

SONGKET RECOGNITION USING IMAGE PROCESSING (SRUIP)

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## **ABSTRACT**

In Malaysia, songket is one of the commencements for Malay culture through their wear. Since it has been so long used, it is also describe as one of the traditional art in our country and also becomes a traditional hand woven cloth of Malay. Thus, Songket Recognition Using Image Processing (SRUIP) is developed to recognize each type of songket through image processing technique. Each type of the songket will undergoes some processes and the image will be train using neural network. The database then is used to store all data and information about each songket in database first. The purpose of SRUIP developed is to distinguish between two differences classes of the songket image; whether it comes from ‘songket corak jalur’ or ‘songket bunga dalam’. This system is used computer system to analyze and interprets images that correspondent to human eye and mind. The similarity of image is compared through template matching process and the data was trained using neural network. Results of the experiment showed that the detection of ‘songket bunga dalam’ has higher successful rate compared to ‘songket corak jalur’.

## ABSTRAK

Di Malaysia, songket adalah salah satu lambang bagi budaya Melayu melalui cara pemakaian mereka. Oleh kerana songket telah begitu lama digunakan, ia juga menggambarkan salah satu seni tradisional di negara kita dan juga menjadi pakaian tradisi bagi orang Melayu. Oleh itu, Sistem Mengenalpasti Songket menggunakan Pemprosesan Imej (SRUIP) dibangunkan untuk mengenalpasti setiap jenis songket melalui teknik pemprosesan imej. Setiap jenis kain songket menjalani beberapa proses dan data kepada imej akan dilatih menggunakan rangkaian neural. Pangkalan data ini kemudian digunakan untuk menyimpan semua data dan maklumat tentang setiap songket dalam pangkalan data yang telah dibina. Tujuan SRUIP dibangunkan adalah untuk membezakan antara dua perbezaan kelas imej songket; sama ada ia datang dari songket corak jalur atau songket bunga dalam. Masalah mengenai sistem pengkelasan dengan menggunakan Sistem Visualisasi Manusia juga diselesaikan. Persamaan imej dibandingkan melalui proses template sepadan dan data telah dilatih menggunakan rangkaian neural. Keputusan hasil ujian menunjukkan bahawa pengesanan songket bunga dalam mempunyai kadar yang lebih tinggi peratusan berjaya berbanding songket corak jalur.

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## CHAPTER 1

### INTRODUCTION

This chapter briefly discuss about the overview of this research. It contains five sections. The first section is about introduction and followed by the problem statement. Next is the objective where the project's goal is determined. After that are the scopes of the system where it tells what process involve in the system. Finally is the thesis organization which briefly describes the structure of this thesis.

#### 1.1 Background

Malaysia is a multi-ethnic, multicultural and also multilingual society. Within Malaysian society, there is a Malay culture, a Chinese culture, an Indian culture, a Eurasian culture, along with the cultures of the indigenous groups of the peninsula and north Borneo (Advameg Inc., 2010). In Malaysia, songket is one of the commencements for Malay culture through their wear. Since it has been so long used, it is also describe as one of the traditional art in our country. During the history time, it is worn by aristocracy like royal family and vassal. This is because at that time, the woven fabric fineness and songket pattern with complexity motive illustrates the rank and high position of enlarger. Plus, it is hand woven either silk or cotton, and intricately patterned with gold or silver threads. Thus, it becomes a luxury product traditionally worn during ceremonial occasions as shoulder cloths, sarong and also as head ties. Songket also becomes the resemblance and pride of the Malay's rich cultural heritage.

Songket Recognition Using Image Processing (SRUIP) is a system which recognizes each type of songket through image processing. Each type of the songket will undergoes some processes and the image will be train using neural network. The database then is used to store all data and information about each songket in database first.

Then, the neural network will be connected to the Matlab GUI to recognize the input image thus print out all the related information about the songket. For instance like name, pattern and other characteristics.

