologies including: SDN, SD-WAN, 5G. The research will be finalized to the projects WatchEDGE and Liason within the framework of RESTART.

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Methods and techniques that will be developed and used to carry out the research	Methodologies to develop the research objectives will come from the fields of: machine learning (neural networks, deep learning), network softwarization and automation, network function virtualization, network security
Educational objectives	The PhD student will learn how to design, develop and deploy AI-based algorithms into a control and orchestration system and how to test performance by simulation, lab testing, and possibly field trials.She/he will also learn how to setup, maintain and manage an experimental edge-computing infrastructure.Moreover, the student will learn how to write and scientific papers on the topic to be published in top international conferences and journals.
Job opportunities	There is a very strong request of PhD students with a specific background knowledge in in the field of edge computing. Recently, some of our former PhD students have been hired in top high-tech companies as Google, Nokia or Facebook
Composition of the research group	1 Full Professors 4 Associated Professors 2 Assistant Professors 4 PhD Students
Name of the research directors	Guido Maier, Giacomo Verticale

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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)	--

(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
The funding for the scholarship comes from the project RESTART a comprehensive program, that aggregates and integrates the main stakeholders of the Italian Telecommunications sector. RESTART promotes TLC science and technologies advancement for both human and IoT users, applications and services in the most diverse sectors: agriculture, commerce, energy, finance, industry, media, health, safety/security, transportation. LIST OF UNIVERSITIES, COMPANIES, AGENCIES AND/OR NATIONAL OR INTERNATIONAL INSTITUTIONS THAT ARE COOPERATING IN THE RESEARCH: Politecnico di Milano; Università di Catania; CNIT-RASS Pisa; Italtel; Università di Roma Tor Vergata EDUCATIONAL ACTIVITIES (purchase of study books and material, including computers, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student 5.707,13 Euro TEACHING ASSISTANTSHIP: (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. COMPUTER AVAILABILITY: individual use DESK AVAILABILITY: individual use D.D. 341 del 15/03/2022 Avviso pubblico per la presentazione di Proposte di intervento per la creazione di "Partenariati estesi alle università, ai centri di ricerca, alle aziende per il finanziamento di progetti di ricerca di base" - nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 "Istruzione e ricerca" - Componente 2 "Dalla ricerca all'impresa" - Investimento 1.3, finanziato dall'Unione europea - NextGenerationEU