IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

# Fast Face Recognition Based Attendance System

**Dr. Moumita Ghosh, Sampad Dutta, Soumen Biswas, Bikramaditiya Nandan**
Department of Information Technology
Narula Institute of Technology, Kolkata, India

**Abstract:** *In recent times everything is automated by using of machine learning and AI. But in schools, colleges, some offices uses the same old traditional method, pen and paper method, for attendance, and modern facial or biometric attendance systems are very costly. We have to replace this traditional method to modern, automated, cost efficient way, and our web app is the perfect thing for this transition. It can detect your face accurately and mark the attendance by using any camera, which has to be connected to the system which is programmed to handle the face recognition.*

**Keywords:** OpenCV, Insightface, Redis Database, Streamlit

## I. INTRODUCTION

In this digital era everything is becoming digitize and contactless, from buisness payments to ticketing system are using contactless system after the COVID-19. And student and employee attendance can now be recorded without any physiscal touch using face detections attendance systyem.

In the traditional student attendance system, teachers called out each student's name individually and marked their attendance on paper with a pen. This method is not only time-consuming but also susceptible to proxy attendance. To address these challenges, some institutes have adopted fingerprint scanners, iris scanners, and other biometric technologies to track attendance.[1]

In the Artificial Intelligency or AI boosting years, face recognition has emerged as a highly effective method for analyzing and interpreting face images. Marking attnendace, finding missing persons, detect drivers, are some applications of face recognition. Methods most of the time used in face recognition include:

Face Detection: Face detector algorithms locate faces, draw bounding boxes around faces, and keep the coordinates of bounding boxes. [2]

1. Feature Extraction: Extract features of faces that will be used for training and recognition tasks.[2]
2. Face Recognition: Matching the face against one or more known faces in a prepared database.[2]

Traditional face recognition system has some drawbacks. For each person we have to train the model by using at least 100 samples, and we cannot train the model using the pretrained model. Every time when new student register he or she has to give new samples and train the model. As the number of people classified increases, the model's accuracy decreases. Need lots of time for this process.

Fast Face Recognition System needs fewer samples for identifying a person, and no need to train the model for a new student.

OpenCV, short for Open Source Computer Vision Library, is a protean open- source computer vision and machine literacy software library. originally developed by Intel in 1999, OpenCV has grown into one of the most extensively used tools for a range of computer vision tasks, including image and videotape analysis, object discovery and recognition, facial recognition, and indeed robotics. It provides a comprehensive suite of functions and algorithms that enable inventors to make advanced operations with ease. OpenCV supports multiple programming languages, including C, Python, and Java, making it accessible to a broad community of inventors and experimenters worldwide.

InsightFace is a state- of- the- art face recognition frame that has gained elevation for its high delicacy and effectiveness. Developed by the InsightFace platoon, it leverages slice- edge deep literacy ways to exceed in face recognition tasks. With its innovative armature and robust algorithms, InsightFace has come a go- to result for colorful operations, ranging from security systems to substantiated stoner gests . By furnishing a comprehensive set of tools and models, InsightFace empowers experimenters and inventors to attack complex face recognition challenges with ease.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

## II. LITERATURE REVIEW

Authors in [1] proposed a model of face recognition-based attendance system. The four steps of this system are database setup, face detection, face feature extraction, face recognition, and attendance updating. Students' face features are used to make databases. The Hear-Cascade classifier and the Local Binary Pattern Histogram technique is used, respectively, for face detection and recognition. Faces are captured and recognized by using classrooms' CCTV footage. Attendance will be mailed to the suitable professor at the end of class.

In this paper [3], Face finding is the procedure where face is attained in an image that's used as an input, and additionally the facial image is mopping up for smooth face identification. To detecting faces, the CNN algorithm can be used.

Authors in [4] proposed a model of Attendance Management System Using Face Recognition. The main purpose is to automate the attendance system by integrating facial recognition technology using the Matlab Graphical User Interface (GUI), modified Local Binary Pattern(LBP), and Support Vector Machine( SVM) algorithm. When face spotting and feature extraction is completed using Viola Jones and LBP, the image is transfer for recognition.

