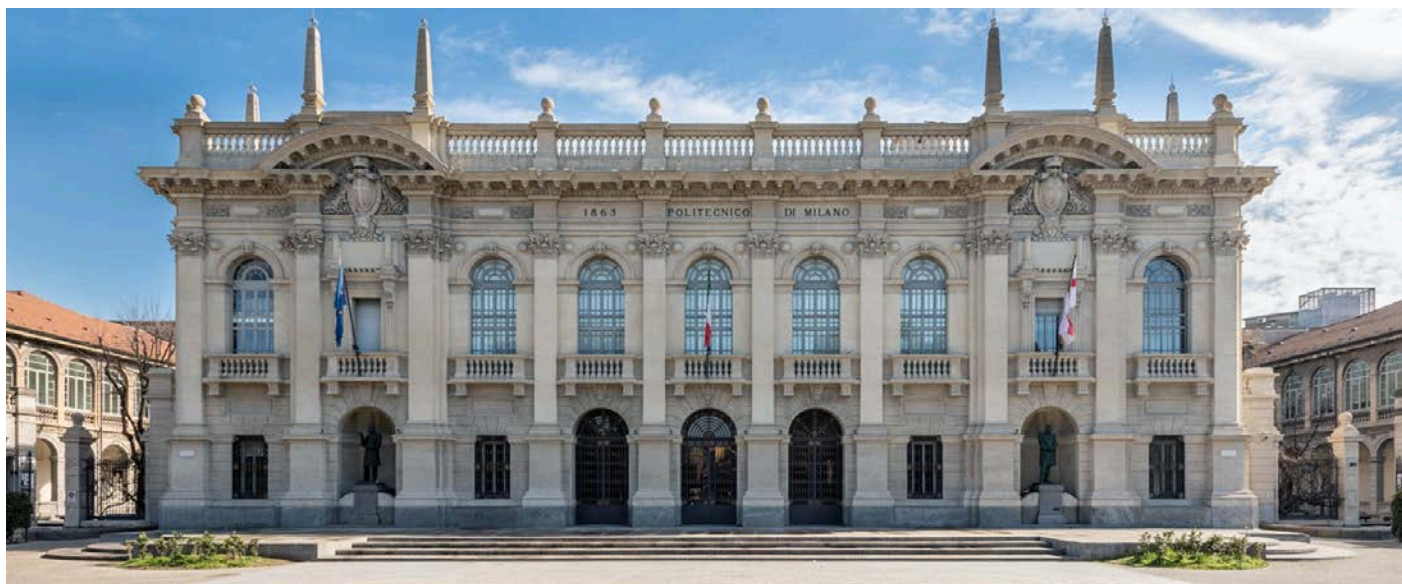2023S

米兰理工大学

机器学习与交互视觉

Politecnico di Milano

Machine Learning and Interactive Computer Vision

Politecnico di Milano

项目简介

01 米兰理工大学
Politecnico di Milano

米兰理工大学创建于1863年，坐落于意大利米兰，是欧洲顶尖工科院校IDEA联盟成员，也是米理-TUM-帝国理工学院欧洲人才学会联盟。米理诞生了欧洲首个电子计算中心，拥有欧洲最大的风洞实验室、欧洲最大的ICT部门之一，世界Top3大学企业孵化器Polihub。诺奖得主、建筑学界最高奖普利兹克奖得主（共5位）等都曾于此学习或任教。

Thought Bridge

03 米兰
Milano

米兰是世界设计之都，欧洲四大经济中心之一。米兰是几乎世界半数奢侈品牌的诞生地，同时也是意大利最大的工业区。其拥有众多著名学府（如米兰理工大学，博科尼大学）。米兰也是欧洲著名的足球队（AC米兰和国际米兰足球俱乐部）和篮球队的驻地。

02 机器学习与交互视觉
Machine Learning and Interactive Computer Vision

机器学习的发展促进了交互视觉的进步，在图像识别、图像处理等方面，机器学习已经取得了非常好的成果，各类新的算法模型的运用也为实现交互视觉提供了更多新的可能，也推动了各行业更高的发展，实现了更多前沿领域的实践。

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交互视觉前沿学科

参观各类科技研发企业，聚焦交互视觉领域的学科前沿应用，参访探知其在实际产业上的应用，智触行业前沿。

官方证书&学术推荐信

提供Polimi官方颁发的项目证书，项目表现优秀者有机会获得教授签署的学术推荐信。

学术人脉拓展

与世界顶尖水平的院士、知名教授、学术权威零距离交谈，实地参观意大利顶尖的大学。

直通Polimi招生官

Polimi招生官现场解读院校招生政策，并提供"一对一"留学申请指导、学术生涯规划。

- 机器学习与交互设计项目注重将机器学习和计算机视觉相结合，使之成为一种强大的工具，同时能够使计算机能够更准确、更高效地分析视觉数据。项目内容包含多种主题，比如图像和视频处理、机器学习算法和图像识别等前沿方向的课题，旨在为学生提供使用机器学习技术开发计算机视觉应用程序的技能和知识，并将其应用于面部识别、物体检测和自动驾驶汽车等实际前沿应用中。

核心模块 Machine Learning and Interactive Computer Vision

■ Applied Machine Learning

It gives an introduction to machine learning techniques and theory, with a focus on its use in practical applications.

