Glide: A Portable Braille Converter Using Mechanical Miniature Pistons

Gaurav Nyaupane
Tribhuvan University
gaurav.74742@memc.tu.edu.np

February 2022

Abstract

Glide is a compact, handheld assistive device aimed at empowering visually impaired individuals to read standard printed text through real-time Braille conversion. Roughly the size of a traditional eraser, Glide is designed to be manually glided over the lines of printed material. It uses a miniature camera to capture the text beneath it and processes the image using Optical Character Recognition (OCR) via OpenCV. The recognized characters are then dynamically translated into Braille patterns. To convey these patterns, the device employs an array of precisely engineered mechanical miniature pistons on its top surface. Each piston acts as a single Braille dot, rising and retracting in real time to form the corresponding tactile configuration. This approach ensures accurate, refreshable Braille feedback as the user moves across the page. The system is controlled by a microcontroller, optimizing performance while maintaining portability.