

IAF SPACE SYSTEMS SYMPOSIUM (D1)  
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ANALYSIS OF AI ALGORITHMS USED IN AUTONOMOUS NAVIGATION FOR MOBILE ROBOTS  
IN SPACE EXPLORATION**Abstract**

Mobile robots are an important aspect in space exploration since they allow for the mapping of unknown terrain, get to inaccessible or dangerous spaces and to gather information about the area. Therefore, it is needed that they are programmed with intelligent algorithms that improve their performance over time, allowing them to adapt to changing conditions and environments. Artificial Intelligence (AI) is widely used in mobile robotics to enhance the capabilities of robots and enable them to operate more efficiently and effectively. These algorithms can be used to solve the most common problems in mobile robotics such as mapping the environment, estimating the position and navigating from one place to another. This research is aimed to address one key application of AI in mobile robotics which is in navigation, where robots use neural networks to build maps of their environment and plan optimal routes to their destinations. AI can also be used to help mobile robots recognize and avoid obstacles, using computer vision algorithms to detect and classify objects in their surroundings. In this paper, some AI algorithms are reviewed on how they can expand a robot's navigation capability and make them more adaptable to changing environments or unexpected situations. Simultaneously, some computer vision algorithms are compared on how they improve a robot's object detection and avoidance.