## **1.2 Problem Statement**

Songket is quite popular nowadays because it comes out with new design and pattern. As the increase of the songket request in market, of course a lot of the songket makers are needed. Songket makers which have better knowledge about songket than others usually keep most of their knowledge about songket in terms of book. Comparing the manual and automatic process of categorizing the songket, manual process requires a lot of human power. Other than that, the stored information in the book is not so good rather than stored in digital form. This is because the information of the songket can be preserves for the future. So, this system will help the Malaysian youth like teenagers to know about some information of songket based on types of the songket. Plus, there also not much information about the songket that can be getting through the internet and sometimes if we search for one type of songket through the internet, the other type of songket also will come out together. So, this will make the user of the internet have some confusion during seek information from the internet.

## **1.3 Objectives**

There are some objectives of this research:

- i. To develop an information system to recognize each details and information of Malaysian songket by having the image of the songket.
- ii. To store all the data in the form of digital.

## 1.4 Scopes

The scopes of this project are:

- i. This system is an information system which related to songket only.
- ii. The system is developing to recognize each details and information of songket such as motif and pattern.
- iii. Each data of songket will be recognize using image as data input to the system and the image then will be undergoes image filtering and image enhancement process in Matlab.
- iv. The data from input image then will be saved in the database. The saved data includes image of the songket, text-info that related to the songket such as description of the songket and also the profile of the songket. All the data will be stored in form of digital. After that, the data is train using neural network.
- v. Then, after training data with the neural network, the system can be testing.
- vi. The image of the songket will be browse and select from file. After that, when the process button is clicked, the image will undergoes a few process.
- vii. Then, the information for the songket will be display out.
- viii. The process can be repeated again with inserting another songket image.
- ix. The scope of this system is for Malaysian citizen especially youth.

## 1.5 Thesis Organization

Thesis organization will be explaining about the chapter that we need to cover in our thesis. The explanation is stated as below.

Chapter 1: This chapter is about Introduction. Introduction briefly describes and introduces the system to user. This system preliminary shows the basic concept of the system, problem statements of the system, objectives, scopes, and how the report is organized.

Chapter 2: Literature Review depicts the manual systems and the existing systems as the case studies of the project. This chapter also reviews the technique, method, equipment, and technology that had been used in the case studies.

Chapter 3: Methodology discusses about the overall workflow in the development of the project. This chapter also discusses the method, technique or approach that has been used while designing and implementing the project.

Chapter 4: This chapter contains the detail of the implementation and describes the project implementation of the system of whole development of system are needed to implement.

Chapter 5: Discuss the result produced by the proposed methodology and discussion that are obtained from the data analysis, project constraint and future work suggestion. In project constraint, there are two parts that has been divided. There are development constraints and system constrain. The development constraint divided into four types which is the first is constructed system, the representational relationship, the nature of system and the process of construction.

Chapter 6: This chapter is about the conclusion of this study. It suggests the future direction in the light of the weaknesses observed in proposed methodology. It also proposes the better way that can be implements to the developed system in order to enhance it for the future.

## **CHAPTER II**

### **LITERATURE REVIEW**

This chapter briefly describes the review on existing techniques related with Songket Recognition using Image Processing that will be developed later. This chapter comprises four sections: The first section describes the components and terms that involved in this system while the second section describes the comprehensive review on technique and tools that will be used. The third section describes the comprehensive review on existing related systems. Next, the fourth section address the review on method, equipment, and technology previously used in the same domain.

#### **2.1 Songket.**

Siti Zainon Ismail (1987) stated that songket is traditional Malaysian woven fabric, which symbolizes refined Malay handicrafts [3]. Songket is a beautiful piece of traditional Malay fabric woven in silk or cotton yarns, using metallic threads to form songket motifs [1]. Songket word is derived from ‘sungkit’ word namely ‘menyungkit’ technique [2]. The existence of songket dates back a few hundred years ago with its origin believed to have started in India [23]. In the past time, only royalty such as sultans and kings traditionally wears it. Now, it is available for anyone to wear or use. However today, it is mostly worn as traditional Malay ceremonial costumes during royal installations, weddings, birth of a child and circumcision ceremonies, Malay festive occasions and formal state functions.



