

# **OBJECT RECOGNITION AND TRACKING BY DEEP LEARNING**

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January 2018

A thesis submitted to the Faculty of Graduate Studies and Research  
in partial fulfilment of the requirements of the degree of  
Master of Engineering

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A great dedication goes here.

# Abstract

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## **Resume**

## **ACKNOWLEDGEMENTS**

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## TABLE OF CONTENTS

<b>Abstract . . . . .</b>	<b>iii</b>
<b>Resume . . . . .</b>	<b>iii</b>
<b>Acknowledgments . . . . .</b>	<b>iii</b>
<b>LIST OF FIGURES . . . . .</b>	<b>viii</b>
<b>LIST OF TABLES . . . . .</b>	<b>ix</b>
<b>Chapter 1: Introduction . . . . .</b>	<b>1</b>
1.1 Motivation . . . . .	1
1.2 Thesis Overview . . . . .	1
<b>Chapter 2: Previous Approaches . . . . .</b>	<b>3</b>
2.1 Section . . . . .	3
2.1.1 Example Subsection . . . . .	3
<b>Chapter 3: Object Detection and Recognition . . . . .</b>	<b>5</b>
3.1 YOLO Darknet . . . . .	5
3.1.1 Pre-trained Model with COCO dataset . . . . .	5
3.1.2 Trained Model with Customized dataset . . . . .	5

3.2 Neural Network Cascading . . . . .	5
<b>Chapter 4: Object Tracking . . . . .</b>	<b>6</b>
4.1 Features to use . . . . .	6
4.1.1 Optical Flow . . . . .	6
4.1.2 Position . . . . .	6
4.1.3 Apperance . . . . .	6
4.2 Feature Matching . . . . .	6
4.2.1 Median Filter . . . . .	6
4.2.2 Sample subsubsection . . . . .	6
4.2.3 Gaussian Mixture Model . . . . .	6
4.3 Kalman Filter Prediction . . . . .	6
<b>Chapter 5: Experiments and Analysis . . . . .</b>	<b>7</b>
<b>Chapter 6: Conclusions and Future Work . . . . .</b>	<b>8</b>
<b>Appendix A: Experimental Equipment . . . . .</b>	<b>10</b>
<b>Appendix B: Data Processing . . . . .</b>	<b>11</b>
<b>References . . . . .</b>	<b>12</b>
<b>Vita . . . . .</b>	<b>13</b>

## LIST OF TABLES

1.1	This is an example Table. . . . .	1
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## LIST OF FIGURES

1.1	This is an example Figure. . . . .	2
2.1	This is another example Figure, rotated to landscape orientation. . . . .	4

## SUMMARY

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# CHAPTER 1

## INTRODUCTION

### 1.1 Motivation

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### 1.2 Thesis Overview

This is a section in Chapter 2.

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Table 1.1: This is an example Table.

