SVD Based Document Image Recognition System for Vehicle Identification

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ASEAN IVO Forum 2020

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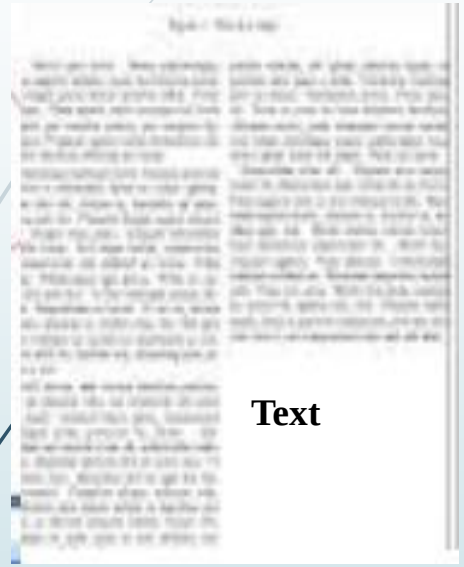
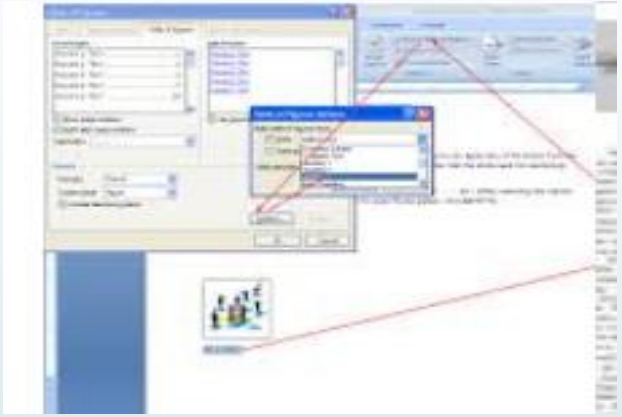
Introduction

- Document Images



Text

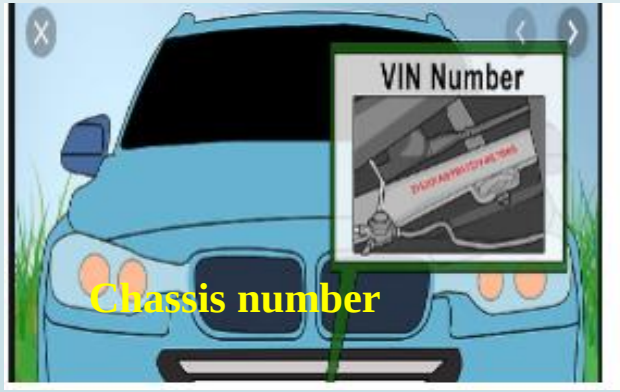


Figure

Signature

Car license plate

Image



Document Image Recognition

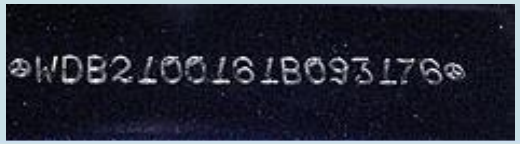
Document Image **Recognition**

- Information retrieving
- Searching
- Editing
- Reporting of image text

Vehicle Identification

- Regular administrative tasks such as
  - License registration,
  - Vehicle valuation assessment,
  - Traffic violation cases

Car license plate Recognition



VIN Number Classification

Vehicle Identification

Car license plate Recognition

- Religious Personal
- Hire Vehicle
- Health and Safety Executive
- Tourist Vehicle
- Private vehicle
- Ambassador

VIN Number Classification

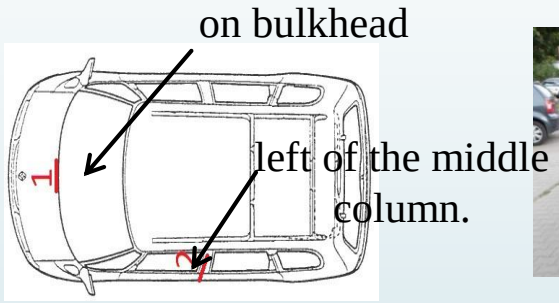
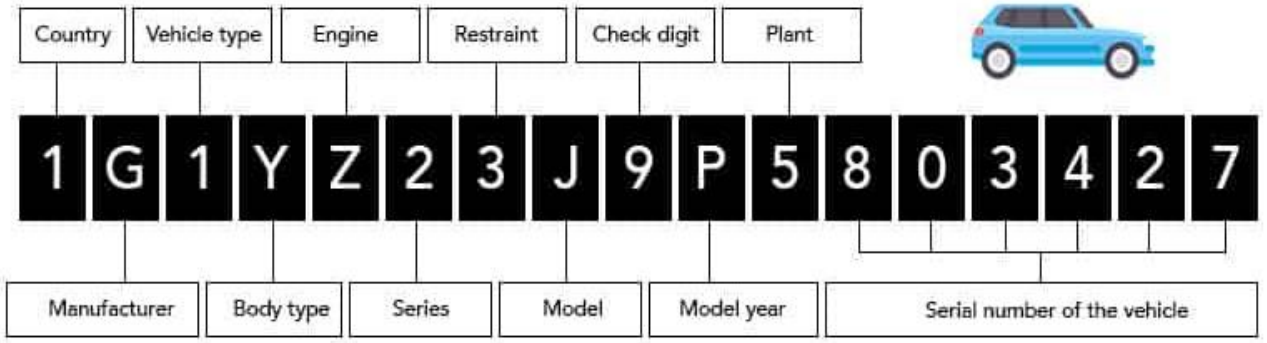


