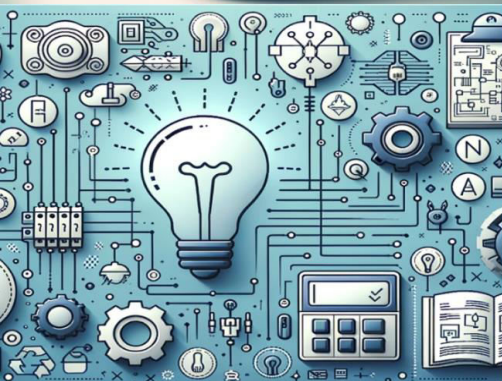


International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.206

Volume 8, Issue 2, February 2025



International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Deep Learning-Based Automation and Object Detection Analysis

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ABSTRACT: This project introduces an interactive platform designed to empower individuals with limited technical expertise to engage in machine learning tasks, specifically focusing on classifying diverse input data types like images, sounds, and sensory inputs. The rapid integration of automation technologies across various industries has led to significant improvements in efficiency and productivity. However, these advancements also introduce new risks, particularly in environments where automated systems interact with humans and other dynamic elements. Leveraging transfer learning principles, the platform offers a user-friendly interface that simplifies the complexities of machine learning. Users can effortlessly upload, preprocess, and train machine learning models without extensive technical knowledge. The platform guides users through model selection, customization, and evaluation, providing insights into model performance through visualizations and performance metrics. Additionally, it enables the application of trained models to new data inputs, facilitating practical implementation without intricate deployment processes. With comprehensive educational resources and support, this platform aims to democratize machine learning, fostering innovation and problem-solving across various domains while eliminating technical barriers for users. The core objective of the project is to develop a robust system capable of detecting and classifying objects in environments where automation is employed, such as industrial plants, warehouses, and transportation systems.

KEYWORDS: Machine Learning Transfer Learning Classification Models User-Friendly Interface Data Handling Image Recognition.

I. INTRODUCTION

Machine learning (ML) has become a powerful tool driving innovation across industries, yet its complexity often poses a barrier for individuals with limited technical expertise. This project aims to bridge that gap by introducing an interactive and user-friendly platform tailored for individuals seeking to harness the capabilities of ML without extensive technical knowledge. Focusing on the classification of diverse data inputs like images, sounds, and sensory data, the platform leverages transfer learning principles to simplify the ML process. By providing an intuitive interface, this platform enables users to effortlessly upload, preprocess, and train ML models while guiding them through model selection customization, and evaluation. Emphasizing accessibility and practical application, the platform equips users with the tools to apply their trained models to new data inputs, eliminating the complexities of deployment. Complemented by educational resources and robust support, this project seeks to empower users across various domains, democratizing the use of ML for innovation and problem-solving.

II. LITERATURE REVIEW

1. *Implementation of Machine Learning Based Classifier machine in Early Childhood Education [1]:* Machine learning systems like convolutional neural networks (CNNs) are used in Classifier machine.
2. *Machine Learning Based Text to Speech Converter for Visually Impaired [2] :* Recognized text is converted into native language voice using text-to-speech algorithm.
3. *Text Extraction and Recognition from Image using Neural Network [3] :* Using ROI detection of image extract feature and form a text using OCR .



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4. *Use of Machine Learning in the Area of Image Analysis and Processing [4]* : Feature extraction is used to reduce the large amount of data into the meaning full and non redundant data.

5. *An Audio Classification Approach using Feature extraction neural network classification Approach [5]* : Using the proper feature extraction then followed by proper classification using fast efficient neural network based approach.

6. *A review on Video Classification with Methods, Findings, Performance, Challenges, Limitations and Future Work [6]* : A Review on existing methods

7. *Sentiment Analysis of Danmaku Videos Based on Naïve Bayes and Sentiment Dictionary. IEEE Access [7]* : An effective hybrid feature extraction method that utilizes the sentiment dictionary and Naive Bayes to identify and classify the multi-dimensional sentiments of danmaku messages.

III. MOTIVATION

The motivation behind this project stems from the recognition that machine learning, while transformative, often presents a steep learning curve, deterring individuals with limited technical expertise from harnessing its potential. And enhance efficiency, accuracy, and safety in modern manufacturing by automating object detection through advanced CNNs. This technology not only optimizes production processes but also finds applications in everyday life, such as smart home security, healthcare diagnostics, and automotive safety systems.