Furthermore, songket also is famous among the Malaysian community for example when people like students also wear this kind of clothes to the class and the workers wear this songket as clothing suit to the official events like dinner. Songket also have become the trend of events like certain fashion show where the model will display clothes from various types of songket design and colour. Plus, men also wear a type of cloth named 'sampin' which is also made from songket fabric during Friday prayers, wedding ceremony and also during Eid al-Fitr. For women, they mostly like to wear the songket as their changed cloth during their wedding day [25].

Recently, songket have also been transformed into apparel, fashion accessories such as handbags as well as home products such as place mats, bed sheets, cushions, table runners and gift items. Besides, songket is not only limited to the apparel on fashion show, fashion accessories and home products only but also have been use in decorating the cuff and collar of Malaysia Airlines (MAS) air steward's jacket. So, this is an example of incorporating songket into apparel. Plus, as time goes by time, songket also comes out with modern design and pattern to make it more attractive in market selling. So, there exist a good competition between songket selling and other material's selling.

Songket has its own unique structure. These structures make the songket looks different from the other type of clothes like 'batik' and others. Norwani Mohd. Nawawi (2002, p. 73) claimed that the structure of 'kain songket' consists of nine parts which are known as 'badan kain', 'kepala kain'/'petak kain', 'tepi kain'/'kaki kain', 'pengapit kepala kain', 'tanah kain', 'punca', 'pengapit badan kain', 'kaki punca' and 'kendik'[4]. But, there are five parts of the structure of 'kain songket' that are basically known which are shown in the table 2.1 below.

Table 2.1: The Structures of 'Kain Songket'.

Part Name	Description
a. 'Badan kain'	The body or the main part of the cloth
b. 'Kepala kain'/'Petak kain'	The panel of the cloth
c. 'Tepi kain'/'Kaki kain'	Border of the cloth
d. 'Pengapit kepala kain'	Side border of the panel
e. 'Tanah kain'	Background (refers to the colour)

The structures of kain Songket are easier to understand and also imagine by referring as depicted in the Figure 2.1 below (Norwani Mohd Nawawi, 2003), which follows the alphabet numbering in Table 2.1.

