



**UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

**DEVELOPMENT OF CONVEYOR TOWER LIGHT ALARM SIGNAL AND  
MONITORING SYSTEM IN FACTORY USING LABVIEW**

This report submitted in accordance with requirement of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor's Degree in Electronic Engineering Technology (Bachelor's Degree in Electronics Industry Technology with Honours)

by

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**TAJUK: DEVELOPMENT OF CONVEYOR TOWER LIGHT ALARM SIGNAL AND MONITORING SYSTEM IN FACTORY USING LABVIEW**

**SESI PENGAJIAN: 2016/17 Semester 1**

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## **APPROVAL**

This report is submitted to the Faculty of Engineering Technology of UTeM as a partial fulfillment of the requirements for the degree of Bachelor of Engineering Technology (Department of Electronics & Computer Engineering Technology) (Bachelor's Degree in Electronics Electronics Industry Technology with Honours). The member of the supervisory is as follow:

.....  
(IR. MOHAMMAD'AFIF BIN KASNO)

## **ABSTRAK**

Projek tahun akhir bertujuan mendedahkan pelajar menjalani kajian teknikal yang lebih tinggi kepada pemikiran dan logik yang perlu dibangunkan untuk memastikan sesuatu yang dapat mengintegrasikan / idea beliau menjadi sesuatu yang berguna. Ini dimulakan dengan permulaan idea atau konsep, yang bukan sahaja bertujuan untuk membangunkan produk (Hardware Perisian), tetapi juga kajian yang mendalam mengenai produk yang sedia ada sebelum ini dalam kategori yang sama dan kekurangan mereka. Oleh itu pendekatan yang diambil untuk mencadangkan penyelesaian, yang lebih baik dari yang sebelumnya dari satu segi atau yang lain. Dengan pendekatan yang sama dalam fikiran, saya, pelajar tahun akhir Sarjana Muda Teknologi Kejuruteraan Elektronik (Industri Elektronik), telah mengambil tajuk projek **PEMBANGUNAN PENGHANTAR TOWER LIGHT ISYARAT PENGGERA DAN SISTEM PEMANTAUAN DI KILANG MENGGUNAKAN LabVIEW** sebagai projek tahun akhir saya. Sistem ini adalah berguna untuk mengurangkan perbelanjaan penyelenggaraan. Projek ini menyediakan penghantaran data ralat isyarat ke dalam excel untuk membantu jurutera untuk mengurangkan masa penyelenggaraan. Tambahan pula, ini adalah suku-manual log data ke dalam excel dengan menggunakan webcam untuk menangkap warna sebagai isyarat masukkan untuk menghantar isyarat ke dalam sistem LabVIEW.

## **ABSTRACT**

The final year project aims at exposing the students undergoing higher technical studies to the thoughts and logic that must be developed to ensure that one is able to integrate his/her ideas into something useful. This generally is initiated by the inception of an idea or a concept, which not only aims at developing a product (Hardware of Software), but also the in-depth study of the earlier existing products in the same category and their deficiencies. Accordingly an approach is taken to propose a solution, which is better from the previous ones in one respect or the other. With the same approach in mind, I, the final year student of Bachelor of Engineering Technology Electronic (Electronic Industry), have taken up project title DEVELOPMENT OF CONVEYOR TOWER LIGHT ALARM SIGNAL AND MONITORING SYSTEM IN FACTORY USING LABVIEW as my final year project. These systems are useful to reduce time of maintenance. This project is providing data logging error signal into Microsoft Excel and this project is to monitoring machine working hour by monitoring tower light. Furthermore, this is semi-manual logging data into excel by using webcam to capture color as input signal to send the signal into program LabVIEW.

## **DEDICATIONS**

I would like to dedicate this project to my supervisor, IR. MOHAMMAD'AFIF BIN KASNO that assists me develop this project. I also want to thank to my family members, lectures and friends that help me in developing this project.



