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TOWARDS A ROBUST AND EXPLAINABLE RISK-REWARD MULTI-OBJECTIVE DECISION
ARCHITECTURE**Abstract**

The use of automation is becoming a frequent practice across many industries, however, there is a reluctance to deploy it in the space industry due to the lack of trust in Artificial Intelligence (AI) decision-making. This low level of trust comes from two key difficulties with AI systems; confidence in the results, and the ability to understand how or why certain decisions were calculated. Providing explanations for automated decisions can work towards building confidence in the generated results, therefore the main focus of this paper is to develop decision-making module based on the principles of explainability.

In this paper, we present a Risk-reward multi-objective decision architecture, considering several conflicting actions, that dynamically changes preferences depending on user input. An additional module is added using Abstract Argumentation (AA) techniques to enable the system to analyze these inputs and determine it's feasibility. Further modules are developed to use reinforcement learning as single objective focus agents, due to their flexibility, after which the results are examined to determine the capabilities of the algorithms and consider the best areas for future investigation.