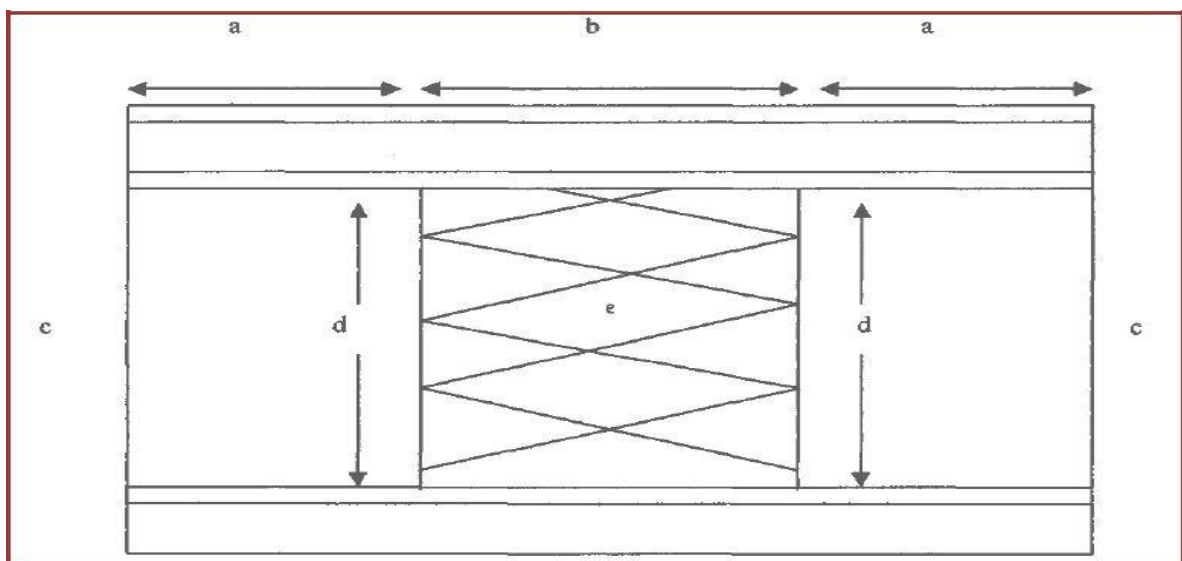


Figure 2.1: Structure of Kain Songket [5].

On the other hand, songket also have six main major types pattern of songket (Norwani Mohd Nawawi, 2003). These are one of the vital criteria in making the garments that are made from songket. Most of these criteria also will be the first thing that someone should know in order to become songket maker. This is because in producing the songket; there will have some rules in making it. Table 2.2 below is the list of six major pattern types of songket in form of table.

Table 2.2: Six Major Types of Songket Pattern.

Name of Pattern	Description's name
i. Songket bunga penuh	Overall or full-pattern.
ii. Songket bunga berterabur	Spotted or scattered pattern.
iii. Songket corak jalur	Vertical and horizontal stripe and border pattern.
iv. Songket tapak catur	Check.

v. Songket corak siku keluang	Chevron.
vi. Songket pucuk rebung	Bamboo shoot pattern.

Next is the motif of the songket. Songket motifs are the one of the elements or criteria in songket production. The word motif can be defined as a distinctive idea, especially a theme elaborated on in a piece of music, literature and others [6]. Plus, motif on the other hand is appearance or basic form in a design or composite. Motifs in songket usually comprises of different categories which are from flora, fauna, geometric, organic and food.

Moreover, tradition pattern have the motive distinctive and had certain names that characterized by our traditional. Example of Fauna motifs like chicken, chicken winglet, bird, scorpion, peacock / peacock's tail and seahorse while the example of flora are bamboo flower design, Red Coondoo, hibiscus and chevron. The example of food motif are like 'tepung talam', 'wajik' and 'putu' while the example for the object motif are like crown, ceremonial knife and flower pot but the common examples that are commonly heard are bamboo flower design, bamboo shoots, and water lily and also pick flower [7]. The pictures below show some of the common pattern of songket that are usually heard.

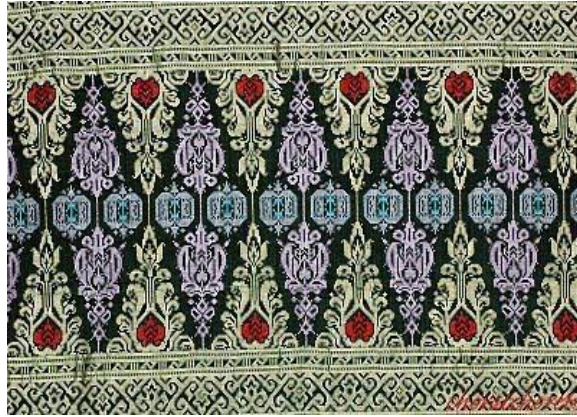


Figure 2.2: Bamboo shoot motif [8]

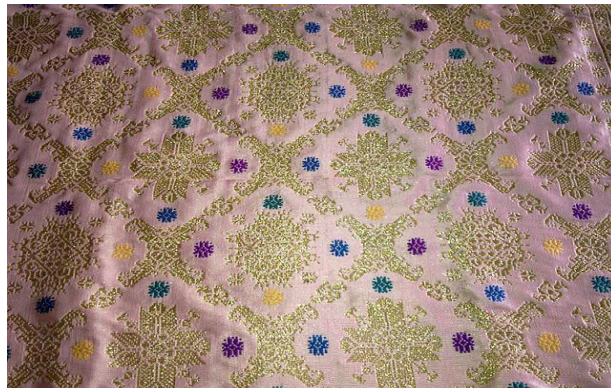


Figure 2.3: Water lily motif [9].