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# TABLE OF CONTENTS

Chapter	Page
ABSTRAK .....	i
ABSTRACT .....	ii
DEDICATIONS .....	iii
ACKNOWLEDGMENTS .....	iv
TABLE OF CONTENTS .....	v
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
CHAPTER 1 .....	1
INTRODUCTION .....	1
1.0 Introduction .....	1
1.1 Project Background .....	1
1.2 Project Objective .....	2
1.3 Problem Statement .....	2
1.4 Project Scope .....	2
CHAPTER 2 .....	3
LITERATURE REVIEW .....	3
2.0 Introduction .....	3
2.1 Background History .....	3
2.1.1 Monitoring System .....	4
2.2 Related Project .....	6
2.2.1 Color Image Processing .....	6
2.2.2 Data Storage .....	8
2.2.3 Application Camera .....	9
2.4 Comparison Image Processing .....	9
CHAPTER 3 .....	11
METHODOLOGY .....	11
3.0 Introduction .....	11
3.1 Work Flow to Implement Project .....	11
3.1.1 Planning .....	12
3.1.2 Analysis .....	12

3.1.3	Design .....	13
3.1.4	Test.....	13
3.2	Flow Chart of Conveyor Tower Light Alarm Signal.....	13
3.2.1	Flow Chart .....	13
3.2.2	Explanation of Flow Chart.....	15
3.3	Block Diagram Monitoring Tower Light Conveyor Alarm System.....	15
3.4	Explanation of Block Diagram .....	17
3.4.1	Tower Light .....	17
3.4.2	Webcam .....	17
3.4.3	Laptop .....	17
3.5	Software Project.....	18
3.5.1	Color Image Processing Design.....	18
3.5.1.1	IMAQdx Open Camera VI .....	18
3.5.1.2	IMAQdx Configure Grab VI .....	19
3.5.1.3	IMAQdx Grab2 VI.....	19
3.5.1.4	IMAQdx Close Camera VI.....	20
3.5.1.5	IMAQ Create VI .....	20
3.5.1.6	IMAQ Dispose VI.....	20
3.5.1.7	IMAQ ColorLearn VI .....	21
3.5.2	Data Storage Design .....	21
3.5.2.1	Open/Create/Replace File Purpose .....	22
3.5.2.2	Write to Text File Purpose.....	22
3.5.2.3	Close File Purpose .....	23
3.5.2.4	Concatenate Strings Purpose .....	23
3.5.3	Condition Design .....	23
3.5.3.1	Case Structure .....	24
3.5.3.2	Format Date/Time String Purpose .....	25
3.5.3.3	In Range and Coerce Purpose.....	25
3.5.4	Real Time and Time Elapsed Design .....	25
3.5.4.1	Get Data/Time in Second.....	26
3.5.4.2	Get Date/Time String Purpose.....	26

3.5.4.3	Wait until millisecond Multiple Purpose .....	27
3.5.5	Expected Result without Count Product .....	27
3.5.6	Improvement Progress Product Detect Design .....	28
3.5.6.2	Vision Acquisition Purpose .....	29
3.5.6.3	Vision Assistant Purpose .....	30
CHAPTER 4	.....	31
RESULT AND DISCUSSION	.....	31
4.0	INTRODUCTION .....	31
4.1	GUI SOFTWARE .....	31
4.1.1	Product Scale .....	33
4.1.2	Result Count Output Product .....	34
4.2	Cause of Equipment Failure .....	34
4.3	Result of Monitoring Graph .....	35
4.3.1	Date 21.8.2016 .....	36
4.3.2	Date 7.12.2016 – 8.12.2016 .....	37
4.4	Result of Output Monitoring Graph .....	39
4.5	Accuracy of Capture Output Product .....	41
CHAPTER 5	.....	43
CONCLUSION AND FUTURE RECOMMENDATION	.....	43
5.1	Conclusion .....	43
5.2	Future Recommendation .....	44
APPENDIX	.....	1
REFERENCE	.....	1