## III. METHODOLOGY

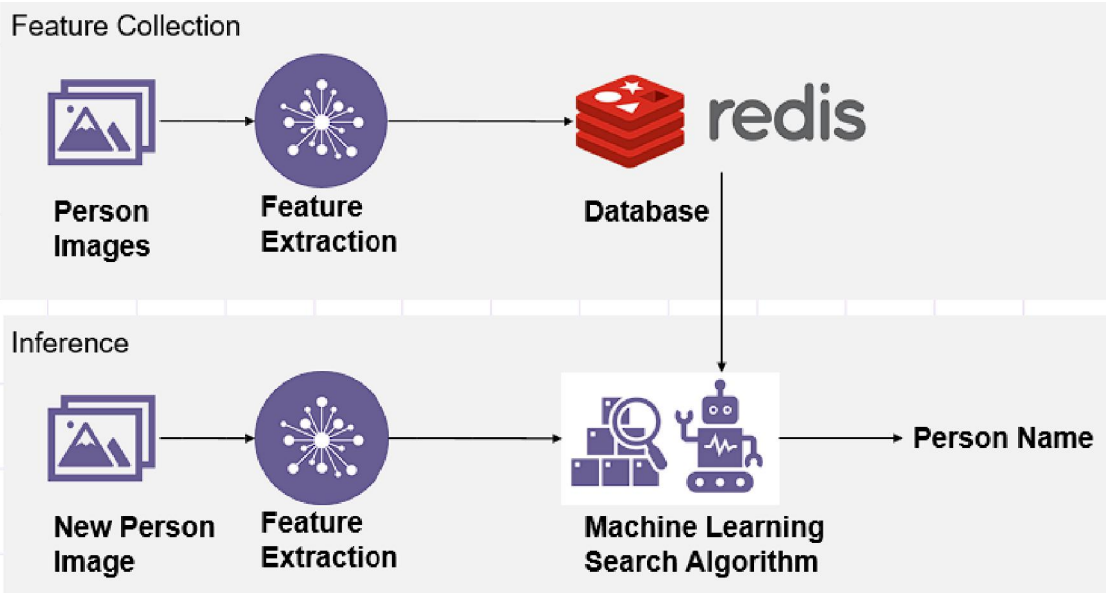


Figure. Fast Face Recognition

An image of a person is captured using web-cam. In the Radis database, person image is kept. Redis is an in memory data structure store that's open source( BSD certified), used as a database, cache, communication broker, and streaming machine. Redis uses an in- memory dataset in order to deliver the best performance.

Machine Learning Search Algorithms like Euclidean Distance, Manhattan Distance, and Cosine Similarity are used to extract features. Search Algorithms are relies on distance measures. Depending on the orders of data, different distance measures must be named and applied. As a result, it's critical to understand the perpetration, computation, and interpretation of a variety of extensively used distance measures.

The little distance between two vectors is described by the Euclidean Distance. It's accure by utilizing the sum of places of differences between corresponding elements, or its square root. The L2- norm of a disparity between vectors and vector spaces is original to the Euclidean distance metric. It's determined

mathematically utilizing Pythagoras' Theorem. The sum of the places along each vertical ordinate represents the common distance between two objects.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

Euclidean Distance expressed as:

$$D(x, y) = \sqrt{\sum_{i=1}^{n}(x_i - y_i)^2)}$$

The Manhattan Distance is the total of all the absolute disparities between two points in all the dimensions.

$$D(x, y) = \sum_{i=1}^{k} |x_i - y_i|$$

Cosine similarity is a mathematical metric that measures the similarity of two vectors in a multi-dimensional space.It establishes whether two vectors roughly point in the same direction by calculating the cosine angle between them.
The cosine similarity may be expressed as:

$$D(x, y) = cos(\theta) = \frac{x \cdot y}{\|x\| \, \|y\|}$$

An open-source Python toolkit called Streamlit makes it simple to develop and distribute stunning, personalized web apps for data science and machine learning. Using Streamlit App, an attendance app was developed.

