**FYP Proposal 2022**



Topic:

An Interactive approach to Cricket shots classification through Deep Learning.

Supervisor:

**Ms. Farah Sadia**

Co-Supervisor:

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Team Members:

**Anas Sohail [19k-1354]**

**Umer Zaidi Syed [19k-0304]**

**Osama Shibli [19k-0142]**



Institution Details



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| **Province** | Sindh | **City** | Karachi |
| **Institution** | National University of Computer and Emerging Sciences (FAST-NU) | **Campus** | Karachi |
| **Department** | Computer Science | **Degree Level** | BS |
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Supervisor Details



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| **Qualification** | Masters in Computer Science | | |

Co-Supervisor Details



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| **Qualification** |  | | |

Head of Department Details



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Project Details



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| --- | --- | --- | --- | --- | --- | --- |
| **Project Title** | An Interactive approach to Cricket shots classification through Deep Learning. | | |  | |  |
| **Group Details** | **Member 1 Name: Anas Sohail**    **Member 1 Roll#:19K-1354** | | **Member 2 Name: Umer Zaidi Syed**    **Member 2 Roll#:19K-0304** | | **Member 3 Name: Osama Shibli**    **Member 3 Roll#:19K-0142** |  |
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| **Project Area of** | Deep Learning, Artificial Intelligence, Computer Vision | | | | |  |
| **Specialization** |  |
|  |  |
| **Project Start** | September 2, 2022 | **Project End Date** | | June 15, 2022 | |  |
| **Date** |  |  | |  | |  |
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| **Project** | Videos uploaded in huge volumes onto various streaming platforms consisting of YouTube and Vimeo play a vital function within the era of data communication. Simultaneously, reading information from these videos is critical trouble. While working with video statistics, making crucial selections even as constantly monitoring what's converting in their frames is a primary concern. The same can be said for numerous sports highlights. Cricket is one of these, thriving with a massive following all over the globe. A match that includes the ICC Men’s Cricket World Cup 2019 hits a worldwide audience of no much less than 1.6 billion, making it one of the well-regarded events ever. This extensive reputation and sizeable fan base create a business factor for working on cricket data. Cricket videos require analysis to develop an unbiased, equitable, and sensor-based commentary system.  Moreover, detecting cricket on the basis of different types of cricket shots can be helpful for both coaches and sports analysts. Coaches and cricket experts have to regularly understand the weaknesses of different teams and adjust their game plans on the basis of those findings. In this context, it is vital to extract information from cricket data. Image recognition has always been a main part to computer vision projects hence we will also be using image normalization techniques on different frames in our video’s dataset, cleaning the irrelevant parts and only taking the part of the video in which, the shot had been executed. | | | | |  |
| **Summary (less** |  |
| **than 2500** |  |
| **characters)** |  |
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| **Project** | Detection and Tracking of the batsman’s bat and his posture in the frame and Classify which shot is executed by the player.  • Exclude the background detected for accurate tracking of players and bat.  • Apply heat mapping to identify player’s body posture and position.  •Identify whether the shot being played is played on the off side or the leg side.  Within our project we aim to examine Cricket Shots from Videos sequences (frame by frame analysis) and correctly classify the input data provided to into its underlying activity category. The main object of our FYP project is to perform research on recognizing different forms of Cricketing shots from video frames via the use of Computer Vision and Deep Learning.  For developing a new Computer Vision model to detect and classify the various shots in Cricket we will review previous attempts of this in different research papers. This is to figure out and develop our own model with better efficiency and accuracy and results as compared to previous models. | | | | |  |
| **Objectives (less** |  | | | | |  |
| **than 2500** |  | | | | |  |
| **characters)** |  | | | | |  |
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| **Literature Review / Background Study** | Computer vision has long been a part of research papers based on cricket. The framework being built aims to establish and build a precision stroke detection strategy that uses representations which will be extracted from video frames of cricket matches [1]. As cricket shots cannot be detected yet from a single video sample, a method based on motion vectors that helps to measure the angle of cricket shots precisely [3]. By designing a convolutional neural network (CNN)-recurrent neural network (RNN) to classify the different cricket shots. The networks were built from scratch and two different architectures were formed after many trials. The Highest accuracy being achieved was 93% by a hybrid CNN-GRU architecture [2]. As Convolutional Neural Networks (CNN) mathematical properties are not quite understood. A simplified model was developed to understand its behavior and mathematical properties [4]. Convolutional neural networks (CNN) success depends on how fast they can be trained. By introducing a new algorithm we test how fast they can process data[5] | | | | |  |
