iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** V **Month of publication:** May 2021

DOI: https://doi.org/10.22214/ijraset.2021.34718

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

Gym ERP System using Machine Learning

Bhandge Hitesh K.[1], Bidave Ashish S.[2], Gadakh Mahesh J.[3], Jadhav Shailesh M.[4], Nikam Rohit R.[5]
[1, 2, 3, 4]*B.E. Student, Dept. of Information Tech., Sanjivani College of Engineering,Kopargaon, India*
[5]*Professor, Dept. of Information Tech., Sanjivani College of Engineering,Kopargaon, India*

Abstract: ***The coronavirus outbreak has affected the normal functioning of a lot of businesses. Amongst some of the worst-hit industries are Gyms. Due to multiple points of contact throughout the Gym, the spread of the virus could increase. Hence, to reduce the need for human intervention for registration, attendance marking and other business issues, a contactless attendance monitoring and ERP system can be implemented along with face recognition to help in identifying gym members while entering the gym. The proposed system consists of face recognition methods using Elman neural network. The image fragmentation is done using Curvelet transform methods and feature extraction takes place using PCA. The system houses a camera for facial recognition. The proposed algorithm results in 94% accuracy.***
Keywords: ***Face Recognition, Covid19, ERP, Attendance monitoring, Machine Learning.***

I. INTRODUCTION

The coronavirus pandemic had affected a lot of businesses, Gyms being majorly hit due to various chances of contamination and infection. Most of the gyms were shut down and out of business to control the spread. However, the reopening of the gyms was not an easy task. Every member had to be monitored while they entered the gym. The use of manual pieces of equipment for testing was possible but increased human interaction hence increasing the risk of infection.

The current methods of attendance monitoring were done by the management staff of the gym, and it increased workload with mandatory usage of Personal Protection Equipment and social distancing norms along with the risk of coming in close contact with people.

We propose a completely contactless and automated system for attendance monitoring and gym Enterprise resource planning (ERP) requirements. The proposed system enables the gym owner with a system that creates and manages a database of the member's complete information viz. Attendance, exercise routines, diet etc. The system also provides a monthly analysis of the data and shares it via SMS or email.

II. LITERATURE SURVEY

In [1] W.L.Wang et al. Proposed a system of gym management using RFID sensors and Ids. The system proposed allows users to mark attendance and tag exercise machines they used. This allowed to keep a track of exercise routines, gym attendance, and even predicting machine maintenance to prevent machine failure. The entire system was contactless and compact.

In [2], Radhika C. Damale et al. Proposed a system of Face Recognition Based Attendance System Using Machine Learning Algorithms. The proposed system creates a database of photographs of faces by recording videos of 11 people looking in different directions. The system detects faces from these videos and extracts frames from the video. The next step is to crop the detected faces, The selected frames contain unwanted elements along with the detected faces. Hence the faces are cropped by using the Deep Neural Networks algorithm. The pre-trained module of Caffe prototxt is used to detect the faces. The cropped images need to be of the same size hence the detected facial images are cropped and resized to 128x128 resolution. These images are again reshaped to a 1D array of size $1x(128)^2$. The feature extraction process is carried out by PCA and LDA. The final classification of the images is done by the Support vector machine (SVM) algorithm, Multilayer Perceptron and Convolutional Neural network. In [4] an algorithm is proposed to increase the efficiency of the Elman neural algorithm in face recognition. The proposed algorithm includes creating dataset of faces, converting color space to HSI and using saturation layer, image decomposition using curvelet transform, feature extraction using Principle component analysis, and final step face recognition using Elman neural network. after applying proposed algorithm, the rate of face recognition 94%.

In [5] The authors propose using a facial recognition system to avoid fake attendance or proxies and saving time. The authors propose to overcome problems faced in face recognition such as intensity of lighting and bad image quality and create a highly accurate attendance system. The authors used algorithms such as Viola-Jones for face detection, PCA for feature selection and SVM for classification.

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

III. PROPOSED ARCHITECTURE

The proposed system is an easy, contact-free and automated solution to managing the entire member data and ERP solutions for a gym along with daily user-health vital checking and machine learning-based face recognition for attendance marking. It utilizes advanced face detection methodologies to mark the attendance of individuals without the need to manually entering the data or verifying the individual. The system hardware comprises one camera module installed at the entrance of the gym to capture photos of the person at the entrance and compare them with photos registered in the database using face recognition methods.

The system consists of three roles and access levels viz. User, Admin and Super Admin. The members of the gym are defined as the users in the system. The members would first be registered in the system database with their information, and photographs by the administrator. During daily use, the members need to momentarily stand in front of the camera. The camera captures the image of the member and recognizes the image via face recognition and compares it with the images already in the database. With the confirmation of both this, the member is allowed in the gym and attendance is marked.

