3D robotic printing process of for public furniture using recycled material

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Abstract:
Robotized 3D printing in construction presents a formidable challenge due to the intricate nature of the construction environment and the diverse material properties required to fabricate modular objects, like public furniture, in varying shapes and sizes. Firstly, the construction environment is inherently complex, characterized by dynamic conditions such as uneven terrain, limited access, and changing weather conditions. Robots operating within such environments must navigate these challenges autonomously, requiring sophisticated sensing and decision-making capabilities to adapt to unforeseen obstacles and uncertainties.

Secondly, the material properties needed for 3D printing in construction are diverse and demanding. Unlike traditional manufacturing processes, where materials are often homogenous and predictable, construction materials vary widely in composition, strength, and behavior. This necessitates the development of specialized printing techniques and material formulations capable of accommodating these variations while maintaining structural integrity and quality.

Moreover, the ability to fabricate modular objects in various shapes adds another layer of complexity to the printing process. Unlike standardized building components, such as bricks or beams, modular furniture pieces may have intricate geometries and complex internal structures. This requires robots to precisely deposit material layer by layer, while ensuring dimensional accuracy and surface finish to meet design specifications. In summary, robotized 3D printing in construction is a challenging endeavor that requires addressing the complexities of the construction environment and developing innovative solutions to accommodate diverse material properties and fabricate modular objects with precision and efficiency.