UNIVERSITI TEKNIKAL MALAYSIA MELAKA

OPTICAL CHARACTER RECOGNITION USING TEMPLATE MATCHING

This report is submitted in accordance with the requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor of Electronic Engineering Technology (Telecommunication) with Honours.

by

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I hereby, declared this report entitled OPTICAL CHARACTER RECOGNITION USING TEMPLATE MATCHING is the results of my own research except as cited in references.

Signature: ……

Author : MAS NASABILLAH BINTI MD NOOR

Date: 16 / 12 / 2019

APPROVAL

This report is submitted to the Faculty of Electrical and Electronic Engineering of Universiti Teknikal Malaysia Melaka (UTeM) as a partial fulfilment of the requirements for the degree of Bachelor of Electronic Engineering Technology (Telecommunication) with Honours. The member of the supervisory is as follow:

Signature: …….

Supervisor : TS. DR. ROSTAM AFFENDI BIN HAMZAH

ABSTRAK

Projek ini dapat memberi manfaat kepada Fakulti Teknologi Kejuteraan Elektrik dan Elektronik (FTKEE), UTeM. Tajuk bagi projek ini ialah mengenal pasti perkataan mengunakan templat yang sepadan. Sistem ini diubah suai bagi memenuhi keperluan penguna. Oleh itu, projek ini bertujuan untuk membina sistem yang dapat mengesan perkataan dalam dokumen yang diimbas. Kaedah ini dapat dikemaskini melalui projek ini dengan mengunakan templat yang sepadan tetapi ia hendaklah menghubungkan dengan mengunakan rangkaian Matlab. Penggunaan padanan templat boleh meningkatkan kualiti pengecaman perkataan disamping mencapai prestasi pengecaman yang baik. Dengan menggunakan perisian ini, ia membantu pengguna untuk membaca apa-apa jenis dokumen yang diimbas dengan jelas tanpa sebarang kabur.

ABSTRACT

This project is useful for the Faculty of Technology in Electric and Electronic (FTKEE), UTeM. The project title is optical character recognition using template matching. The system is developed to meet the community needs. Therefore, this project is intended to develop a system that is able to detect text in the scanned document. The method used in completing this project is template matching but it is implemented using MATLAB software. The use of template matching can improve the quality of recognition while achieving good performance. By using this software, it helps user to read any types of scanned documents clearly without any blurry.

DEDICATION

ALHAMDULILLAH.
TO MY PARENTS,
PUAN NOLEE BINTI MOHD MAKSOM
AND MY LATE FATHER MD NOOR BIN SALEH
FOR EVERYTHING.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

OCR	Optical Character Recognition
GAN	Generative Adversarial Network
MSER	Maximally Stable Extreme Regions

CHAPTER 1

INTRODUCTION

1.0 Project Background

Optical Character Recognition (OCR) is method of identifying text or sentences from scanned documents or handwritten. From this method, the experimental results indicate that it increased precision in optical recognition for example handwritten recognition (N. Ventaka Rao et al 2016). OCR systems identify character from scanned documents that have been scanned using scanner and inverted them into ASCII data. OCR has three stages which are document scanning process, recognition process and verifying process. At the first stage, the handwritten or printed documents were scan using a scanner. The reliability of the document scanned depends on the scanner. A high-speed and colour value scanner is therefore beneficial. The recognition method involves a few complex algorithms and previous loaded templates and reference books that are verified through the document characters and the consistent ASCII editable machine characters. Human intervention operates the identification either periodically or sequentially (Pranob K Charles et al 2012).

To recognize from any text multimedia such as image, audio and video, optical character recognition can be enforced. Automatic recognition of multimedia is based on the implementation for computer vision and variation recognition. In order to fix the image problem, we may use image processing, character positioning, character segmentation, neural network for text recognition (Karishma Tyagi et al 2014).

1.1 Problem Statement

In recent years, many applications need offline handwriting systems, which include mail categorization, bank processing, document reading and postal address recognition, bank checking. Every process needs to be done by using computer such as working under postal service. Every mail that have been received need to be decoded and

delivered every single day with amount something like 30 million handwritten envelopes. The challenges are when the envelope has to be scanned and the document is not clear after the scanning process has been done. Unless the document is clear, the computer system cannot read it accurately.

Having a text recognition can help to solve the problem because it is a device that everyone can used. It also can make things easier for everyone that needs this device in their daily life.

1.2 Objective

The purpose of this project is:

1. To recognize the characters in image format.
2. To improve the quality of text recognition system using optical character recognition.
3. To study the performance of optical character recognition.

