

ABSTRACT

People with speech disabilities communicate in sign language and therefore have trouble in mingling with the able-bodied. There is a need for an interpretation system which could act as a bridge between them and those who do not know their sign language. A functional unobtrusive Indian sign language recognition system was implemented and tested on real world data. A vocabulary of 2 symbols was collected using 1 subjects, totaling 2 images. The vocabulary consisted mostly of one-handed signs which were drawn from a wide repertoire of words of technical and daily-use origins. The system was implemented using web-cam which enables surrounding light conditions and object color to have negligible effect on the efficiency of the system. The system proposes a method for a novel, low-cost and easy-to-use application, for Indian Sign Language recognition, using the web-cam. In the fingerspelling category of our dataset, we achieved above 100% recognition rates for 2 signs with overall 2 distinct alphabets (I, V) recognized with an average accuracy rate of 100%.

ACKNOWLEDGEMENT

The completion of this study would have not been possible if not dependent on the steadfast support given by our Dean(E&T), **Dr. K. Duraivelu**

We deeply express our sincere thanks to our Head of Department **Dr. S. Prasanna Devi**, for encouraging and allowing us to present the project on the topic “**HAND GESTURE RECOGNITION FOR INDIAN SIGN LANGUAGE**“ at our department premises for the partial fulfillment of the requirements leading to the award of Bachelor of Technology degree.

It is our privilege to express our sincerest regards to our project coordinator, **Mrs. M. Poonkodi** for her valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of our project.

Last but not the least we express our thanks to our parents and friends for their cooperation and support.

TABLE OF CONTENTS

NO	CHAPTER NAME	PAGE NO
	ABSTRACT	iii
	ACKNOWLEDGEMENT	iv
	LIST OF FIGURES	vi
	LIST OF TABLES	vii
1	INTRODUCTION.....	1
1.1	COMPUTER VISION	2
1.2	OPEN CV	3
1.3	VIOLA JONES METHOD	4
1.4	CONVOLUTIONAL NEURAL NETWORK	6
1.5	KERAS	8
1.6	NUMPY	9
2	LITERATURE REVIEW.....	11
3	SOFTWARE REQUIREMENT ANALYSIS.....	13
3.1	PYCHARM	13
3.2	TENSORFLOW	14
3.3	SYSTEM REQUIREMENT	15
4	SYSTEM DESIGN.....	16
4.1	SYSTEM ARCHITECTURE	16
4.2	DATA FLOW WITHIN SYSTEM	18
5	IMPLEMENTATION.....	19
5.1	HAND DETECTION	19
5.2	IMAGE ACQUISITION	20
5.3	IMAGE PREPROCESSING	21
5.4	FEATURE EXTRACTION	24
5.5	USAGE OF NEURAL NETWORK FOR RECOGNITION	25
5.6	CONVOLUTIONAL NETWORK	27

6	TESTING.....	30
6.1	SIMULATION RESULT	30
6.2	DISCUSSION	33
7	CONCLUSION AND FUTURE ENHANCEMENTS...	34
7.1	CONCLUSION	34
7.2	FUTURE SCOPE	34
	REFERENCES.....	35

LIST OF FIGURES

FIG NO	FIGURE NAME	PG NO
1.1	HAND DETECTION SYSTEM AS A PART OF HAND GESTURE RECOGNITION SYSTEM	2
4.1	SYSTEM ARCHITECTURE	16
4.2	GESTURE RECOGNITION HAND TRACKING SYSTEM	18
5.1	HAND DETECTION	19
5.2	IMAGE ACQUISITION	20
5.3	IMAGE PREPROCESSING	21
5.4	FEATURE EXTRACTION	25
5.5	ARTIFICIAL NEURON	26
5.6	A TYPICAL CONVOLUTIONAL NETWORK	29
5.7	A NEURAL NETWORK	29
6.1	GESTURE 1: V	30
6.2	GESTURE 2: 1	31
6.3	INPUT HAND	32

LIST OF TABLES

TABLE NO	TABLE	PG.NO
2.1	COMPARISON OF VARIOUS DIFFERENT METHODS FOR HAND GESTURE RECOGNITION SYSTEM	12
3.1	SYSTEM SPECIFICATION	15