

**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 at this occasion.

Vijaykumar R Pai

**ABSTRACT**

You saw an image and your brain can easily tell what the image is about, but can a computer tell what the image is representing. Caption Generatoris a machine learning application that identifies the action portrayed in the given image. The objective is to generate a caption that will describe the image that will say what kind of actions is taking place in it. The application will take the image as input and recognize the context of an image and describe them in a natural language like English. At the macro level, Tensorflow, Keras with Python, CNN and LSTM library is used to train, test and generate a caption for the Image.

**CONTENTS**

**ABSTRACT Page No.**

1. **INTRODUCTION 1 - 4**
   1. PROBLEM STATEMENT 3
   2. PURPOSE 3
   3. SCOPE 3
   4. PROPOSED SOLUTION 3 - 4
2. **LITERATURE SURVEY 6 - 10** 
   1. **BACKGROUND STUDY 6 - 7**
   2. **FEASIBILTY STUDY** 8
   3. **RELATED WORK 9**
   4. DRAWBACKS OF EXISTING SYSTEM 10
3. **HARDWARE AND SOFTWARE REQUIREMENTS 12 - 15**
   1. HARDWARE **REQUIREMENTS** 12
   2. SOFTWARE **REQUIREMENTS**  12
   3. TOOLS AND TECHNOLOGIES 13 - 15
4. **SOFTWARE REQUIREMENTS SPECIFICATION**  **17 - 19**
   1. USERS 17
   2. FUNCTIONAL REQUIREMENTS 17 - 18
   3. NON FUNCTIONAL REQUIREMENTS 19
5. **SYSTEM DESIGN 21 - 27**
   1. DATA FLOW DIAGRAM 21
   2. PROCESS FLOW DIAGRAM 22
   3. METHODOLOGY 23 - 27
6. **IMPLEMENTATION 29 - 40**
   1. SOURCE CODE 29 - 35
   2. SCREENSHOTS 36 - 38
7. **MODEL EVALUATION AND PERFORMANCE 40 - 44** 
   1. MODEL TESTING 40
   2. MANUAL TEST CASES 41 - 44
8. **RESULTS AND DISCUSSION 46 - 49** 
   1. RESULTS 46 - 48
   2. RESULTS OF WRONG GENERATION OF CAPTION 49
   3. DISCUSSION 49
9. **CONCLUSION** 51
10. **FUTURE ENHANCEMENTS** 53

**Appendix A BIBLIOGRAPHY**

**Appendix B USER MANUAL**

**LIST OF FIGURES**

**Page No.**

1. Fig 5.1 Data Flow Diagram Level 0 21
2. Fig 5.2 Process Flow Diagram 22
3. Fig 5.3 How Images are Pre-Processed 23
4. Fig 5.4 How Captions are Pre-Processed 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 36
9. Fig 6.2 Result Page Screen 37
10. Fig 6.3 Home Screen 2 38
11. Fig 6.4 Result Page Screen 2 38
12. Fig 7.1 BLEU Score for Model Evaluation 40
13. Fig 8.1 Black and white dog is running through the grass 46
14. Fig 8.2 Two children are playing on the grass 47
15. Fig 8.3 Dog is running through the grass 48
16. Fig 8.4 Wrong generation of caption 49

**LIST OF TABLES**

**Page No.**

1. Table 7.1 Valid Input Test Case 41
2. Table 7.2 Valid Input Test Case 42
3. Table 7.3 Invalid Input Test Case 43
4. Table 7.4 Invalid Input Test Case 44