## LIST OF TABLES

Table	Page
Table 1: Comparison Image Processing.....	9
Table 2: IMAQdx Open Camera VI.....	18
Table 3 IMAQdx Configure Grab VI.....	19
Table 4: IMAQdx Grab2 VI.....	19
Table 5: IMAQdx Close Camera VI.....	20
Table 6: IMAQ Create VI.....	20
Table 7: IMAQ Dispose VI.....	20
Table 8: IMAQ ColorLearn VI.....	21
Table 9: Open/Create/Replace File Purpose.....	22
Table 10: Write to Text File Purpose.....	22
Table 11: Close File Purpose.....	23
Table 12: Concatenate String Purpose.....	23
Table 13: Case Structure.....	24
Table 14: Format Data/Time String Purpose.....	25
Table 15: In range and Coerce Purpose.....	25
Table 16: Get Date/Time in Second.....	26
Table 17: Get Date/Time String Purpose.....	26
Table 18: Wait Until millisecond Multiple Purpose.....	27
Table 19: Vision Acquisition Purpose.....	29
Table 20: Vision Assistant Purpose.....	30
Table 21: Time (Hour).....	36
Table 22: Time (second).....	37
Table 23: Time (Hour).....	38
Table 24: Time (Hour).....	39
Table 25: Output Product Detect.....	40
Table 26: Minute of Running Process (Green Light).....	40
Table 27: Time (minute) and Output.....	41

# LIST OF FIGURES

Figure	Page
Figure 1: Iris Recognition System .....	4
Figure 2: Web-Based Student Attendance System.....	5
Figure 3: Attendance List Menu.....	5
Figure 4: Synthesis Algorithm Extraction Result: (a) Single Color Factor Image Threshold Segmentation. (b) Morphology Processing Result with Graph (a). (c) Wand Extraction Image with Graph (b) .....	6
Figure 5: Front Panel (Blue Ball) .....	7
Figure 6: Front Panel (Red Ball) .....	7
Figure 7: Data Logging using MS-Excel Sheet Generated using TDMS File Format.....	8
Figure 8: Top: Three Image Taken over Two Days from a Webcam at the (Quiet), Stuttgart Airport Bottom: A frame From a 1 Minute Synopsis of This Period.....	9
Figure 9: Flow Chart of Implement Project.....	12
Figure 10: Flow Chart .....	14
Figure 11: Hardware Block Diagram .....	15
Figure 12: Software Block Diagram.....	16
Figure 13: Camera Design Imaq ColourLearn .....	18
Figure 14: Data Storage Design.....	22
Figure 15: Excel Design Case Structure.....	24
Figure 16: Time/Date Format and Elapsed Time Design.....	26
Figure 17: Expected Result MS-Excel .....	28
Figure 18: Product Detect Design .....	29
Figure 19: Green Light GUI Design with Good Product (Save into Excel PD) .....	31
Figure 20: Green Light GUI Design with Not Good Product (Not save into Excel PD) .....	32
Figure 21: Yellow Light GUI Design with Good Product (Not save into Excel PD) .....	32
Figure 22: Red Light GUI Design with Good Product (Not save into Excel PD) .....	32
Figure 23: Not Good Product .....	33
Figure 24: Good Product .....	33
Figure 25: Match ColourLearn (Score 800 above).....	33
Figure 26: Excel store the Good Product .....	34
Figure 27: Table cause of Six Big Losses .....	35
Figure 28: Time in Second .....	36
Figure 29: Graph Time (second) VS Condition (reason) .....	36
Figure 30: Graph Time (hour) VS Condition (reason).....	37
Figure 31: Graph Time (second) VS Condition (reason) .....	38
Figure 32: Graph Time (hour) VS Condition (reason).....	38
Figure 33: Graph Time (hour) VS Condition (reason).....	39
Figure 34: Graph Output (product) VS Time (minute) .....	40
Figure 35: (a) Time (second), (b) Output (product) .....	41
Figure 36: Graph Output (product) VS Time (minute) .....	41

# **CHAPTER 1**

## **INTRODUCTION**

### **1.0 Introduction**

This project is about the Development of Conveyor Tower Light Alarm Signal and Monitoring in factory using LabVIEW. This project is developed for industry which monitoring the tower light alarm usually has at the production line. Basically, tower light is purposing to remain or alert worker weather the machine is running or stop. Propose of tower light monitoring system is to minimize the cost of rejecting product and reduce time maintenance for machine.

### **1.1 Project Background**

The project here is about Conveyor Tower Light Alarm Signal with a combination of LabVIEW software. In this project I have planned to develop a logging system for detecting signal error into Microsoft excel by using a webcam. The webcam will act as the input of the system which is detecting color of tower light signal (RED, GREEN, YELLOW) by following the LabVIEW program. Once the webcam is detecting signal, the data will send into Microsoft excel to record the data. There is other program that helps engineers to solve the problem by referring reason of the error signal. The program will continuously record 12-hour working conveyor. This system not just can use in Conveyor Tower Light Alarm Signal, but it also can be practically used in system monitoring.

