SPORTS CELEBRITY IMAGE CLASSIFICATION

1. Introduction

As sports celebrities become more common in media and online, finding ways to identify and categorize their images has become important. This paper presents a new system for classifying images of sports celebrities using advanced image recognition techniques. Sports celebrity image classification focuses on identifying and categorizing images of well-known athletes. This process uses advanced machine learning algorithms, particularly Convolutional Neural Networks (CNNs), to accurately distinguish between different sports figures based on their appearance, uniforms, and associated features. We tested several CNN models, including ResNet and MobileNetV6, to evaluate their performance in distinguishing between athletes from different sports and leagues. The dataset used in this study comprises thousands of labeled images sourced from Kaggle. Building on the techniques outlined in reference[1], our results demonstrate that the CNN-based system, particularly with MobileNetV6, achieves high accuracy and robustness. This system has significant potential for applications in media management, fan engagement, and automated content tagging.

2. Related Work

The field of sports celebrity image classification has seen considerable research, with several key studies advancing the understanding and methodologies in this domain. This section reviews the contributions of four significant papers in this area. Reference Paper [1] demonstrated the effectiveness of CNNs in classifying images into specific categories by training on extensive datasets. Reference Paper [2] investigates how celebrities use social media platforms, such as Twitter, to create an illusion of personal connection and backstage access. Examining the components of a sports celebrity's brand image can help sports managers gain a deeper understanding of how this image is created and managed [3]. The survey on face recognition by computers reviews research focused on face recognition techniques using Convolutional Neural Networks (CNNs) [4]. It highlights various studies that have applied CNNs to enhance the accuracy and effectiveness of face recognition systems.

3. Materials and Experimental Evaluation

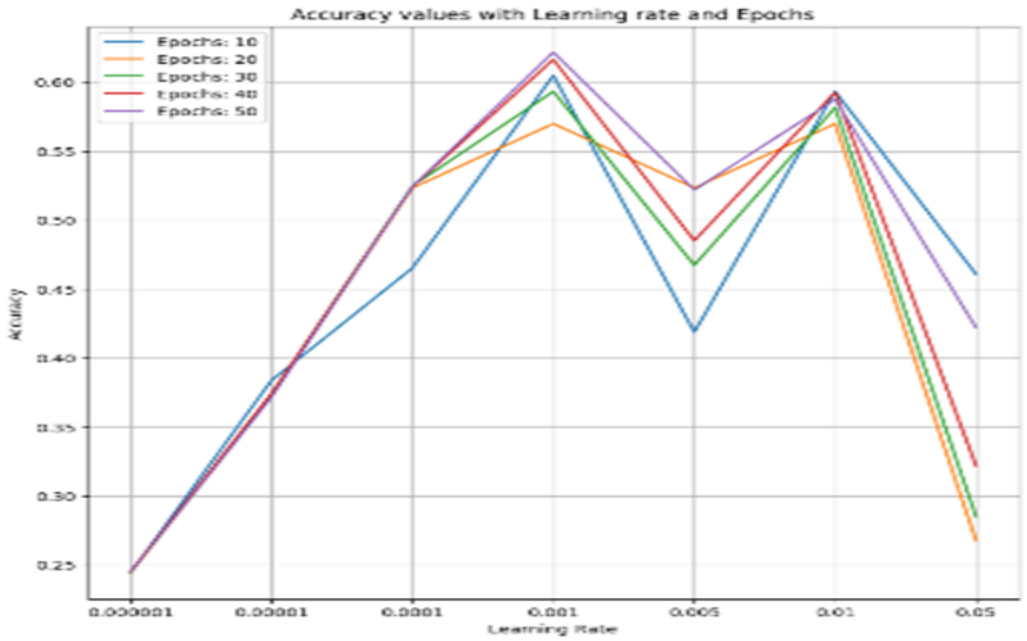
3.1 Dataset

- https://www.kaggle.com/datasets/yaswanthgali/sport-celebrity-image-classification
- The Dataset contains images of legends in their respective games. Each directory has around 100 images to build a model to classify these images. The 4 categories of classes are :Kane Williamson, Kobe Bryant, Maria Sharapova and Ronaldo
- The class Kane Williamson makes up 50% of the data, while another class Maria Sharapova makes up only 30%.