x	f(x)	g(x)
1	6	4
2	6	3
3	6	2
4	6	2

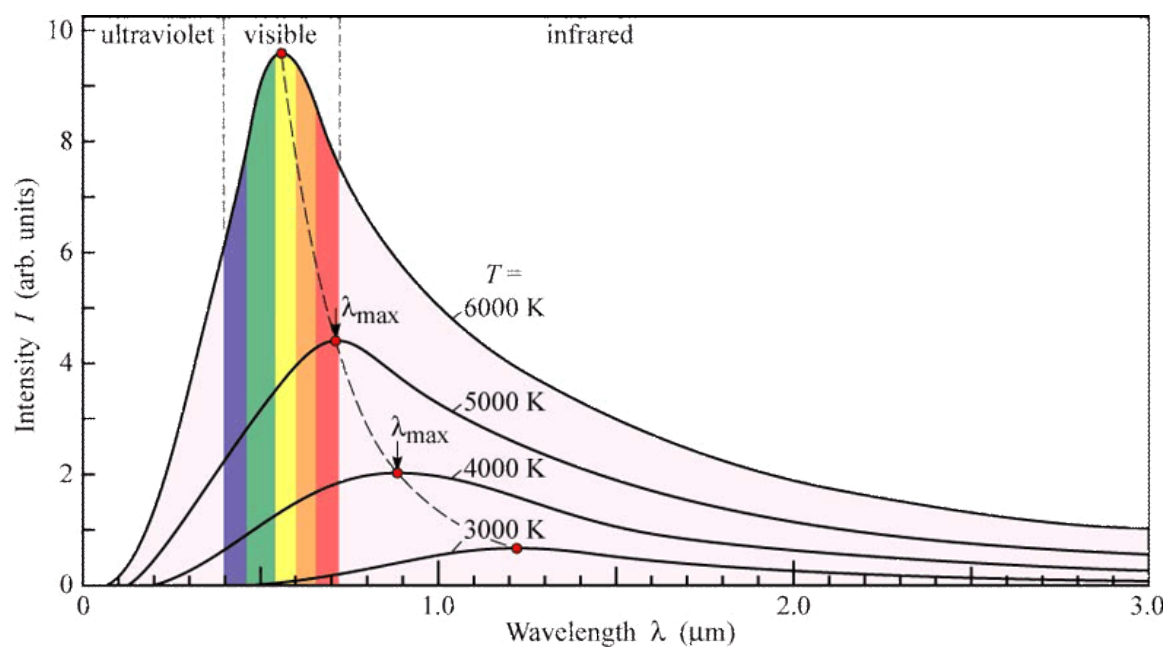


Figure 1.1: This is an example Figure.

## **CHAPTER 2**

### **PREVIOUS APPROACHES**

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#### **2.1 Section**

This is a section in Chapter 2.