## **1.2 Project Objective**

The objective of this development are:

1. To study of solution for efficiency of the Conveyor Tower Light Alarm Signal.
2. To design circuit for monitoring of Conveyor Tower Light Alarm Signal.
3. To develop a data logging system referring to the previous study.
4. To analyze output Conveyor Tower Light Alarm Signal using developmentally monitoring system.

## **1.3 Problem Statement**

The problem statement is the information causes and reason machine breakdown is not store for future reference. There is problem when output target is no achieve. A lot of time is used to identify the problem. Therefore, this project is to monitoring machine working hour by monitoring tower light.

## **1.4 Project Scope**

The scope for this project is to build data logging system which is to record real time and causes of error by using LabVIEW software platform. Furthermore, this project is for tower light system and to record output of product into Microsoft Excel. The data logging will then be analyzed in order to improve the productivity.



## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter will discuss about finding and analysis of previous project that related with Monitoring Conveyor Tower Light Alarm Signal. All the detail is taken from various resources such as journal, thesis, book and valid websites. Monitoring Conveyor Tower Light Alarm Signal is similar with system attendance monitoring by using sheet to record machine problem. The idea to create Monitoring Conveyor Tower Light Alarm Signal because to help engineer fix problem or maintenance the machine. The system maybe a problem to who are responsible to record signal error by manually. Base on Murizah Kassim, Hasbullah Mazlan, Norliza Zaini, and Muhammad Khidhir Salleh in 2012 have done research of a system called Student Attendance, there are few disadvantage by using sheet, because record data sheet maybe missing or time error and problem error is not properly write down in record sheet (Kassim et al. 2012). Therefore, Monitoring Conveyor Tower Light Alarm Signal is a semi-automated system that related with monitoring system and color image processing. This project is to Monitoring Conveyor Tower Light Alarm Signal for every second and record the error signal by using LabVIEW software. This project is using combination of IMAQ and Input / Output file LabVIEW platform to capture color of tower light signal and record data into Microsoft Excel.

#### **2.1 Background History**

For a long time, industry has been searching for acceleration in speed of development and reduce costs of experiment to store the data for future plane. The conveyor tower light system is the best achievement in this search for monitoring system.

### 2.1.1 Monitoring System

Base on Teh Wei Hsiung and Shahrizat Shaik Mohamed in 2011 show development for a system called Performance of Iris Recognition using Low Resolution Iris Image for Attendance Monitoring. The purpose of this project is to upgrade system attendance manually to the automation system and to achieve good quality performance of iris recognition using low resolution image for the attendance monitoring system. Two methods had been analysis, which is Hough Transform and Daugman's Integro Differential. Method of Hough Transform can recognize the low resolution iris with the accuracy of 100% and 86.88% Daugman's Integro Differential method. Hough Transform is technique that uses vertical and horizontal to detect iris boundary, pupil boundary and determine the eyelids and Daugman's technique, the techniques will search for maximum change if the pixel values on the circular path (Hsiung & Shaik Mohamed 2011). The benefit of this project is the security is not reliable such as the password may be forgotten or hacked and ID card may be lost or forged. For limitation of this project is system may be problem cannot purpose well, therefore no other choice to wait maintaining the system.



Figure 1: Iris Recognition System

Base on Murizah Kassim, Hasbullah Mazlan, Norliza Zaini, and Muhammad Khidhir Salleh in 2012 show development of a system called Student Attendance System Using RFID Technology. The productive of this project is to improve the current manual attendance record to semi-automated system by using RFID system and to help raise academic of student. RFID system has two type of reader, one is active reader that need internal battery 12 voltage power

supply and other one is passive reader that no need internal battery, that are main difference of active and passive reader. There are six methods that relate to RFID processing, which are RFID reader and tag, Data reporter, Web Server, Data Collector, Database and Graphical User Interface (GUI). There are two purpose of Database, one is store the information capture by a RFID reader and store information assembled from online web-interface and can controlled the record data(Kassim et al. 2012). The weakness of this system is the cost of installation and unsettling influence from other electronic gadgets will diminish the force as separation get substantial.

