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Character Recognition for Visually Impaired People Using OCR and Raspberry Pi

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Abstract: In a world increasingly reliant on textual information, access to printed content remains a challenge for visually impaired individuals. This paper presents the design and implementation of a cost-effective, portable smart assistive device using Raspberry Pi, camera module, Optical Character Recognition (OCR), and Text-to-Speech (TTS) conversion to empower blind and low-vision users. The system captures printed text via a camera, processes it using Tesseract OCR, and outputs speech using eSpeak or gTTS. Designed for offline use with minimal interaction, the system provides a robust solution for reading printed documents in real-time and under varying lighting conditions. Extensive testing confirms the device's utility in daily activities, education, and public engagement. The project aims to provide real-time, offline, and easy-to-use access to textual information, promoting independence and inclusivity for the visually impaired community.

Keywords: OCR, Raspberry Pi, Tesseract, Assistive Technology, Visual Impairment, eSpeak, gTTS, Python, Text-to-Speech





