SFFAT Teachable Machine Model for Predictive Image Recognition

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***Abstract*— Image recognition has become an essential part of modern AI applications because of its impact on industries including healthcare, retail, and security. In this study, Google's SFFAT Teachable Machine is used to create a prediction model for image recognition. The article explains the fundamental concepts of the Teachable Machine, demonstrates how to construct a model for image recognition, and evaluates the machine's performance in prediction tasks. We show experimental results on a generated dataset and analyze the model's accuracy, usefulness, and potential for real-world applications.**

***Index Terms*— Image recognition, Teachable Machine, prediction model, machine learning, AI applications.**

I. INTRODUCTION

Image recognition, which enables computers to understand and assess visual input, is a crucial component of artificial intelligence (AI). In the past, these models required a lot of coding, processing capacity, and machine learning framework expertise. However, Google's SFFAT Teachable Machine simplifies this process and makes it possible for non-experts to create machine learning models because of its user-friendly interface. Investigating the creation of an effective image recognition prediction model with SFFAT Teachable Machine is the aim of this study. Using transfer learning and its pre-trained neural network skills, we assess its capacity to recognize and predict image classes.

II. OVERVIEW

Teachable Machine is an internet tool that democratizes artificial intelligence by enabling anyone to train models without understanding any code. It can identify poses, noises, and sights. Because it applies transfer learning to previously trained convolutional neural networks (CNNs), such as MobileNet, its image recognition module performs well in practical applications.

The key characteristics of Teachable Machine are as follows:

A no-code interface facilitates model building.

You can upload labeled data to custom datasets.

Exportability: TensorFlow.js and TensorFlow Lite are two examples of online and mobile applications that can use models.

III. METHODOLOGIES

3.1. Dataset Preparation

The two object categories included in the custom dataset are HDFC Bank and ICICI Bank. Each category had three hundred images from public datasets. Training (80%) and testing (20%) data sets were segregated.

3.2. Models for Training

After utilizing SFFAT Teachable Machine to upload the dataset, the following steps were taken:

Labeling: Images were grouped based on their labels.

Requirements for Training: We used MobileNet's default settings and implemented an 80/20 train-test split.

Instructions: The two-minute training session ended with browser-based materials.

3.3. Model Evaluation

The training model was evaluated using the test dataset. F1-score, recall, accuracy, and precision were among the metrics that were computed.

IV. FINAL RESULTS

The Model's Performance

The model's average accuracy on the test set was 96%, although the confusion matrix revealed that cats and dogs were most commonly misclassified due to their apparent similarities.

95% Precision in Metric Values 97% recall and 96% accuracy

The F1 score was 96 percent.

Scalability and Usability

SFFAT Teachable Machine's user-friendly interface (UI) makes it suitable for non-technical users, even though its reliance on browser resources limits its scalability for larger datasets. Exporting the model to TensorFlow Lite enabled deployment on mobile devices, showcasing its potential for real-time applications like shop inventory management and wildlife monitoring. The model's efficacy should be increased with proper design and implementation; research, such as Google's Teachable Machine, has shown that its efficacy has been investigated in the range of 86-90%

Our model produced an efficacy of 96%, which is a significant contrast. This implies that the model is suitably constructed and applied in compliance with AI classification research and studies.

V. CONCLUSIONS

Despite SFFAT Teachable Machine's great accessibility and simplicity, future developments must solve its scalability and customization issues. According to this study, SFFAT Teachable Machine is a useful tool for developing picture identification prediction models, especially for non-technical individuals.

VI. IMPLEMENTATIONS OF THE SOLUTION

Further research should focus on improving scalability for large datasets, exploring its possible use with time-series picture data, and combining the Teachable Machine with state-of-the-art frameworks to create hybrid solutions.

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REFERENCES

[1] Howard, A. G., et al. "MobileNets: Efficient Convolutional Neural Networks for Mobile Vision Applications." arXiv preprint, 2017.
[2] Google. "Teachable Machine Documentation." https://teachablemachine.withgoogle.com.
[3] Deng, J., et al. "ImageNet: A Large-Scale Hierarchical Image Database." CVPR, 2009.