## IV. RESULT AND DISCUSSIONS

This project's basic operation is to save students' face data in database in order to be student detection and mark the attendance. Additionally, attendance includes the student's recognisable photograph

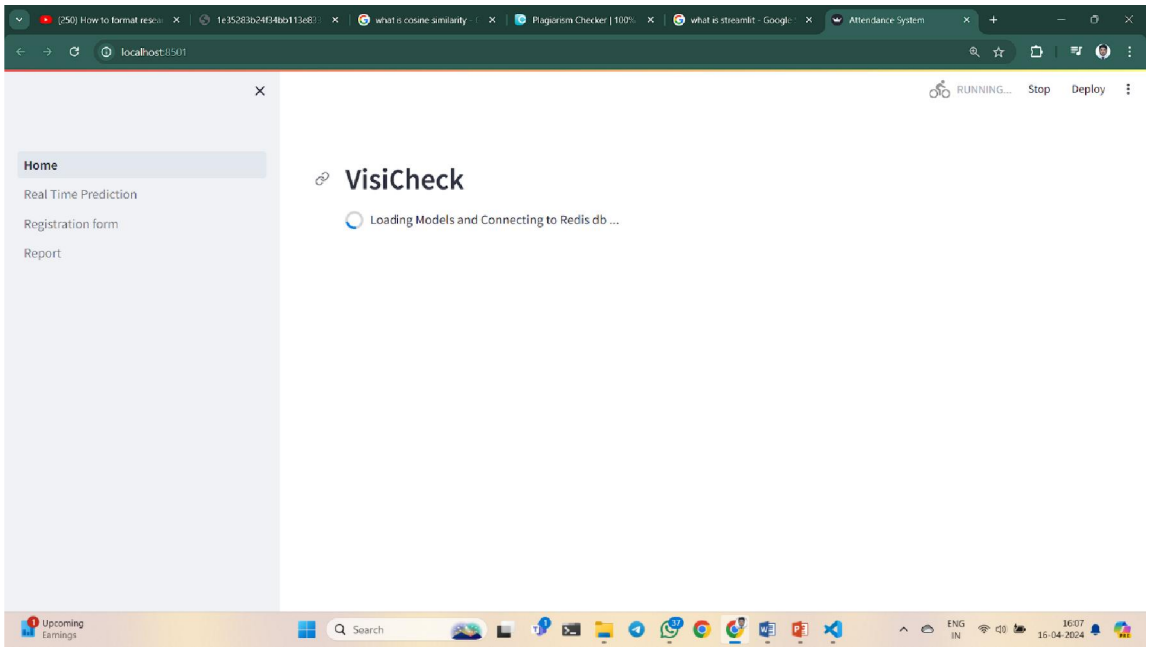


Figure 1: Home page

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

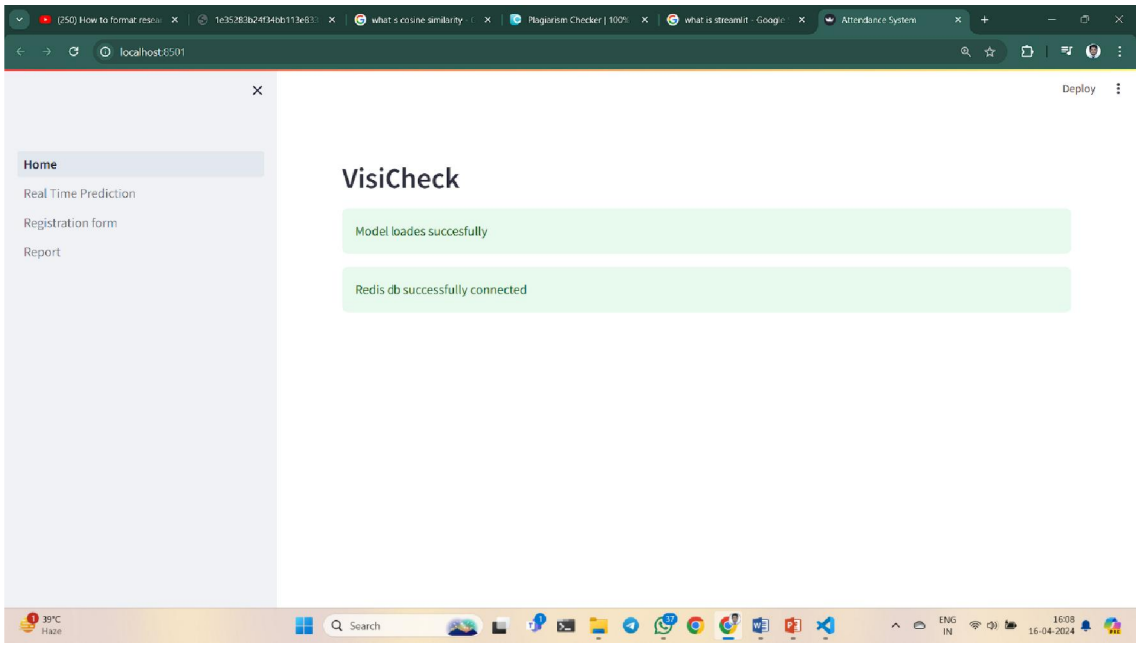


Figure 2 : Home page with successfully load models

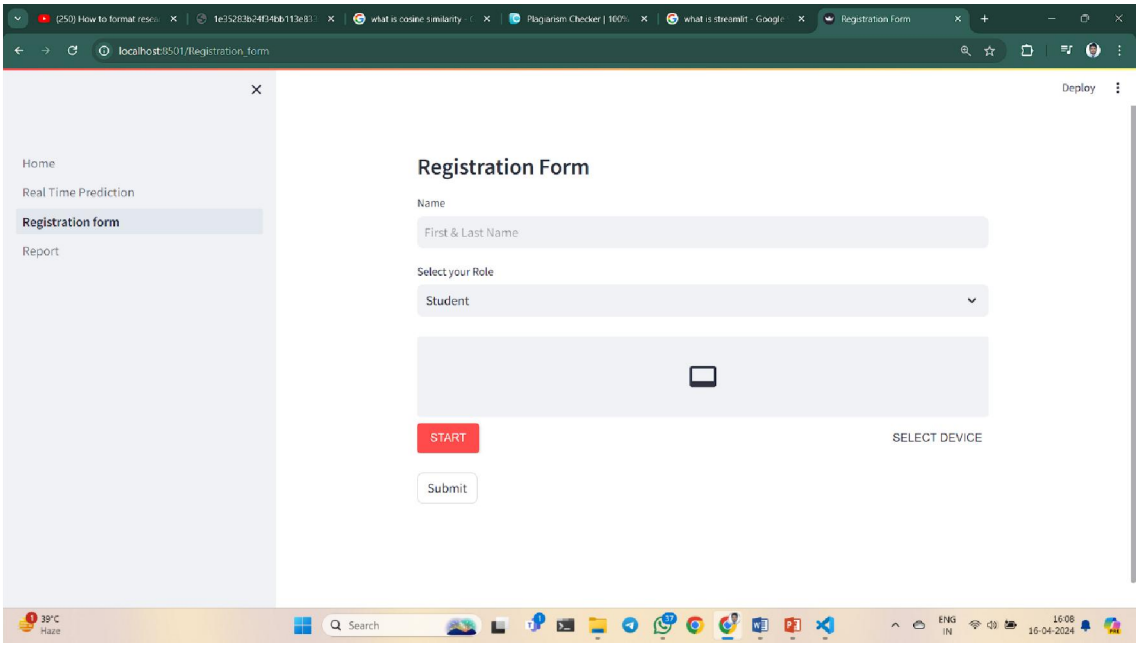


Figure 3: Registration page

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

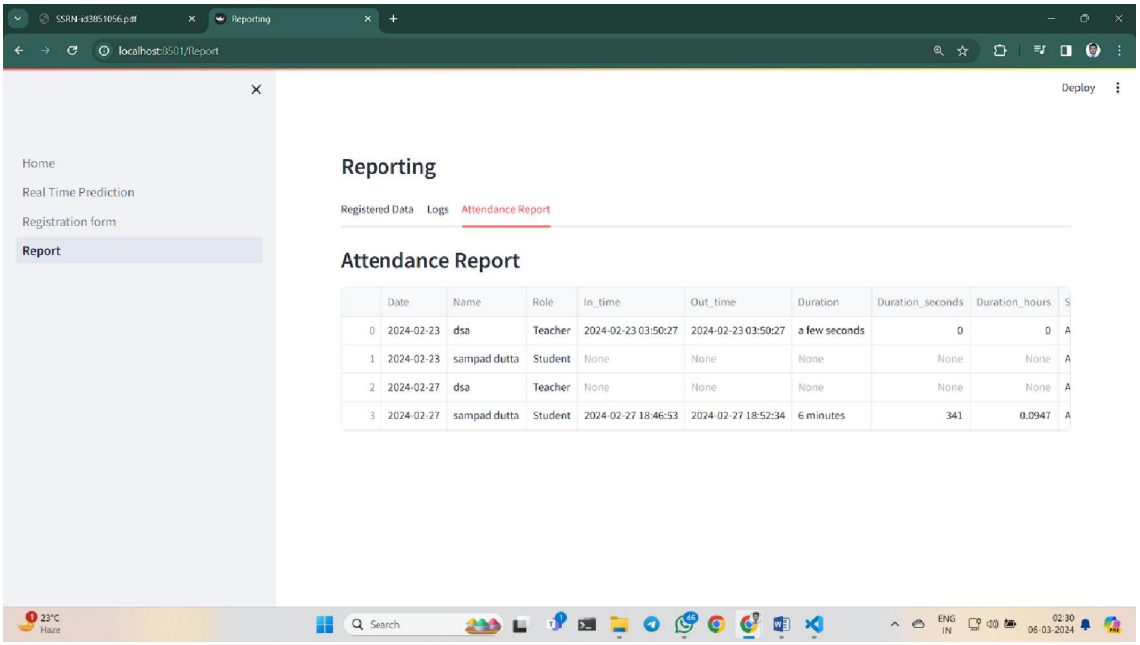


Figure 4: Report page

## V. CONCLUSION

A face-recognition automatic attendance system automatically determines the name of the person. The suggested application can identify registered teachers and students.

For unregister students, this system identifies the unregistered. Each day, note when students enter and leave. Obtain the instructor's and the student's daily attendance records.

