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MITIGATING MARINE PLASTIC POLLUTION USING DEEP LEARNING

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**Abstract**

Marine plastic pollution is an escalating environmental concern, threatening marine biodiversity and ecosystem health across the globe. Traditional methods for detecting plastic waste in marine environments are often labor-intensive and time-consuming. To address this, our study proposes a novel approach that leverages underwater imagery and machine learning to automate the detection of plastic pollution. We utilized a diverse dataset of underwater images, which were pre-processed and classified into two categories: plastic and no plastic. Advanced image processing techniques, including feature extraction and enhancement, were applied to improve the clarity and quality of the images. Subsequently, machine learning algorithms were trained on the processed images to develop a model capable of accurately identifying the presence of plastic. Our model demonstrated high accuracy and reliability in distinguishing plastic from non-plastic objects in underwater settings. These findings are pivotal in advancing the development of automated tools for monitoring marine environments, offering a scalable solution to the challenge of plastic pollution detection. The implications of this research extend to environmental conservation efforts, providing a technological foundation for more effective and efficient management of marine ecosystems. By integrating state-of-the-art detection methods, our study contributes to the broader goal of mitigating the impact of plastic pollution on marine life. Continued exploration and refinement of these techniques are essential for enhancing their application in real-world scenarios and furthering our understanding of marine pollution dynamics.

**Keywords**: marine plastic pollution, underwater imagery, machine learning, environmental conservation, detection methods