POLITECNICO DI MILANO

PhD in BIOINGEGNERIA / BIOENGINEERING - 38th cycle

PARTENARIATO PNRR Research Field: DEVELOPMENT OF M-HEALTH TECHNOLOGIES AND METHODOLOGIES FOR CONTINUOUS MONITORING, WELLBEING, AND HEALTH

Monthly net income of PhDscholarship (max 36 months)
€ 1250.0 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	M-health technologies and methodologies can be used to monitor daily life activities or gestures and to support vulnerable populations promoting healthy behaviours and preventing health risks. Monitoring daily gestures such as for instance handwriting can be important for the early detection of frailty conditions: in children, handwriting alteration can be a symptom of dysgraphia, in elderlies can be precursor of disease (e.g. Parkinson) or can indicate a sign of age-related degeneration. In both populations a continuous observation of the gestures and abilities can trigger a prompt intervention without waiting for clinical spots visits that in most of the cases are carried out ones the diagnosis is already evident. The aim of this PhD will be to identify one or two use cases and to adopt or personalize a m-health technology in order to monitor children or seniors in their daily routine. The PhD research will develop an integrated assessment methodology, mainly in non-controlled environments, through sensitive, specific and reliable objective measurements, in order to deliver a personalized longitudinal monitoring and empower users in their healthy behaviors. The proposed technologies will be co-designed with relevant stakeholders in order to obtain solutions adopted at scale. The data measured will be analysed to extract relevant features and will be integrated with machine

	learning algorithms aimed at detecting anomalies, predicting and/or preventing degeneration, classifying pathologies. The final aim will be to exploit technologies to optimize user wellbeing and promote prevention. This project research is in the framework ECS-MUSA ECOSISTEMA DELL'INNOVAZIONE MUSA - MULTILAYERED URBAN SUSTAINABILITY ACTION CUP D43C22001410007 Decreto di Concessione D.D. 1055 del 23/06/2022
Methods and techniques that will be developed and used to carry out the research	Starting from systematically reviewing the literature, the candidate will identify use cases, will develop, or identify the best technologies (wearables, smart objects and/or mobile/tablet applications) and use advanced processing methodologies to derive objective features able to quantitively assess the specific ability. The candidate will evaluate and test the reliability of such devices/methodologies and their validity against the gold standard used clinically to measure the same gestures and/or quantities.
Educational objectives	The candidate will acquire specific expertise on the used methodologies and improve team collaboration skills.
Job opportunities	The acquired expertise will open different job opportunities as researcher and/or research manager in research public/private institutions, and in instrumentation or service companies. Also companies and institutions interested in wearable sensors, internet of things applications and machine learning will take advantage from the collaborations with a PhD with this kind of experience.
Composition of the research group	1 Full Professors 1 Associated Professors 0 Assistant Professors 0 PhD Students
Name of the research directors	PROF. SIMONA FERRANTE

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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	625.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
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.   This project research is in the framework ECS-MUSA ECOSISTEMA DELL'INNOVAZIONE MUSA - MULTILAYERED URBAN SUSTAINABILITY ACTION CUP D43C22001410007 Decreto di Concessione D.D. 1055 del 23/06/2022 D.D. 3277 del 30/12/2021 Avviso pubblico per la presentazione di Proposte di intervento per la creazione di 12 Ecosistemi dell'innovazione sul territorio nazionale da finanziare nell'ambito del Piano Nazionale di Ripresa e Resilienza, Missione 4 Componente 2 Investimento 1.5 - Creazione e rafforzamento di ecosistemi dell'innovazione, costruzione di leader territoriali di R&S -finanziato dall'Unione europea - NextGenerationEU.