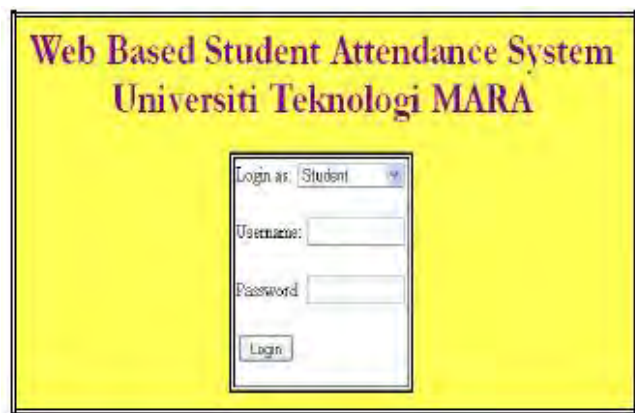


Figure 2: Web-Based Student Attendance System



Figure 3: Attendance List Menu

## 2.2 Related Project

The related project is about reference of application or system in used that related with project. This project is used Color Image Processing, Data Storage and Application Camera. Three of the processing is to capture color of tower light (RED, YELLOW, And GREEN). Tower light is purpose to alert surrounding about the machine.

### 2.2.1 Color Image Processing

Base on Mao Xiaobo, Yang Jing, 2011. Have done research on Product-Background Segmentation of Color Image Base on LabVIEW. Research is about benefit, limitations and recommendation in combination of three methods are threshold segmentation, magic wand processing and morphological image. The purpose of this research is to extract image from a complex background by using LabVIEW and NI - IMAQ Vision software platform. There are benefits of this research is to realize color image target and background separation (Xiaobo & Jing 2011). For the limitation, this three combination is quite complicated to program and to extract from the background need to adjustable HSL (hue-saturation-lightness) to show the result.

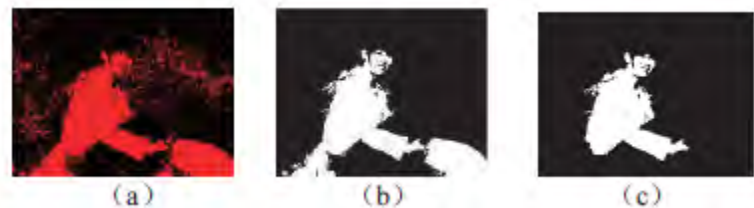


Figure 4: Synthesis Algorithm Extraction Result: (a) Single Color Factor Image Threshold Segmentation. (b) Morphology Processing Result with Graph (a). (c) Wand Extraction Image with Graph (b)

Base on Roland Szabo, Aurel Gontean and Loan Lie, 2011 show development of Cheap Live Color Recognition with Webcam. The productive of this project is to reduce investment of industry to create system which can recognize color. Two method that can recognize color which

is first method IMAQ USB, with combination of IMAQ USB In it (for initialization), IMAQ USB Grab Setup (for grabbing the configuration), IMAQ USB Grab Acquire (for acquire image) and IMAQ USB Close (close the drive) these combination is for gray background, that represent USB webcam drive. Moreover, combination of IMAQ Create (need for IMAQ USB Grab Acquire) and IMAQ Learn which calculate color spectrum, by using LabVIEW and combination with IMAQ platform, color image can be capture (Roland Szabo, Aurel Gontean 2011). Benefit of this method is can work with any USB webcam and can recognize color in real-time by using color spectrum calculation. Second method LabWindows/cvi ANSI C programming language. This method is including C language to verify third party webcam and vision driver for color image. Benefit of this method is can easily to recognize color by changing the binary value for specific color (Roland Szabo, Aurel Gontean 2011).



