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AI applications in space missions and data analysis

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Abstract: Artificial intelligence (AI) is one of the most transformative technologies today, capable of revolutionizing complex processes in many fields, from industry to scientific research. In the space sector, AI is becoming increasingly important, with impacts both the processing chain of data generated by space missions and on the management of space missions themselves. For what concerns data analysis, AI has demonstrated relevant capabilities in extracting information from satellites' payloads, produced by both Earth observation or space exploration missions. In supporting satellite mission operations, techniques such as predictive analysis, detection anomaly, and generative AI techniques are also creating new opportunities for advanced automation and operation support. During the seminar, the main AI techniques currently used will be presented, highlighting how they are used in processing sensor data or in decision-making systems. The problems related to the availability of data and their confidentiality will also be presented, as well as the risks related to the difficulty in using AI algorithms in critical areas. Finally, the topics related to the necessary computing HW infrastructures on ground and the possibility to move in space part of the computation, highlighting the sustainability challenges, will be discussed.

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Grassano Room