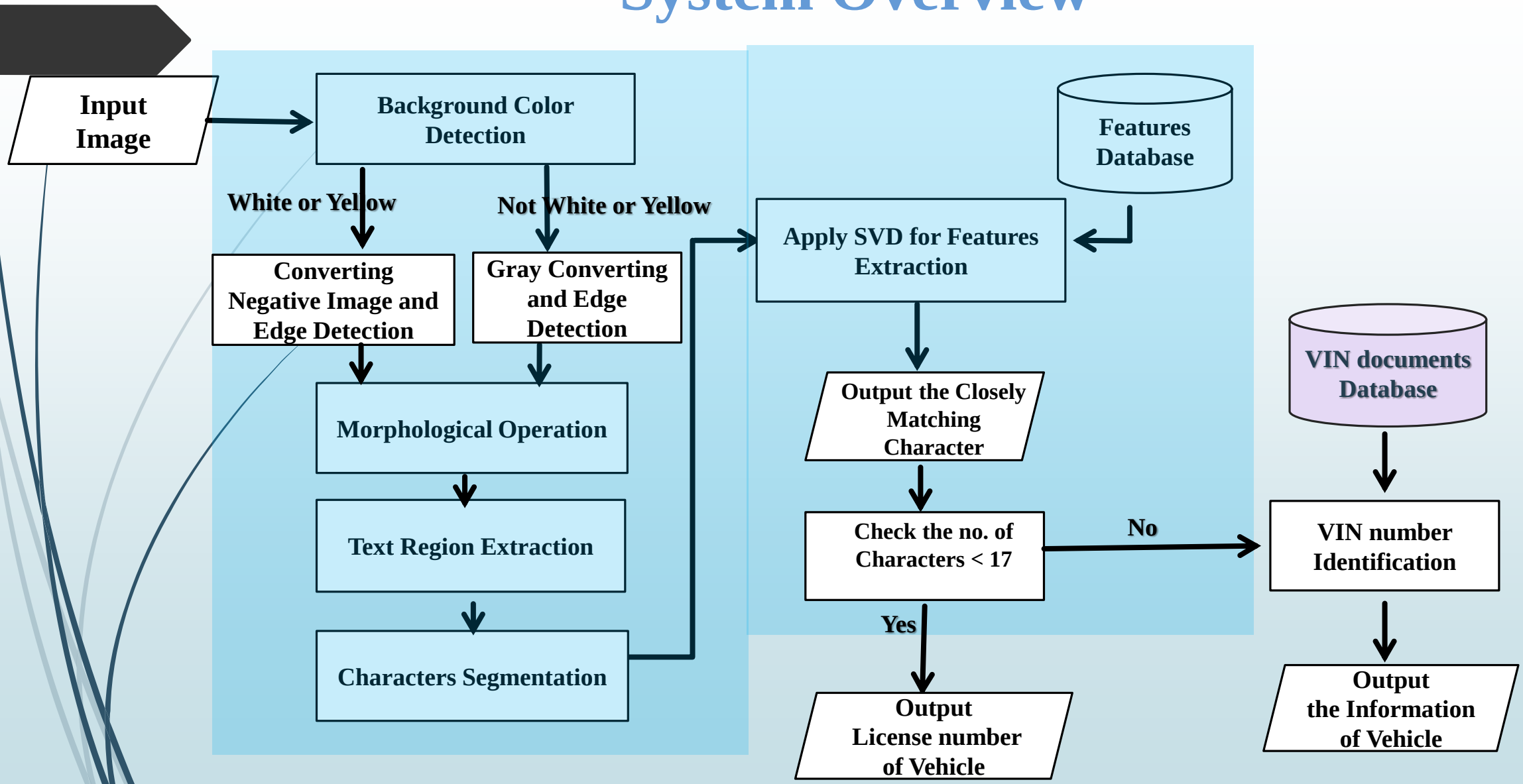
Fig. Locations of VIN Number



Objectives

- To improve the vehicle registration plates recognition result and VIN classification result.
- To generate the Chassis image database.
- To create the image database by the several types of vehicle registration plates of Myanmar.
- To implement the automatic Vehicle identification Model.