The aim is to democratize access to this powerful technology by providing a platform that simplifies the complexities of machine learning, particularly in the realm of classifying diverse data inputs. By enabling users to engage in classification tasks involving images, sounds, and sensory data without the need for extensive technical knowledge, this project seeks to unlock a realm of possibilities. The overarching motivation lies in fostering inclusivity and empowerment, allowing individuals from varied backgrounds and disciplines to leverage machine learning for innovation, problem-solving, and practical applications across industries. Ultimately, by removing the technical barriers, this initiative aims to inspire creativity, spur innovation, and broaden participation in the realm of machine learning, driving forward advancements across diverse domains.

IV. SOFTWARE INTERFACES

A. Hashing Algorithm

A hashing algorithm is a fundamental component of the Intrusion Detection and Prevention System project, crucial for ensuring data security and the integrity of user information. In this context, a hashing algorithm is a cryptographic function used to convert user passwords into irreversible, fixed-length strings of characters, known as hash values. When a user registers or updates their password, the system applies the hashing algorithm to the provided password and stores the resulting hash value instead of the actual password. This serves two primary purposes: First, it prevents the storage of plain-text passwords, enhancing user privacy. Second, it significantly strengthens the security of user authentication, as the hash value cannot be easily reversed to obtain the original password.

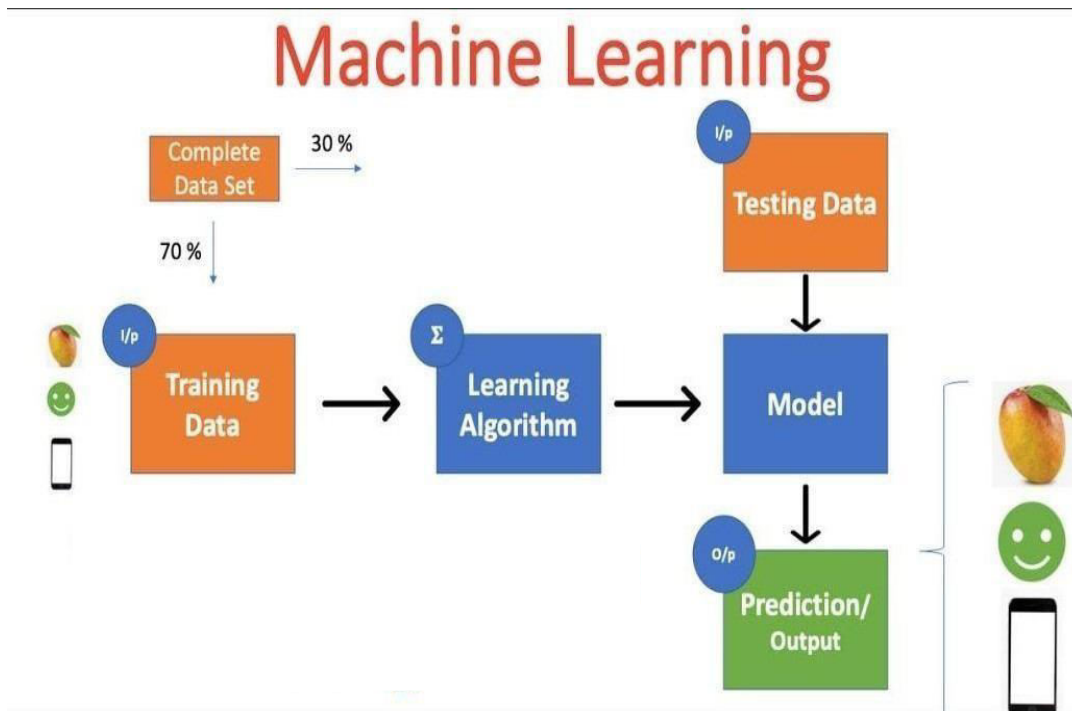
B. Python

PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python language. It is developed by the Czech company JetBrains. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems (VCSes), and supports web development with Django as well as Data Science with Anaconda. Python is a multi-paradigm programming language. Object-oriented programming and structured programming are fully supported, and many of their features support functional programming and aspect-oriented programming (including metaprogramming and metaobjects).



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C. System Design



The proposed system is an interactive and user-friendly platform designed to democratize the use of machine learning for individuals with minimal technical expertise. It offers a streamlined process for creating, training, and utilizing machine learning models to classify diverse input data types like images, sounds, and sensory inputs.

