



PES UNIVERSITY

(Established under Karnataka Act No. 16 of 2013)
100-ft Ring Road, Bengaluru – 560 085, Karnataka, India

6th Semester Project Report on

CAPTION GENERATOR

Submitted by

VIJAYKUMAR R PAI (PES1201702013)

Jan – May 2020

Under the guidance of

Dr. Thenmozhi S
Associate Professor
Department of Computer Applications
PES University, Bengaluru - 560085

**FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER APPLICATIONS
PROGRAM – MASTER OF COMPUTER APPLICATIONS**



**FACULTY OF ENGINEERING
DEPARTMENT OF COMPUTER APPLICATIONS
PROGRAM – MASTER OF COMPUTER APPLICATIONS
CERTIFICATE**

This is to certify that the project entitled

CAPTION GENERATOR

is a bonafide work carried out by

VIJAYKUMAR R PAI - PES1201702013

in partial fulfillment for the completion of 6th semester project work in the Program of Study MCA with specialization in Data Science under rules and regulations of PES University, Bengaluru during the period Jan. 2020 – May 2020. The project report has been approved as it satisfies the 6th semester academic requirements in respect of project work.

Internal Guide

Dr. Thenmozhi S, Associate Professor
Department of Computer Applications,
PES University, Bengaluru - 560085

Chairperson

Dr. Veena S

Dean-Faculty of Engineering & Technology

Dr. B K Keshavan

Name and Signature of Examiners:

Examiner 1:

Examiner 2:

Examiner 3:

DECLARATION

I, **VIJAYKUMAR R PAI (PES1201702013)**, hereby declare that the project entitled, ***CAPTION GENERATOR***, is an original work done by me under the guidance of **Dr. THENMOZHI S, Associate Professor, Department of Computer Applications**, and is being submitted in partial fulfillment of the requirements for completion of 6th Semester course work in the Program of Study **MCA**. All corrections/suggestions indicated for internal assessment have been incorporated in the report. The plagiarism check has been done for the report and is below the given threshold.

PLACE:

DATE:

VIJAYKUMAR R PAI

PES1201702013

ACKNOWLEDGEMENT

The satisfaction and euphoria are that successful completion of any task would be incomplete without mentioning the people who made it possible.

I would like to express my deep sense of gratitude to respected Vice Chancellor of PES University, **Dr. Suryaprasad J**, for giving the opportunity to work on this project.

I take this occasion to thank my sincere and heartfelt thanks to Dean, Faculty of Engineering and Technology **Dr. Keshavan B K, PES University** and Chairperson, Department of Computer Applications **Dr. Veena S** for their motivation, support and for providing a suitable working environment.

With a great pleasure, I express my sincere gratitude to my guide **Dr. Thenmozhi S, Associate Professor, Department of Computer Applications**, for providing me with right guidance and advice at the crucial junctures which helped me in completing the project work on time. I am wholeheartedly thankful to her for giving me valuable time, suggestions and for showing me the right way in completing my project successfully.

I extend my sincere thanks to our project coordinator **Mr Tamal Dey, Assistant Professor, Department of Computer Applications**, for providing schedule and timelines and documenting information about project.

I also thank other faculty members and friends who directly or indirectly helped in completing this project work.

Vijaykumar R Pai

ABSTRACT

Humans have the ability to see visuals and comprehend the information associated with the visuals. The human brain automatically does this process. Can computers mimic the same? This question gives rise to this project "Caption Generator". Caption Generator is a machine learning application that identifies the action portrayed in the given image. The objective is to generate a caption that well describes the image. The machine has to be artificially trained to identify the captions as a meaning description of the given image. The application has to take the image as input and recognize the context of the image and describe them in a natural language like English. Suitable deep learning and artificial intelligence is used to achieve the objective.

CONTENTS

ABSTRACT	Page No.
1. INTRODUCTION	
1.1 PROBLEM STATEMENT	3
1.2 PURPOSE	3
1.3 SCOPE	3
1.4 PROPOSED SOLUTION	4
2. LITERATURE SURVEY	
2.1 BACKGROUND STUDY	6
2.2 FEASIBILITY STUDY	7
2.3 RELATED WORK	8
2.4 DRAWBACKS OF EXISTING SYSTEM	9
3. HARDWARE AND SOFTWARE REQUIREMENTS	
3.1 HARDWARE REQUIREMENTS	11
3.2 SOFTWARE REQUIREMENTS	11
3.3 TOOLS AND TECHNOLOGIES	12
4. SOFTWARE REQUIREMENTS SPECIFICATION	
4.1 USERS	16
4.2 FUNCTIONAL REQUIREMENTS	16
4.3 NON FUNCTIONAL REQUIREMENTS	18
5. SYSTEM DESIGN	
5.1 DATA FLOW DIAGRAM	20
5.2 PROCESS FLOW DIAGRAM	21
5.3 METHODOLOGY	23
6. IMPLEMENTATION	
6.1 SOURCE CODE	29
6.2 SCREENSHOTS	34
7. MODEL EVALUATION AND PERFORMANCE	
7.1 MODEL TESTING	37
7.2 MANUAL TEST CASES	38
8. RESULTS AND DISCUSSION	
8.1 CORRECT CLASSIFICATION OF CAPTION GENERATION	43
8.2 MISCLASSIFIED CAPTION GENERATION	46
8.3 DISCUSSION	46
9. CONCLUSION	48
10. FUTURE ENHANCEMENTS	50
Appendix A BIBLIOGRAPHY	
Appendix B USER MANUAL	

LIST OF FIGURES

	Page No.
1. Fig 5.1 DFD Level 0	20
2. Fig 5.2 Process Flow Diagram	21
3. Fig 5.3 Image Pre-Processing steps	23
4. Fig 5.4 Caption Pre-Processing steps	24
5. Fig 5.5 Working of CNN Algorithm	25
6. Fig 5.6 LSTM Cell Structure	26
7. Fig 5.7 Working of Caption Generator	27
8. Fig 6.1 Home Screen	34
9. Fig 6.2 Result Page Screen	35
10. Fig 7.1 BLEU Score for Model Evaluation	37
11. Fig 8.1 Black and white dog is running through the grass	43
12. Fig 8.2 Two children are playing on the grass	44
13. Fig 8.3 Man in red shirt is standing on the edge of the water	45
14. Fig 8.4 Wrong generation of caption	46

LIST OF TABLES

	Page No.
1. Table 7.1 Valid Input Test Case (a)	38
2. Table 7.2 Valid Input Test Case (b)	39
3. Table 7.3 Invalid Input Test Case (a)	40
4. Table 7.4 Invalid Input Test Case (b)	41