System Overview

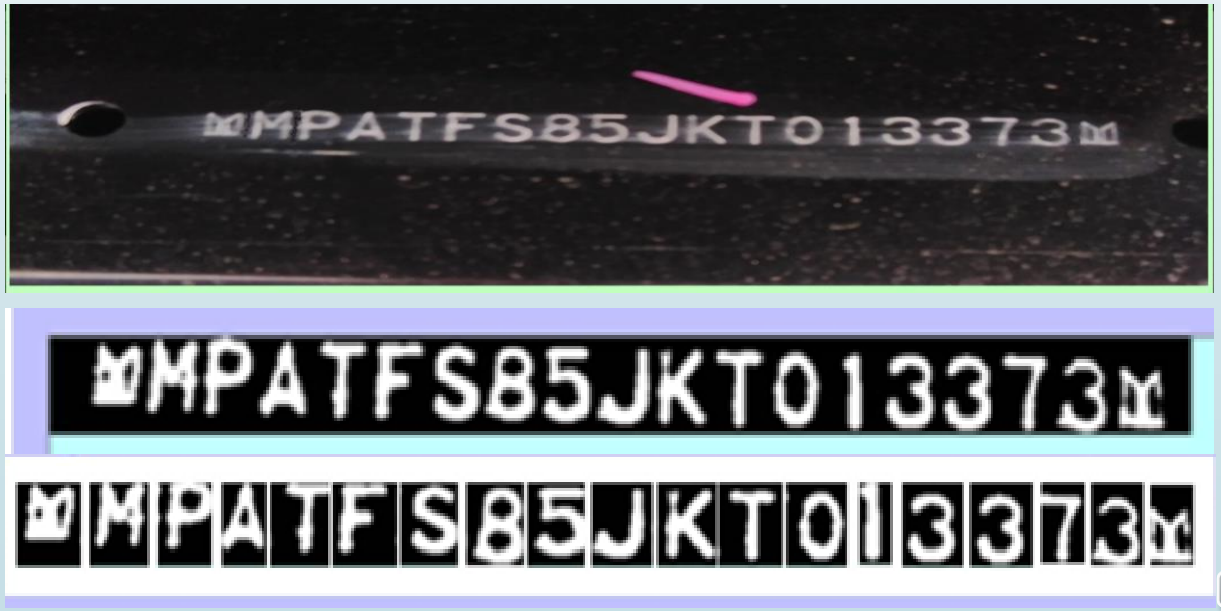


System Implementation

Algorithm of Character Segmentation

1. Binarization to the input image.
2. Created objects count (White Pixel) histogram along the width of the image.
3. Find the starting and ending points of each adjacent nonzero area.
4. Crop each character according to the result of step(3).
5. Temporary save these cropped character images in local disk for feature calculation process.

License number of Vehicle



VIN number of Vehicle

Feature Matching and Classification

- The operation procedure is as follow:

1. Create data matrix, say ‘A’
2. Apply SVD, $A = U\sum V^T$
3. Compute feature descriptor matrix, $H = \sum V^T$
4. Given a test vector ‘a’ and compute $a^T U$
5. Repeat $a^T U$ to match the dimension $H = \sum V^T$
6. Find the minimum of $\| remap\ (\ a^T U, size(H, 2)) - H) \|$ to get the desired class.

Experimental Result

Fig.(a). Illustration of the Character Recognition (License plate)

Fig.(b). Illustration of the Character Recognition (VIN)

Table.1. VIN number information

VIN Number = MPATFS85JKT013373		
1	Brand	ISUZU
2	Vehicle Type	Double Cab
3	Model Year	2019
4	Country of Origin	Thailand

Table.2. Accuracy Rate

	Test Item	Accuracy
1	License Plate	99.6%
2	VIN	98.7%

Conclusion

- A vehicle identification system is developed for the need of actual requirement in Myanmar.
- According to the implementation and results, we can say that the system can truly crop the interested text area and segmented each character.
- This proposed model applied to both vehicle number recognition and VIN number identification.
- Furthermore, car information management system can easily be added for more information about inspected vehicle.
- Currently, recognition process is only available in offline. The real time vehicle examination and identification systems should be done by using available the network and web camera in future.

Thank You

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