

Nanomaterial in Robotics: Bridging the Gap Between Current Applications and Future Possibilities



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Abstract Nanomaterials in robotics have transformed precision medicine, photothermal therapy, imaging, and medical materials and devices. This review covers nanomaterials' current and future robotics applications. It also addresses nanomaterials in robotics research challenges and limitations. Nanotechnology is used to develop tiny robotic agents for surgery, therapy, imaging, and diagnosis. It also examines nanotechnology's role in metastatic cancer treatment and functional food development. This field has made progress, but research is still lacking. These include the lack of comprehensive studies on nanoparticles' environmental and health effects, the lack of effective methods for regulating nanoparticle release, and the need for a regulatory framework that takes nanomaterials' unique characteristics and potential hazards into account. The review identifies and examines literature gaps and suggests future research to fill them. Recognizing and addressing these issues can help nanomaterials and robotics reach their full potential.

Keywords Nanomaterial · Robotics · Nanotechnology · Trends · Challenges · Limitations

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