■ Bayesian Learning and Monte Carlo Simulation

It aims to give an applications-oriented introduction to the Bayesian statistical learning. Part of the subject is devoted to a practical introduction to Monte Carlo techniques.

■ Computer Vision and Deep Learning

Study Hierarchical Structures and Scale space, Principal Components Analysis (PCA), feature extraction and matching, unsupervised and supervised classification and recognition as well as various machine learning methods, stereo vision and essential & fundamental matrixes, optical flow, tracking (Kalman/Particle) and deep learning for vision.

■ Adaptive Image Recognition

It includes topics on theory and applications of adaptive image processing, image analysis, and pattern recognition methods for image object detection, classification, and indexing. There are presented feature extraction algorithms based on colour, texture, motion, and shape information; generic applications: face recognition, number plate detection, digit recognition, word segmentation, and image search by its MPEG-7 colour descriptors.

■ Image Analysis and Computer Vision

Study both the foundations on image formation, image analysis, and the methodology underlying the solution techniques to the main problems involved. Image analysis addresses the extraction of the content of one or several images, in order to obtain a representation of the observed3Dscene through Computer Vision.

■ Video Signals

Provide the student with an in-depth knowledge of selected and advanced topics on image and video analysis and processing. It covers topics in the areas of Image Analysis, and pattern recognition; feature extraction; image segmentation; advanced image rendering.

■ Sparse Representations for Image and Signal Modeling

The main goal is to provide the student with an understanding of the most important aspects of the theory underlying sparse representation and, more in general, of sparsity as a form of regularization in learning problems.

■ Human-Computer Interaction for AI

Introduce participants to a conceptual/methodological framework that can help them to identify issues that users can encounter when interacting with AI-based technologies (false expectations, biases in decision-making, limitation of control), and approach them during the design of AI systems by means of a user-centered perspective leading to the identification of adequate user interfaces and interaction paradigms.

核心实验室
The Artificial Intelligence and Robotics Laboratory at Politecnico di Milano (AIRLab)

It is one of the longest-standing research groups in Italy working on Artificial Intelligence, Robotics and Machine Perception. AIRLab is a community of researchers pursuing many lines of research that covers most of the fields associated to Artificial Intelligence, Machine learning, Robotics and Computer Perception. This richness of expertise makes AIRLab an outstanding project partner and a knowledgeable and resourceful supplier of services.

核心实验室
I3Lab - Innovative Interactive Interfaces

It is a multidisciplinary research laboratory that deals with the design and development of innovative interactive technologies, within the framework of the Human-Computer Interaction (HCI) discipline.

The laboratory offers multidisciplinary skills with a broad spectrum, from the analysis of user needs to the design of interfaces and interaction, to the creation of highly engineered software, to the creation of prototypes of digital and "tangible" products (using microcontrollers and 3D printers) to design and execution of empirical studies.

I3Lab cooperates with important national and international universities such as MIT, Georgia Institute of Technology, Università di Milano-Bicocca, and with hospitals, social cooperatives and therapeutic centers including: Cooperativa Fraternità e Amicizia, Fondazione Don Carlo Gnocchi, Ospedale Fatebenefratelli, Ospedale Niguarda, Istituto Neurologico Besta, Fondazione Sacra Famiglia Onlus, Associazione La Nostra Famiglia, CRC Balbuzie.

师资团队
Faculty

Professor Matteo Matteucci

- is Associate Professor at Department of Electronics, Information and Bioengineering of Politecnico di Milano
- Ph.D. in Computer Engineering and Automation at Politecnico di Milano
- main research topics are pattern recognition, machine learning, machine perception, robotics, computer vision and signal processing
- has been the principal investigator in national and international funded research projects on machine learning, autonomous robots, sensor fusion and benchmarking of autonomous and intelligent systems

Professor Caglioti Vincenzo

- Ph.D. in Computer and System Engineering in 1992 from Politecnico di Milano
- main research interests are in Image Analysis and Computer Vision, and in Robotics Generally, addressed problems consist in the automatic construction of models of an observed scene, or model of a robot
- research results have been published in 17 papers in international journals, 34 papers in international conference proceedings or international books. Participant of the International Funded Research Projects and reviewer for International Journals

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交互视觉学科前沿

该项目围绕机器学习与交互视觉这一交叉学科课题的经典理论、基础知识、应用实践案例等内容；包括图像理解、图像识别、自动驾驶的实践项目，由米兰理工大学世界顶尖水平教授全程指导授课。