| **Project Implementation Method (less than 2500 characters)** | We will review existing Cricket shot classifier approaches from Past Research Papers. Our main purpose of doing this is to get a base line of the accuracy and efficiency. This will give us a good starting point for developing our own model for classifying cricket shots. We will also be implementing one model from a past research paper onto our selected dataset. This will help is finding deficiencies but also help us to improve our model by comparing it to that model and avoiding the same issues. Furthermore, we will be implementing CNN model which is widely used in image recognition in computer vision.  We will try to cover most common cricketing shots like Cover Drive, Flick, and Straight Drive etc. with some other activities like batsmen’s posture when playing the respective shot.  Tentatively we have a dataset of about 6 hours of videos which are highlights of different cricket matches, we will be adding more data which will mainly be videos specifically related to a shot played by the batsman. Irrelevant data will be cleaned from ‘matches highlights’ data and only the main shots will be picked.  Some of the models Which were mentioned in the research papers and are previously used are CNN and GRU (Specific model of RNN). | | | | |  |
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| **Benefits of the Project (less** | The recognition and classification of cricket shots from video sequences has several potential applications.  Many of these applications might not even seem all that apparent at first but can become the cornerstone of many different application later down the line.  Some of these include within fields such as:   1. Computer Vision 2. Virtual Reality 3. Augmented Reality 4. Video assistance 5. Monitoring and evaluation of sports in industry 6. Video games 7. Monitoring and evaluation of human(s) 8. Extraction of information from videos 9. Help for Sports analysts and Cricket coaches 10. Real time applications for sports matches 11. Assistance for people who are new to cricket   Further expanding on the above examples. In recent years VR/AR has expanded and become more widely available to the general publication. Once thought to be the work of fiction has now become a reality. Video games/Sports have become one of the most recent uses of this technology. Allowing users to play their favorite sports at home without needing to go to a ground or have a large team to enjoy it. Our project provides the benefit of players being able to practice certain kinds of shots or even see which shots they play the most by being integrated with these technologies.  Cricket shot classification also allows for sports analysts and coaches to see what type of shots the players play on different fields in response to different balls, pitch and weather conditions.  By being able to recognize and classify different types of cricket shots our project brings the next stage of evolution for being able to extract information from Videos. By Further expanding on the ways information is currently extracted from videos it will evolve and bring about a new way of extracting and using that information. | | |  | |  |
| **than 2500 characters)** |  | | | | |  |
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| **Technical** |  | | |  |
| **Details of Final Deliverable (less than 2500 characters)** | A model that can recognize various cricketing shots played with in different cricket matches based on models of Deep learning using computer vision. | | |  |
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| **Final Deliverable of the Project** |  | | |  |
|  | The final deliverable of the project is to introduce new hybrid model of Computer vision for recognizing different cricketing shots. |  |  |  |
| **Core Industry (Optional)** | Computer Vision, Help for Sports analysts and Cricket coaches |  |  |  |
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| **Other** | ESPN cricinfo and cricbuzz. |  |  |  |
| **Industries**  **(Optional)** |  |  |  |  |
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| **Core** | Computer Vision, Deep Learning, Tensorflow, Keras, OpenCV, Sklearn, Pandas, Numpy and Flask. |  |  |  |
| **Technology** |  |  |  |  |
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| **Other** | Machine Learning, Artificial Intelligence |  |  |  |
| **Technologies (Optional)** |  |  |  |  |
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| **Sustainable** | Discover which are the variables that determine which shot is performed by the batsmen. |  |  |  |
| **Development** |  |  |  |  |
| **Goals**  **(Optional)** |  |  |  |  |
|  |  |  |  |  |
| References     |  |  |  | | --- | --- | --- | | 1. List and number all bibliographical references here like this. 2. A.B. Smith, C.D. Jones, and E.F. Roberts, “Article Title”, Journal, Publisher, Location, Date, pp. 1-10. 3. Jones, C.D., A.B. Smith, and E.F. Roberts, Book Title, Publisher, Location, Date |  |  | | |  |  |  |
| Project Key Milestones | |  |  |  |
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| **Elapsed time in Months** | **Milestone** | **Deliverable** | | |
| Month 1 | Problem identification, Set limits for the problem and design approach, and writing of proposal report and presentation | Problem Identification. | | |
| Month 2 | Detailed literature review of existing cricket shots classification research papers and the techniques they have used. Selection of base research papers and dataset collection. | Dataset. | | |
| Month 3 | Explore tools and libraries for performing Object/batsman detection and recognition along with the full pipeline. Setup tools and libraries. | Theoretical framework. | | |
| Month 4 | Training and Implementation of the algorithms on the datasets. Review of the Implemented algorithms and testing. | Baseline model with results. | | |
| Month 5 | FYP1 report writing.  Request feedback from advisor and start working on new Hybrid models. | FYP1 report. | | |
| Month 6 | Extend experiment. |  | | |
| Month 7 | Review of the Implemented algorithms and testing.  Comparison of existing architecture with our proposed model. | Our proposed model results. | | |
| Month 8 | Developing the reports with details of the experiment.  Documenting the evaluation of results of the experiment.  Preparing the report for the complete experiment.  Preparing the presentation. | FYP2 Report. | | |

Project Equipment Details



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| **Item(s) Name** | **Type** | **No. of Units** | **Per Unit Cost (in Rs)** | **Total (in Rs)** |
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