## REFERENCES

**[1].** Chaitra T.K, M.C. Chandrashekhar, Dr. M.Z. Kurian [August 2018] , "Attendance Management System Using Face Recognition", JETIR , Volume 5, Issue 8 , ISSN-2349- 5162

**[2].** Principal, S. H. M., Mishra, A., Sharma, J. K., Aarif, M., & Arwab, M. SMART AND INNOVATIVE IDEAS TO PROMOTE TOURISM FOR GLOBAL TRADE AND ECONOMIC GROWTH.

**[3].** Ebrahimi, M., Attarilar, S., Gode, C., Kandavalli, S. R., Shamsborhan, M., & Wang, Q. (2023). Conceptual Analysis on Severe Plastic Deformation Processes of Shape Memory Alloys: Mechanical Properties and Microstructure Characterization. Metals, 13(3), 447.

**[4].** J. K. S. Al-Safi, A. Bansal, M. Aarif, M. S. Z. Almahairah, G. Manoharan and F. J. Alotoum, "Assessment Based On IoT For Efficient Information Surveillance Regarding Harmful Strikes Upon Financial Collection," 2023 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2023, pp. 1-5, doi: 10.1109/ICCCI56745.2023.101285 00.

**[5].** Khan, S.I., Kaur, C., Al Ansari, M.S. et al. Implementation of cloud based IoT technology in manufacturing industry for smart control of manufacturing process. Int J Interact Des Manuf (2023). https://doi.org/10.1007/s12008- 023-01366-w

**[6].** M, Arun and Alalmai, Ali and Aarif, Mohd, Student's Anticipation in Procuring Post Graduation Programme in Hotel Management through Distance Learning (March 1, 2022). ANWESH: International Journal of Management & Information Technology (2022), Available at SSRN: https://ssrn.com/abstract=4 072674

**[7].** Tidake, Vishal & Mazumdar, Nilanjan & Kumar, A. & Rao, B. & Fatma, Dr Gulnaz & Raj, I.. (2023). Sentiment Analysis of Movie Review using Hybrid Optimization with Convolutional Neural Network in English Language. 1668-1673. 10.1109/ICAIS56108.2023.100737 50.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

**[8].** Kaur, C., Panda, T., Panda, S., Al Ansari, A. R. M., Nivetha, M., & Bala, B. K. (2023, February). Utilizing the Random Forest Algorithm to Enhance Alzheimer's disease Diagnosis. In 2023 Third International Conference on Artificial Intelligence and Smart Energy (ICAIS) (pp. 1662-1667). IEEE.