##### **2.1.1 Example Subsection**

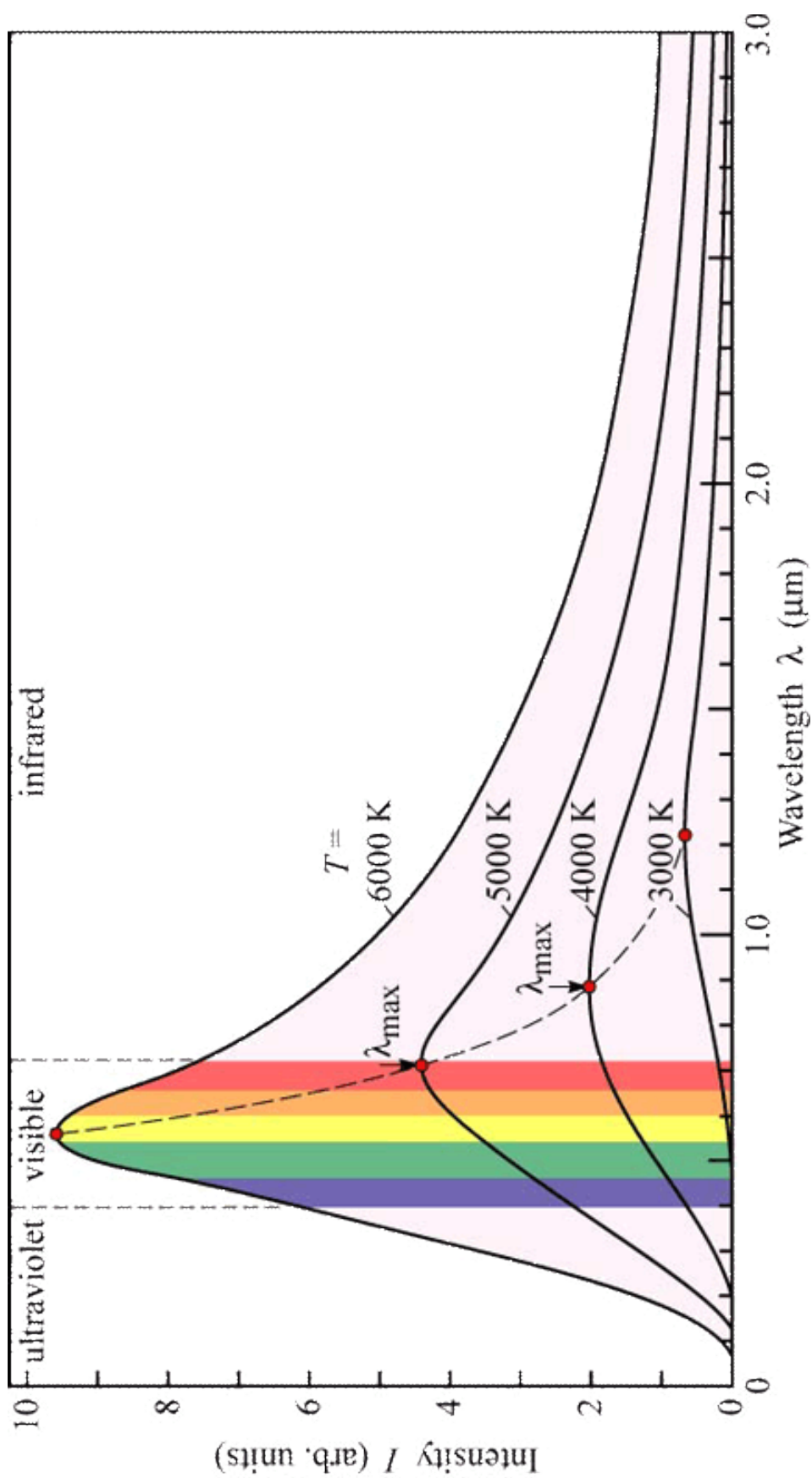


Figure 2.1: This is another example Figure, rotated to landscape orientation.

## **CHAPTER 3**

### **OBJECT DETECTION AND RECOGNITION**

#### **3.1 YOLO Darknet**

##### **3.1.1 Pre-trained Model with COCO dataset**

##### **3.1.2 Trained Model with Customized dataset**

###### **3.1.2.1 Dataset**

MIO-TCD SPID Caltech

###### **3.1.2.2 Kmeans Clustering**

Image clustering

#### **3.2 Neural Network Cascading**

Caltech

## **CHAPTER 4**

### **OBJECT TRACKING**

#### **4.1 Features to use**

##### **4.1.1 Optical Flow**

###### **4.1.1.1 Lucas Kanade Optical Flow**

###### **4.1.1.2 Farnback Optical Flow**

##### **4.1.2 Position**

##### **4.1.3 Apperance**

#### **4.2 Feature Matching**

##### **4.2.1 Median Filter**

##### **4.2.2 Sample subsubsection**

##### **4.2.3 Gaussian Mixture Model**

#### **4.3 Kalman Filter Prediction**



## **CHAPTER 5**

### **EXPERIMENTS AND ANALYSIS**

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## **CHAPTER 6**

### **CONCLUSIONS AND FUTURE WORK**

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# **Appendices**

## **APPENDIX A**

### **EXPERIMENTAL EQUIPMENT**

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## **APPENDIX B**

### **DATA PROCESSING**

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- [1] B. W. Kernighan and D. M. Ritchie, *The C Programming Language Second Edition*. Prentice-Hall, Inc., 1988.
- [2] G. P. Burdell, *Myths and Their Origins Plus Some Extra Words to Make the Title Really Long and Extend to the Next Line*. Real Books, Inc., 2017.
- [3] A. Einstein, B. Podolsky, and N. Rosen, “Can quantum-mechanical description of physical reality be considered complete?” *Phys. Rev.*, vol. 47, pp. 777–780, 10 1935.

## **VITA**

Vita may be provided by doctoral students only. The length of the vita is preferably one page. It may include the place of birth and should be written in third person. This vita is similar to the author biography found on book jackets.