- We used 80% of the data for training and 20% for Validation

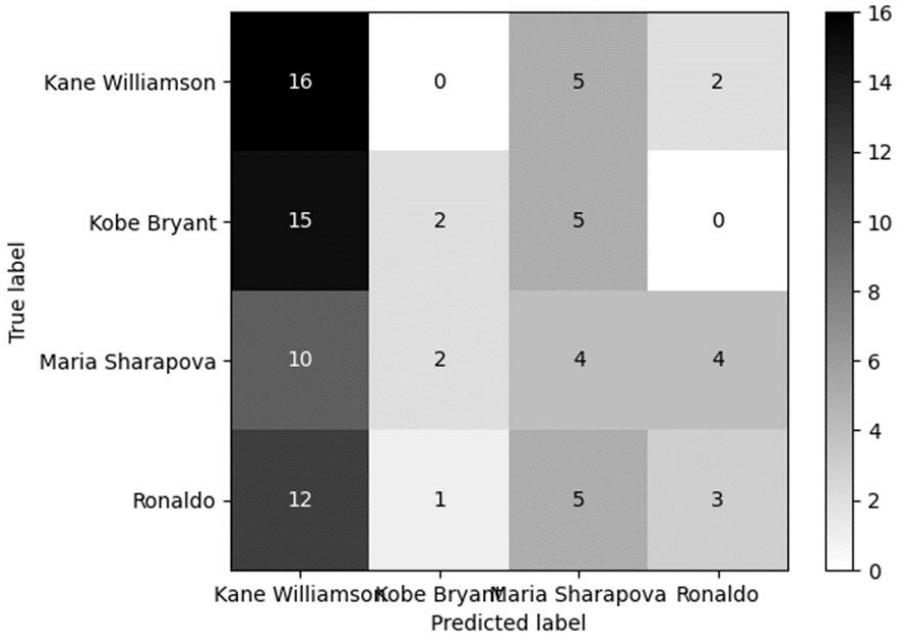
3.2 Methodology

- MobileNetV2 is a lightweight efficient convolutional neural network developed by Google for mobile and embedded devices. It uses depthwise separable convolutions and introduces linear bottlenecks with inverted residuals to enhance efficiency and performance. This architecture balances computational cost and accuracy, making it ideal for real-time applications with limited resources.
- It's used in a variety of applications, including image classification, object detection, and other computer vision tasks
- Kaggle provides a valuable resource for sports celebrity image classification through its datasets. These datasets typically contain a large collection of labeled images featuring various sports celebrities, gathered from diverse sources. They often include metadata such as celebrity names, sports disciplines, and image contexts, which are crucial for training and evaluating classification models.
- When tuning a MobileNetV2 algorithm, several parameters and strategies can be adjusted to optimize performance for a specific task. The following parameters: Learning rate and Epochs are used.
- The performance of the system is illustrated in the graph below.



3.3 Results

The confusion matrix : A confusion matrix provides a detailed breakdown of the classification performance of the model by showing the number of correct and incorrect predictions for each class is illustrated below



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Classification Report: A classification report summarizes the performance metrics for each class, typically including precision, recall, and F1-score. Here's a format for the classification report:

	precision	recall	f1-score	support
0	0.30	0.70	0.42	23
1	0.40	0.09	0.15	22
2	0.21	0.20	0.21	20
3	0.33	0.14	0.20	21
accuracy			0.29	86
macro avg	0.31	0.28	0.24	86
weighted avg	0.31	0.29	0.25	86

This matrix and report provide insights into how well the classification model performs for each celebrity class and overall.

4. Future Work

While the project achieved high classification accuracy, there are opportunities for further improvement. Future work could explore incorporating additional features, such as temporal data from video sequences or integrating other modalities like audio, to enhance the system's capabilities. Additionally, expanding the dataset to include more celebrities and sports disciplines could further improve model performance and applicability.

5. Conclusion

The sports celebrity image classification project demonstrates significant advancements in accurately identifying and categorizing images of athletes using modern machine learning techniques. By leveraging convolutional neural networks

(CNNs) and transfer learning, the system effectively classifies images of sports celebrities across various disciplines, achieving high levels of accuracy and robustness. This project highlights the potential of advanced image classification techniques in the sports domain and sets a foundation for future developments in automated sports celebrity recognition and management.

6.Reference

1.https://www.ijeast.com/papers/196-198,Tesma609,IJEAST.pdf

2.https://journals.sagepub.com/doi/abs/10.1177/1354856510394539

3.https://research.usq.edu.au/item/q098q/a-sport-celebrity-image-model-focusing-efforts-to-improve-outcomes

4. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1444814