**[9].** Kandavalli, S. R., Wang, Q., Ebrahimi, M., Gode, C., Djavanroodi, F., Attarilar, S., & Liu, S. (2021). A brief review on the evolution of metallic dental implants: history, design, and application. Frontiers in Materials, 140.

**[10].** C. Kaur, T. Panda, S. Panda, A. Rahman Mohammed Al Ansari, M. Nivetha and B. Kiran Bala, "Utilizing the Random Forest Algorithm to Enhance Alzheimer's disease Diagnosis," 2023 Third International Conference on Artificial Intelligence and Smart Energy (ICAIS), Coimbatore, India, 2023, pp. 1662-1667, doi: 10.1109/ICAIS56108.2023.100738 52.

**[11].** M. A. Tripathi, R. Tripathi, F. Effendy, G. Manoharan, M. John Paul and M. Aarif, "An In-Depth Analysis of the Role That ML and Big Data Play in Driving Digital Marketing's Paradigm Shift," 2023 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2023, pp. 1-6, doi: 10.1109/ICCCI56745.2023.101283 57.

**[12].** Siddiqua, A. Anjum, S. Kondapalli and C. Kaur, "Regulating and monitoring IoT controlled solar power plant by ML," 2023 International Conference on Computer Communication and Informatics (ICCCI), Coimbatore, India, 2023, pp. 1-4, doi: 10.1109/ICCCI56745.2023.101283 00.

**[13].** Dr. V Suresh, Srinivasa Chakravarthi Dumpa, Chiranjeevi Deepak Vankayala, HaneeshaAduri, Jayasree Rapa [2019], "Facial Recognition Attendance System Using Python and OpenCV", Journal of Software Engineering and Simulation Volume 5 : Issue 2 (2019) pp: 18-29 ISSN(Online) :2321-3795 ISSN (Print):2321- 3809

**[14].** M. Lourens, A. Tamizhselvi, B. Goswami, J. Alanya-Beltran, M. Aarif and D. Gangodkar, "DatabaseManagement Difficulties in the Internet of Things," 2022 5th International Conference on Contemporary Computing and Informatics (IC3I), Uttar Pradesh, India, 2022, pp. 322-326, doi: 10.1109/IC3I56241.2022.10072614

**[15].** Dhas, D. S. E. J., Raja, R., Jannet, S., Wins, K. L. D., Thomas, J. M., & Kandavalli, S. R. (2023). Effect of carbide ceramics and coke on the properties of dispersion strengthened aluminium□silicon7□ magnesium hybrid composites. Materialwissenschaft und Werkstofftechnik, 54(2), 147-157.

**[16].** Prabha, C., Arunkumar, S. P., Sharon, H., Vijay, R., Niyas, A. M., Stanley, P., & Ratna, K. S. (2020, March). Performance and combustion analysis of diesel engine fueled by blends of diesel+ pyrolytic oil from Polyalthia longifolia seeds. In AIP Conference Proceedings (Vol. 2225, No. 1, p. 030002). AIP Publishing LLC.

**[17].** Abd Algani, Y. M., Caro, O. J. M., Bravo, L. M. R., Kaur, C., Al Ansari, M. S., & Bala, B. K. (2023). Leaf disease identification and classification using optimized deep learning. Measurement: Sensors, 25, 100643.

**[18].** Ratna, K. S., Daniel, C., Ram, A., Yadav, B. S. K., & Hemalatha, G. (2021). Analytical investigation of MR damper for vibration control: a review. Journal of Applied Engineering Sciences, 11(1), 49-52.

**[19].** Abd Algani, Y. M., Ritonga, M., Kiran Bala, B., Al Ansari, M. S., Badr, M., & Taloba, A. I. (2022). Machine learning in health condition check-up: An approach using Breiman's random forest algorithm. Measurement: Sensors, 23, 100406. https://doi.org/10.1016/j.measen.20 22.100406

**[20].** Mourad, H. M., Kaur, D., & Aarif, M. (2020). Challenges Faced by Big Data and Its Orientation in the Field of Business Marketing. International Journal of Mechanical and Production Engineering Research and Development (IJMPERD), 10(3), 8091-8102.