01

02

直通Polimi招生官讲座

将邀请Polimi招生官为学生们提供一手的招生信息宣讲，包括申请Polimi硕士、博士的一对一指导，以及在职业发展、留学规划、项目申请方面的咨询以及经验分享。
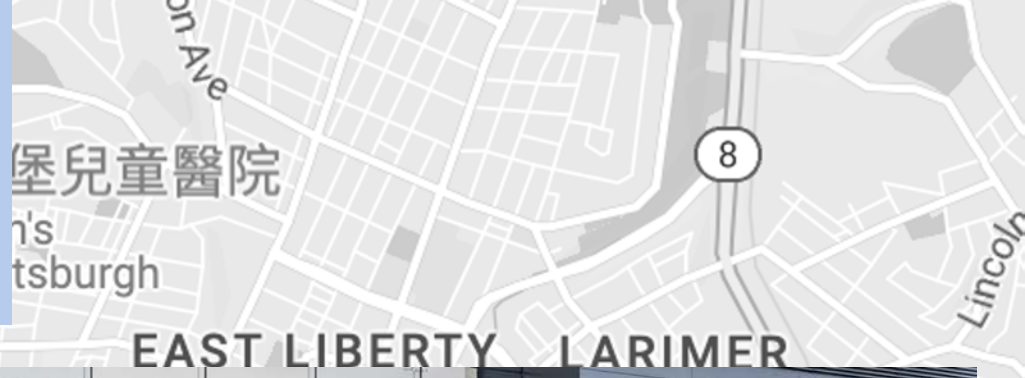
科创机构

将参邀请惠普公司、微软等500强企业高管为同学们提供职业发展、行业生涯发展指导等经验分享。同时也会参观各类科技研发企业、机器人公司等企业研发中心。

03

04

人文体验

将参观米兰主教大教堂、斯卡拉歌剧院、米兰王宫，以及二十世纪博物馆等。此外，还有机会现场观看意甲足球比赛，近距离感受这座欧洲顶级足球之城的魅力。

Hewlett Packard Enterprise
惠普公司

惠普公司是世界最大的计算机公司之一，作为全球领先的下一代软件定义的基础架构领导者，HPE拥有世界级的服务器、存储、网络、融合基础架构和产品组合。

Microsoft House
意大利微软总部

微软公司作为全球最大的软件公司，一直是新技术变革的领导者。微软公司为各种计算机安装设备驱动程序提供一系列的软件产品开发、制造、授权和支持，是世界PC机软件开发的先导。

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日程安排

线下项目周期为14天，开设时间为2023.7.24-8.6，下面为参考行程。**具体安排因航班/签证排期等可能会有调整，但是课时总数、活动安排总数等一致。**

参考行程							
Time	Day1	Day2	Day3	Day4	Day5	Day6	Day7
08:00-09:00		早餐	早餐	早餐	早餐		
09:00-12:00	抵达米兰&接机办理入住	开学典礼&核心课程	核心课程	核心课程	核心辅导课	企业机构参访	企业机构参访
12:00-13:00		午餐	午餐	午餐	午餐		
13:00-17:00		破冰活动&熟悉周边环境	校园参访	实验室参访	核心课程&实验室参访		
17:00-20:00			小组实践课程	小组实践课程			

Schedule Week 1

Time	Day8	Day9	Day10	Day11	Day12	Day13	Day14
08:00-09:00	早餐	早餐	早餐	早餐	早餐	早餐	早餐
09:00-12:00	核心课程	核心课程	核心课程	核心课程	实验室项目实践 & 个人实践项目展示	项目结业仪式启程回国	到达国内
12:00-13:00	午餐	午餐	午餐	午餐			
13:00-17::00	核心课程	核心课程	核心课程	小组研讨课			
17:00-20:00	小组实践课程	文化活动	学院晚餐 & 文化活动	实验室参访			

Schedule Week 2

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申请须知

申请条件

1. 全日制在读本科生、研究生;

2. 具备微积分、电子信息、计算机科学技术等基础课程;

3. 具备较强的英语语言沟通能力，雅思不低于6.0，或托福不低于80，或通过英语四级考试，不能提供英语成绩的，需要参加英语口语测试。

项目费用

1. 项目费用：3950 EUR/人，包括课程、文化活动、机构探访、住宿、餐饮、当地通勤及接送机、项目服务管理费用及保险费用，不包含签证服务费和往返机票，明细如下：

课程费用	・专业核心课程费用； ・Workshops费用; ・教学课件、书籍、资料费用； ・教学场地相关费用； ・各类专业设计软件版权使用费用； ・助教费用。	保险	・财产损失保险(100 万美金保额); ・个人境外旅行意外保险(约200万人民币保额);。

住宿与活动费用

1. 食、住、行服务:
・部分餐饮;
・住宿费用;
・接送机送机费用，当地每日通勤交通费用。

2. 文化实践及参访费用:
・全程2-4个机构探访费用；
・全程6-10个文化体验探访费用；
・Panels组织费用。

3. 生活服务费用：
・大学区域及房间网络服务;
・First-Aid 紧急治疗包和支援服务;
・当地医院医疗服务。

4. 项目管理费用:
・项目方管理费用;
・外方院校管理费用。

申请方式

1. 扫描下方二维码，填写申请信息；

2. 如有问题，可在线咨询Cindy老师（微信：TBStudy11）。

项目申请　　　　　咨询顾问：Cindy