Summer School/ Workshop/ Lectures/ Bootcamps on "Integrating Artificial Intelligence in the Building Sector"

Program Overview and Timing

Politecnico di Milano's CIB student chapter has organized a series of events on "Integrating Artificial Intelligence in the Building Sector" as promised in its winning proposal for the Sebestyen Future Leaders award. These events include a) a summer school focused on "Machine learning for building performance analysis.", which took place as a part of EC3 summer school in Crete, b) a lecture series on "AI in Construction", which took place in 3 online sessions, and c) a Bootcamp series on "Machine Learning for Building Energy Analysis, which took place in 3 online sessions. These events covered the 18-hour commitment for content creation in the proposal. The detailed information on the timing of each session can be found in the table below:

Event	Sub-event	Date	Duration
Session on "Machine learning for building performance analysis." In Ec3 Summer School	Introductory Presentations	7 July, 2023	3 hours
	Hands-on Exercises	7 July, 2023	3 hours
"AI in Construction" Lecture Series	Lecture 1: Generative Models for Construction and Facility Management	11 September, 2023	2 hours
	Lecture 2: Computer Vision and Image Processing in Construction Sector	30 October, 2023	2 hours
	Lecture 3: AI and Generative Design methods in Construction	21 November 2023	2 hours
Bootcamp Series on "Machine Learning for Building Energy Analysis"	Session 1: Data Cleaning and Preprocessing for Energy Databases	11 October, 2023	2 hours
	Session 2: Building Stock Clustering based on Energy Measure	18 October, 2023	2 hours
	Session 3: Developing Predictive Energy Models using Machine Learning	25 October, 2023	2 hours
Total Hours			**18 hours**

Program Participants

A total of people participated in the event organized by our CIB chapter, which indicates a significant interest in the topic and delivery format from the target audience. The participants were mainly from leading universities and companies, most of which were not CIB members (less than 10%). This shows great potential for including more people into CIB ECR or professional networks if interesting and interactive programs are developed, and the correct audience is targeted. The communication channels were Politecnico di Milano's pull email list of PhD students, CIB newsletters and website, and LinkedIn. The number of participants in each session can be found in the table below, and the full list of participants for each session will be sent to you through email.

Event	Sub-event	Number of Registrations	Number of Participants
Session on "Machine learning for building performance analysis." In Ec3 Summer School		14	14
"AI in Construction" Lecture Series	Lecture 1: Generative Models for Construction and Facility Management	131	59
	Lecture 2: Computer Vision and Image Processing in Construction Sector	50	24
	Lecture 3: AI and Generative Design methods in Construction	86	41
Bootcamp Series on "Machine Learning for Building Energy Analysis"		81	50
Total Number of Participants		**362**	**188**

Program Contribution and Collaborations

This program contributed to benefitting from the already existing cumulative knowledge and expertise of the CIB network, specifically the W078 commission, to educate researchers and professionals in the field and create a more intelligent and sustainable construction industry and built environment. The delivered events provided professionals and researchers in the Architecture, Engineering, and Construction (AEC) industry with a comprehensive understanding of how AI can be applied in their field to increase efficiency, reduce costs, improve outcomes, automate and optimize processes, and reduce risks. Hence, practitioners can choose the proper AI solution to solve the problems, make informed decisions, and increase productivity in their firms.

During the different sessions, we collaborated with leading associations, like the European Council of Computing in Construction (EC3), leading Professors and researchers from ETH Zurich, University of Illinois Urbana Champaign, Israel Technical University, and Politecnico di Milano, and professionals from renowned firms such as Oracle, PWC, and Populous as keynote speakers. The knowledge and expertise shared during the lecture series by the keynote speakers were highly insightful and covered a plethora of topics and applications in the AI domain, which were areas of interest for ECRs and practitioners in the field. The boot camp series and the summer school provided an unparalleled opportunity to apply the theoretical knowledge and potentials of AI into practice and follow problem-driven exercises to deliver technical and optimal solutions to the problems in construction projects, which mainly targeted students, researchers, and practitioners in the field. Therefore, the delivered events targeted a wide range of audience and contributed to increasing both theoretical and practical knowledge in the construction sector.

Finally, the delivered events used the existing knowledge and experience in the CIB professional network to engage them within a **GLOBAL COLLABORATION** for the common and fruitful purpose of using AI to improve and digitalize the AEC sector for a better, safer, and more sustainable life for **PEOPLE AND THE PLANET** and share their knowledge and experience to the younger generation, the **FUTURES**. These are the main CIB Vistas pillars we aimed to follow and succeeded.

Project Budget

No.	Description	Amount (€)
01	Travel cost to Crete to deliver the EC3 summer school	500
02	Poster design, graphical works, and social media coordination	1000
03	Bootcamp sessions and Keynote speaches	1000
Total		2,500

Project Team

Polimi	Ania Khodabakhshian, Prof. Andrea Giovanni Mainini, Prof. Fulvio Re Cecconi