**[21].** Ruban, S. R., Jayaseelan, P., Suresh, M., & RatnaKandavalli, S. (2020, December). Effect of textures on machining of carbon steel under dry cutting condition. In IOP Conference Series: Materials Science and Engineering (Vol. 993, No. 1, p. 012143). IOP Publishing.

**[22].** Naidu, K. B., Prasad, B. R., Hassen, S. M., Kaur, C., Al Ansari, M. S., Vinod, R., ... & Bala, B. K. (2022). Analysis of Hadoop log file in an environment for dynamic detection of threats using machine learning. Measurement: Sensors, 24, 100545.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.53
Volume 4, Issue 1, May 2024

**[23].** Suman, P., Bannaravuri, P. K., Baburao, G., Kandavalli, S. R., Alam, S., ShanthiRaju, M., & Pulisheru, K. S. (2021). Integrity on properties of Cu-based composites with the addition of reinforcement: A review. Materials Today: Proceedings, 47, 6609-6613.

**[24].** Kandavalli, S. R., Rao, G. B., Bannaravuri, P. K., Rajam, M. M. K., Kandavalli, S. R., & Ruban, S. R. (2021). Surface strengthening of aluminium alloys/composites by laser applications: A comprehensive review. Materials Today: Proceedings, 47, 6919-6925. 25. Sharma, Nisha, Anil Kumar Yadava, Mohd Aarif, Harishchander Anandaram, Ali Alalmai, and Chandradeep Singh. "Business Opportunities And Challenges For Women In The Travel And Tourism Industry During Pandemics Covid19." Journal of Positive School Psychology (2022): 897-903.

**[25].** Raja, R., Jegathambal, P., Jannet, S., Thanckachan, T., Paul, C. G., Reji, S., & Ratna, K. S. (2020, November). Fabrication and study of Al6061-T6 reinforced with TiO2 nanoparticles by the process of friction stir processing. In AIP Conference Proceedings (Vol. 2270, No. 1, p. 030002). AIP Publishing LLC.

**[26].** Face Recognition Attendance System Using Python (analyticsvidhya.com)

**[27].** InsightFace: an open source 2D&3D deep face analysis library

**[28].** Kumar, B., & Kumar, P. (2022). Preparation of hybrid reinforced aluminium metal matrix composite by using ZrB2: A systematic review. Materials Today: Proceedings.

**[29].** Kandavalli, S. R., Khan, A. M., Iqbal, A., Jamil, M., Abbas, S., Laghari, R. A., & Cheok, Q. (2023). Application of sophisticated sensors to advance the monitoring of machining processes: analysis and holistic review. The International Journal of Advanced Manufacturing Technology, 1-26.

**[30].** Aarif, Mohd, and Ali Alalmai. "Importance of Effective Business Communication for promoting and developing Hospitality Industry in Saudi Arabia." A case study of Gizan (Jazan) (2019).

**[31].** Abd Algani, Y. M., Ritonga, M., Kiran Bala, B., Al Ansari, M. S., Badr, M., & Taloba, A. I. (2022). Machine learning in health condition check-up: An approach using Breiman's random forest algorithm. Measurement: Sensors, 23, 100406. https://doi.org/10.1016/j.measen.20 22.100406

**[32].** Smitha, Pavithra S Hegde, Afshin [ May-2020]," Face Recognition based Attendance Management System", IJERT, ISSN:2278-0181, Vol. 9 Issue 05.

**[33].** Mourad, H. M., Kaur, D., & Aarif, M. (2020). Challenges Faced by Big Data and Its Orientation in the Field of Business Marketing. International Journal of Mechanical and Production Engineering Research and Development (IJMPERD), 10(3), 8091-8102.

**[34].** Nandhini R, Duraimurugan N, S.P.Chokkalingam [ February 2019], "Face Recognition Based Attendance System", IJEAT, ISSN: 2249 – 8958, Volume-8, Issue-3S

**[35].** OpenCvDocumentation - https://opencv.org