1.3 Scope

The scope of this project is to detect text or character in the scanned document. Besides that, human can communicate with computer using text recognition. It also helps everyone to choose the best technique for the accuracy of the system and make it easier. In order to do that, there's some process need to be followed which include image acquisition, threshold, segmentation, feature extraction and lastly, post processing. With all of this procedure, the scanned document can be read accurately.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

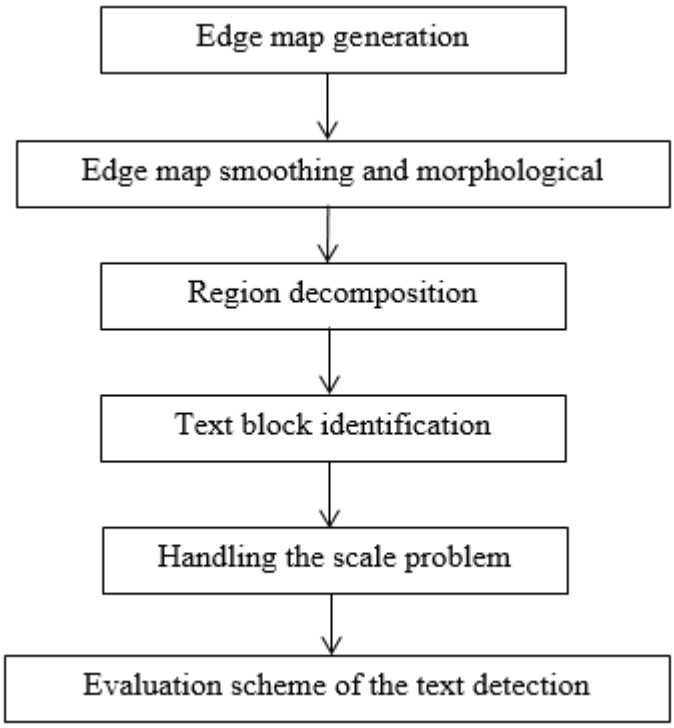
Throughout this segment, the literature reviews of the related project will be presented and elaborated. This chapter also will cover about the study and idea based on the preceding as well as the concept to accomplish this project. The method use for the task will be explaining every section in details.

2.1 Past Related Project Research

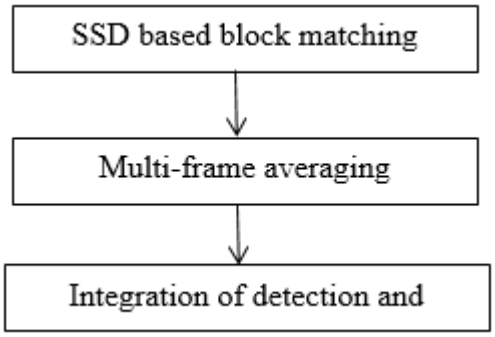
2.1.1 A Video Text Detection and Recognition System

This paper is written by Jie Xi, Xian-Sheng Hua, Xiang-Rong Chen, Liu Wenyin, Hong-Jiang Zhang (2015) proposed a new method that eliminate text information from news videos. First, a technique that combines text detection and text tracking is existing to detect text areas in key frames (images) along with a scheme to calculate this approach's performance. Next process is increase the quality of the spotted text blocks by multi-frame averaging to obtain better recognition results. Lastly, we apply an adaptive thresholding technique to binary text blocks and use an off-the-shelf OCR module to recognize the text. The proposed system's detection and recognition rate is 94.7% and 67.5% respectively.

The first method is text detection. There are 6 steps for text detection.



Second method is text tracking. Text tracking consists 3 steps.



The third method is binarization and recognition. There's 3 step in this method.

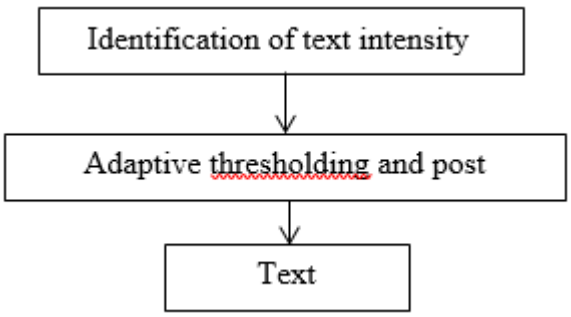


Table 2.1: The final detection of text blocks.

	Process smooth out and original formed a region.
	Region decomposition generates candidate text blocks.
	Description of text blocks.