

Design and Development of Self Balancing Two Wheeler

Vilas V Khasnis, K Himanth Raj, Uday Raj Kumar, Monish V, Kallamadi Murali Krishna

Department of Electronics and Communication Engineering
Ballari Institute of Technology and Management, Ballari, India

Abstract: *The Self-balancing robots represent a fascinating intersection of technology and practical application. This project aims to design and develop a self-balancing two-wheeler robot capable of maintaining stability and balance autonomously. Drawing inspiration from principles observed in human balance and locomotion, the robot employs a combination of sensors, actuators, and control algorithms to achieve its objective. The project begins with an in-depth literature survey, exploring existing research and methodologies in the field of self-balancing robotics. Leveraging insights from key publications, the project outlines fundamental principles, sensor fusion techniques, advanced control methodologies, and challenges inherent in self-balancing robot design. Key components including an Arduino Uno board, accelerometers, gyroscopes, DC motors, batteries, and optional reaction wheels are carefully selected and integrated into the robot's hardware architecture. A systematic approach to hardware selection, assembly, sensor integration, microcontroller programming, and motor control ensures a coherent and functional design. Throughout the development process, emphasis is placed on rigorous testing, calibration, and iterative improvement. The robot is subjected to various environmental conditions and scenarios to validate its stability and performance. Calibration procedures refine sensor accuracy and control algorithms, enhancing the robot's ability to maintain balance under dynamic conditions. The project culminates in the creation of a comprehensive documentation package, detailing schematics, code explanations, assembly instructions, and testing methodologies. Additionally, a presentation showcases the robot's functionality, design rationale, and potential applications. By meticulously following the outlined steps and leveraging insights from existing research, this project aims to contribute to the advancement of self-balancing robotics and serve as a foundation for future exploration and innovation in this exciting field.*

Keywords: Self-balancing robots