POLITECNICO DI MILANO

PhD in INGEGNERIA DELL'INFORMAZIONE / INFORMATION TECHNOLOGY - 39th cycle

Research Area n. 3 - Systems and Control

THEMATIC Research Field: REVISE AND ENHANCE: WIN-WIN INSIGHTS FOR HOME DELIVERY SERVICES

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 efficient transportation of goods is a major goal of Logistics Service Providers (LSPs). This is particularly evident in e-retail settings. The unprecedented growth of e-retail has amplified its transport-related negative externalities, e.g., emissions, traffic congestion, and noise. As a result, efficient and sustainable goods transportation is a central societal concern in urban areas. In Attended Home Delivery (AHD) services (e.g., groceries and furniture delivery) the LSP coordinates its visit to a customer within a time slot. An ever-growing body of literature has been aiming at devising efficient vehicle distribution routes for time slot allocation and selection mechanisms. Several such contributions fall under the title of Dynamic Time Slot Management (DTSM). A key challenge of DTSM is offering a customer a set of time slots, in real-time, that are convenient for both the LSP and the customer. The complexity of such decisions is mainly due to not knowing the location and demand of future customers. The aim of this PhD project is to complement the literature by devising effective algorithms for the DTSM, and exploring innovative strategies for assigning and revising time slots.
Methods and techniques that will be developed and used to carry out the research	The candidate will develop and implement mathematical models for problems under uncertainty. Such models will

	be rooted in modeling paradigms such as stochastic programming and stochastic dynamic programming. A variety of solution methods will be explored and implemented, ranging from exact decomposition algorithms to metaheuristic algorithms.
Educational objectives	The main educational objectives for the candidate is to create state-of-the-art knowledge in developing mathematical models and solution algorithms for optimization problems in the field of transportation science and logistics. In doing so, the candidate will be trained in deploying and developing adequate methodologies to both deterministic problems, as well as problems under uncertainty.
Job opportunities	Besides an academic career in the field of transportation science and logistics, the candidate will acquire competitive optimization skills that are highly in demand in the private sector.
Composition of the research group	2 Full Professors 3 Associated Professors 1 Assistant Professors 3 PhD Students
Name of the research directors	Ola Jabali, Pietro Belotti

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
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.

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