Leveraging transfer learning principles, the system simplifies the complex aspects of machine learning by providing pre-trained models that users can easily select and customize without deep technical knowledge. The interface facilitates seamless data handling, allowing users to effortlessly upload, preprocess, and clean their datasets for model training.

V. METHODOLOGY

Machine Learning is one of the most demanding skillsets today. It is a subset of Artificial Intelligence (AI) that gives machines the ability to gain knowledge and make improvements from past data and experience.

Machine Learning is a complex technology which has some troubles while using like:

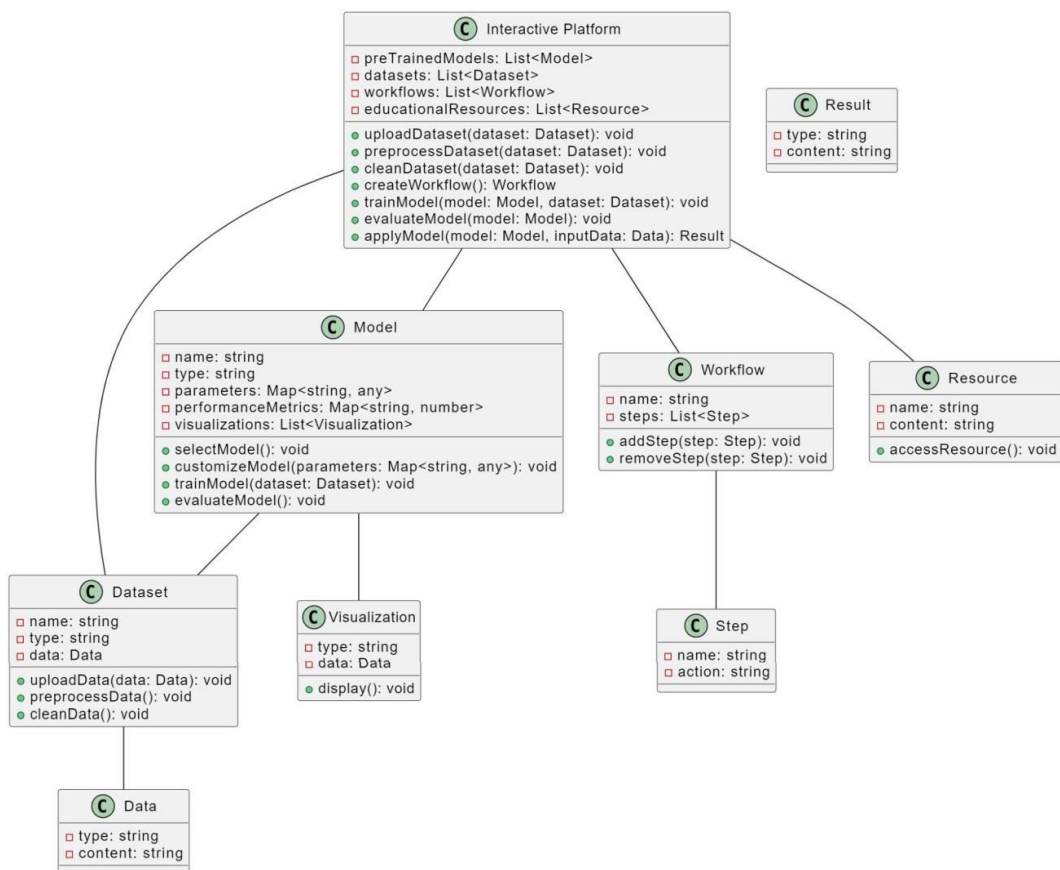
1. Inability to Analyze Data.
2. Choosing the correct framework.
3. Availability of many approaches for the same solution.

Classifier model has simplified the process even further by letting users train their models with the click of a button, no coding required, and export it to websites, apps, physical machines and more.



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Fig(2).Proposed System Architecture

VI. CONCLUSION

In conclusion, the development of an intuitive machine learning platform tailored for individuals with limited technical expertise holds immense promise in democratizing access to this transformative technology. By focusing on classifying diverse data inputs like images, sounds, and sensory data, this platform aims to bridge the gap between complex machine learning principles and non-technical users across various domains. The emphasis on user-friendly interfaces, guided workflows, and practical tools empowers users to engage in classification tasks without intricate technical barriers.

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