Figure 5: Front Panel (Blue Ball)

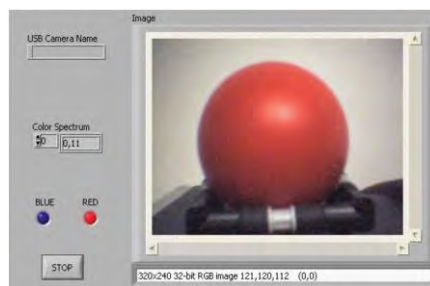


Figure 6: Front Panel (Red Ball)

## 2.2.2 Data Storage

Based on Devdutt Pradhan, Lakshmi Lakshminarayanan, Vineeth Patil, 2014 have develop system A LabVIEW Based Power Analyzer. Base Power Analyzer is combination of Power Analyzer, Power Quality Indices and Events (Harmonics) and Event Logging. This system is done because of poor power quality and conventional power equipment are not having the ability to store data for future reference. Event Logging is a process for store the data into MS-Excel. By using Technical Data Management Streaming (TDMS) software file input/output platform. TDMS comprises of two particular file, which are binary file that save and record about the information and a binary index file that gives merged data on all the traits and pointers in the binary file (Devdutt Pradhan, Lakshmi Lakshminarayanan 2014). The weakness of this system is the TDMS are specific to a binary file.

	A	B	C	D	E
1	Interruption Time	Time*	Duration of Interruption (sec)	RMS Voltage(V)	
2	05/07/2013 03:29:07.151 PM	0	0	17.49449955	
3	05/07/2013 03:29:08.119 PM	1	0.927032975	17.50323233	
4	05/07/2013 03:29:09.159 PM	2	1.928110223	17.47163711	
5	05/07/2013 03:29:10.119 PM	3	2.927167916	17.51472282	
6	05/07/2013 03:29:12.118 PM	25	24.926425593	17.5023392	
7	05/07/2013 03:30:09.117 PM	62	61.92554168	17.48179874	
8	05/07/2013 03:30:10.116 PM	63	62.92553992	17.46715829	
9	05/07/2013 03:30:11.118 PM	66	65.92691469	17.49927147	
10	05/07/2013 03:30:34.120 PM	87	86.92787232	17.45375133	
11	05/07/2013 03:30:35.117 PM	88	87.92652921	17.51410656	
12	05/07/2013 03:30:36.121 PM	89	88.92688661	17.47263267	
13	05/07/2013 03:30:37.118 PM	90	89.92734357	17.50091147	
14	05/07/2013 03:30:38.116 PM	91	90.92529094	17.4471604	
15	05/07/2013 03:30:39.117 PM	92	91.92525836	17.49828386	
16	05/07/2013 03:30:51.118 PM	104	103.9269443	17.46873728	
17	05/07/2013 03:30:52.118 PM	105	104.92693115	17.48947402	
18	05/07/2013 03:30:53.119 PM	106	105.9270587	17.21454237	
19	05/07/2013 03:31:00.117 PM	113	112.9254659	16.62420194	
20	05/07/2013 03:31:01.117 PM	114	113.92551862	16.88749932	
21	05/07/2013 03:31:02.116 PM	115	0	73.69717932	
22	05/07/2013 03:31:04.117 PM	116	0	103.7878926	
23	05/07/2013 03:31:04.116 PM	117	0	103.9259668	
24	05/07/2013 03:31:05.116 PM	118	0	103.8632504	
25	05/07/2013 03:31:06.116 PM	119	0	103.6433291	
26	05/07/2013 03:31:07.117 PM	120	0	103.91528875	
27	05/07/2013 03:31:08.117 PM	121	0	103.4732694	

Figure 7: Data Logging using MS-Excel Sheet Generated using TDMS File Format



### 2.2.3 Application Camera

Base on Yael Pritch, Alex Rav-Acha, Avital Gutman and Shmuel Peleg. Have done research on Webcam Synopsis, peeking around the world. The purpose of this research is to generate a short video (Pritch et al. 2007). There are two process of webcam, first is online phase it done in real time. Second is Response Phase. This phase may take a few minutes, depending on the activity in the time period of interest.



Figure 8: Top: Three Image Taken over Two Days from a Webcam at the (Quiet), Stuttgart Airport Bottom: A frame From a 1 Minute Synopsis of This Period

### 2.4 Comparison Image Processing

Table 1: Comparison Image Processing

Product-Background Segmentation of Color Image	Color Recognition with Webcam
- Need to set proper threshold in order to carry on the image segmentation more accurately.	- Easily to recognize color by changing the binary value for specific color.

<ul style="list-style-type: none"><li>- Complicated combination to realize color image target and background separation.</li></ul>	<ul style="list-style-type: none"><li>- Easy to capture color image by using color spectrum range.</li></ul>
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