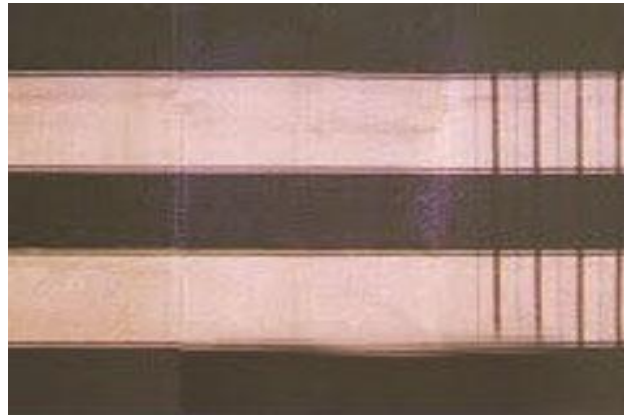


Figure 2.4: Stripe pattern motif.

Pahang is the one of the country in Malaysia that is popular with songket production. This is due to Pahang has long been known as one of most conservative states in Malaysia, where the ancient customs and traditions of the local Malays are still vividly alive [11]. While this means that Pahang ‘suffers’ from a dearth of hedonistic nightclubs and all night parties, for the more culturally inclined visitor it offers some of the most attractive insights into the country’s fast disappearing arts and as well as crafts traditions.

One of the most mesmerizing cultural attractions of the state is the Pahang Silk Weaving Centre, located in the quiet Cultural Village at Pulau Keladi, in the royal town of Pekan, located about half an hour away from Pahang’s state capital city of Kuantan. This place has become the public face of Pahang’s most prestigious cottage industry, as the bulk of the work is still done in the weavers homes. Plus in the same time, the place also becomes a museum when all the songket that have produced is stored and collection of each type of songket produced is being exhibited for tourist who came there.

The picture below show one of the Traditional Malay costumes that are made of songket in Pahang.



Figure 2.5: Baju Riau-Pahang (Baju Turki). This is a long gown styled dress, cut at the front with 7 or more buttons and worn with a sarong [13].

As mentioned before, the Pahang Silk Weaving Centre is located in Cultural Village at Pulau Keladi. Instead plays the roles as museums that exhibits collection of Songket, the place also become the Pahang Royal Weaving Skills Institute where is equipped educational facilities which include skills loom weaving hall, pre-weaving hall, lecture rooms, library, computer room, drawing room, gallery and hostels which can accommodate about 40 students in a one-time as well as administrative offices and training facilities. At the same time, they still used the manual system which is by having the book that contains the songket details. Below is some of the picture taken there that shows the piece of songket that comes from various types of motifs and patters. The piece of cloth becomes the sample/reference to produce another piece of songket.



Figure 2.6: Pattern named 'Beranak'.

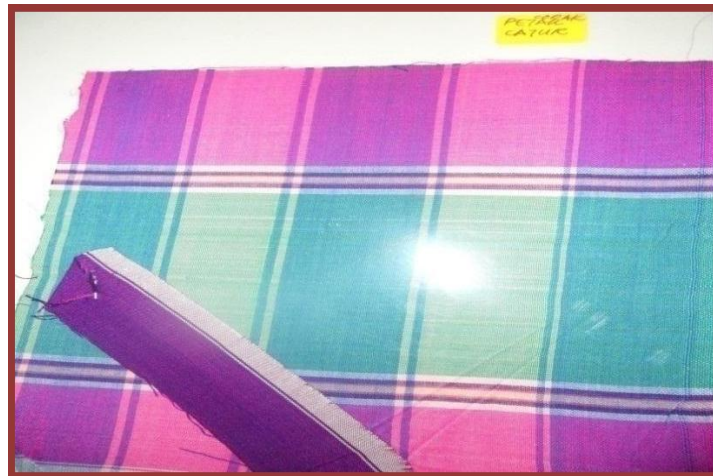


Figure 2.7: Chess Box Pattern.