AN EFFICIENT OPTICAL RECOGNITION ALGORITHM FOR HAND-PUNCHED TAMIL BRAILLE

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A Dissertation Submitted in Partial Fulfillment for the Requirement for Master of Science Degree in Advanced Software Engineering

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in collaboration with University of Westminster, UK

2021

Abstract

Inclusive education provides equal opportunities for everybody to follow their passion in life. Vision impairment is a disability that historically prevented students from engaging in academics. However, advancements in technology and especially in the field of computer vision and image processing have created a level playing field for those students to follow the dreams of their lives. Many academic institutions today provide courses for vision impaired students as well.

However, there is a unique challenge that still hasn't been overcome for vision impaired students, that negatively affects them. These students use the popular braille writing system in their assignments, projects and exams. The text that is produced by these students are first sent to a translator who has the knowledge to translate braille writing to natural language text. Once the translation is done, then the text is forwarded to the relevant academic stuff for evaluation. This introduces severe delays and errors in the process. Optical braille recognition refers to all the technology that can collectively help solve this unique problem and avoid the step of a manual translation process by introducing an automatic braille translator to various languages. Students in Sri Lanka face this unique challenge for the Tamil language. Also most Sri Lankan education institutes widely use hand-punched braille for most of their work and use braille typewriters in a limited scope. Therefore, it is important to solve the problem of braille recognition for hand-punched braille which is even more challenging than embossed braille, because standard braille measurements don't hold true.

The system that is proposed through this thesis introduces a unique algorithm for braille line detection and word detection for hand-punched braille documents. Such a system will be instrumental in creating a level playing field for visually challenged students in Sri Lanka. Such systems have the potential of revolutionizing the attitude of the educationists towards the bold act of including these students into the mainstream curriculums which encourages inclusive education.

Key Words: Vision impairment, Braille, Optical Braille Recognition, Hand-Punched Braille, Embossed Braille