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| **Abstract:** |  |
| The growing concern over plastic waste and the environmental impact of conventional 3D printing materials has driven research into the use of recycled plastics, particularly Low-Density Polyethylene (LDPE) from plastic bottles, to produce 3D printing filament. This research explores the process of converting discarded plastic bottles into 3D printing filament through extrusion, utilizing Fused Deposition Modeling (FDM) technology. The study aims to create cost-effective, eco-friendly products while contributing to sustainability, reducing plastic waste, and offering new employment opportunities. Challenges such as maintaining consistent filament quality and managing the properties of recycled LDPE are discussed. Variations in the mechanical properties of LDPE, its flexibility, and melting temperature are explored, revealing both its potential and limitations for 3D printing. The research also emphasizes the importance of sorting, cleaning, and quality control during the filament production process. Despite obstacles such as contamination and market acceptance, ongoing advancements in LDPE recycling technologies promise to improve both the performance and environmental impact of 3D printing materials. This study underscores the transformative potential of recycled LDPE in the 3D printing industry, contributing to a circular economy and a more sustainable future. | |