

**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 Generatoris 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. PROBLEM STATEMENT 3
  2. PURPOSE 3
  3. SCOPE 3
  4. PROPOSED SOLUTION 4

1. **LITERATURE SURVEY** 
   1. **BACKGROUND STUDY 6**
   2. **FEASIBILTY STUDY** 7
   3. **RELATED WORK 8**
   4. DRAWBACKS OF EXISTING SYSTEM 9
2. **HARDWARE AND SOFTWARE REQUIREMENTS** 
   1. HARDWARE **REQUIREMENTS** 11
   2. SOFTWARE **REQUIREMENTS**  11
   3. TOOLS AND TECHNOLOGIES 12
3. **SOFTWARE REQUIREMENTS SPECIFICATION** 
   1. USERS 16
   2. FUNCTIONAL REQUIREMENTS 16
   3. NON FUNCTIONAL REQUIREMENTS 18
4. **SYSTEM DESIGN** 
   1. DATA FLOW DIAGRAM 20
   2. PROCESS FLOW DIAGRAM 21
   3. METHODOLOGY 23
5. **IMPLEMENTATION** 
   1. SOURCE CODE 29
   2. SCREENSHOTS 34
6. **MODEL EVALUATION AND PERFORMANCE** 
   1. MODEL TESTING 37
   2. MANUAL TEST CASES 38
7. **RESULTS AND DISCUSSION** 
   1. CORRECT CLASSIFICATION OF CAPTION GENERATION 43
   2. MISCLASSIFIED CAPTION GENERATION 46
   3. DISCUSSION 46
8. **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