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| **Abstract:** |  |
| This study presents a comprehensive study on the development and construction of a low-cost CNC router tailored to the context of Bangladesh. It addresses the need for affordable precision manufacturing technologies in the region, particularly for small-scale businesses and educational institutions. The study highlights the design, optimization, and implementation of a CNC router machine, considering the specific requirements and constraints of the local industry. Initially, a CAD model of the CNC routing machine was developed to visually represent the project and set it as the target. By the end of the project, a small-scale wooden prototype was successfully created, capable of cutting various materials ranging from wood to steel to acrylic, while remaining easily portable. The instruments and electronics used in this project were all industrial grade, including a Daedalus 3018 CNC Router Spindle and a 5-axis Mach3 controller board, allowing the project to scale up and meet larger industrial needs while maintaining a low budget for easier accessibility. This project aims to enhance access to advanced manufacturing technologies, foster innovation, and contribute to the socio-economic development of Bangladesh. The findings and insights presented in this thesis offer valuable guidance for future endeavors in the field of affordable CNC router development in similar contexts. | |