The Admin of the gym has access to creating an invoice, send messages to the users, add/ modify client, manage subscription, create/ modify batches, create/modify packages, and manage expenses via the admin panel of the ERP system.

The Super Admin of the gym has access to adding members, displaying members, Add/ Active Subscription, Modify/update member.

IV. METHODOLOGY

To develop an automated ERP and attendance monitoring system. The following procedure was carried out:

A. Creating a browser-based web application:
B. Creating a node.js web server application
C. Creating a back4app database
D. Face recognition

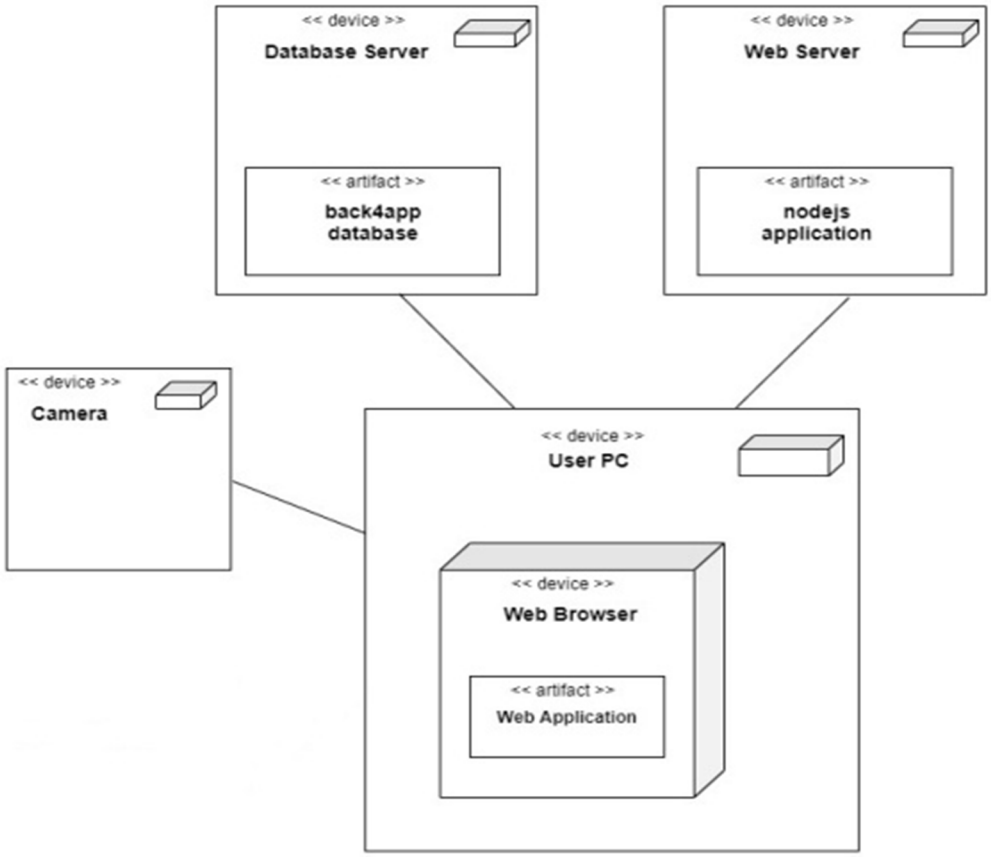


Fig -1: Deployment Diagram

©IJRASET: All Rights are Reserved

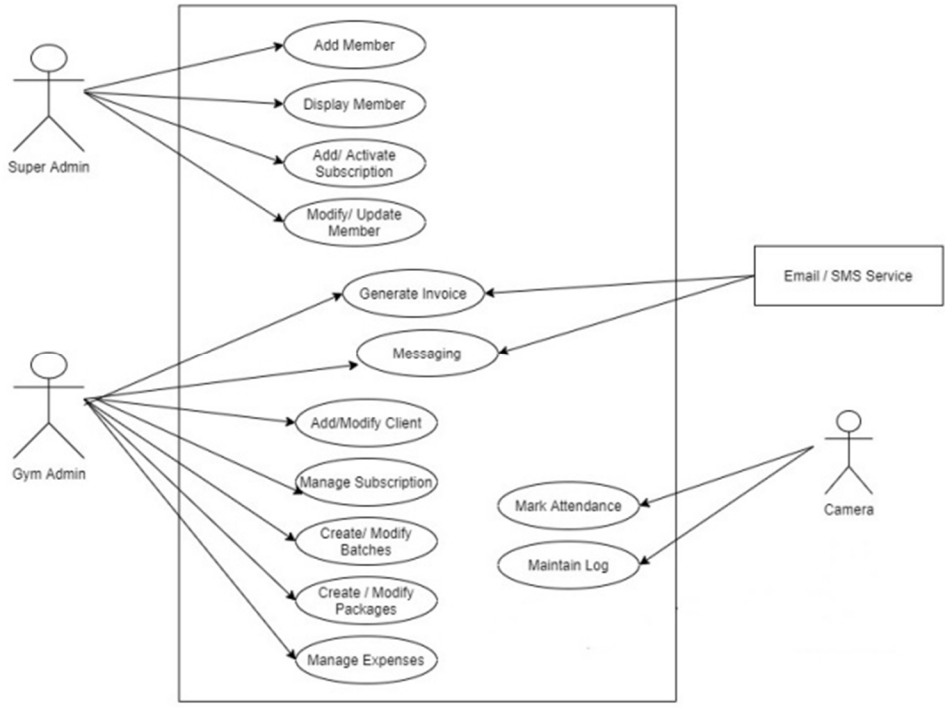


Fig -2: Use case diagram

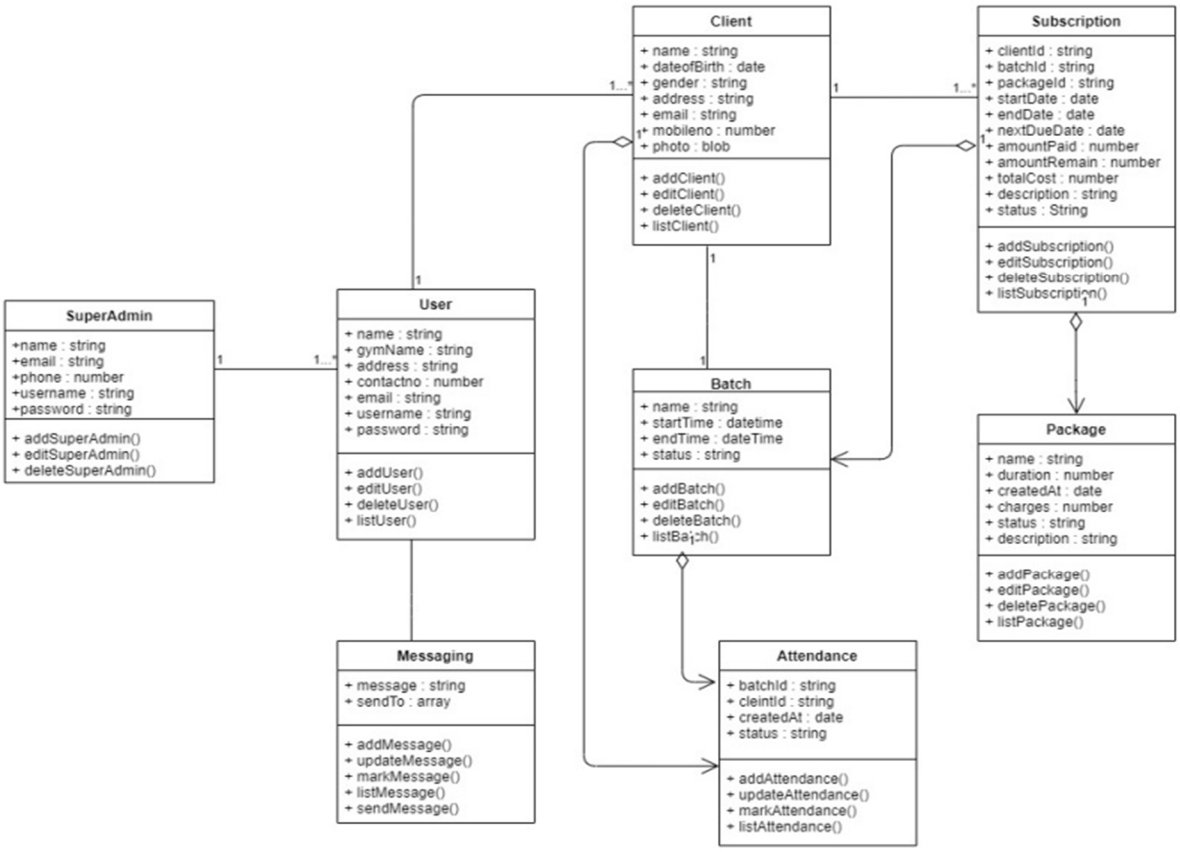


Fig -3: Class diagram

©IJRASET: All Rights are Reserved

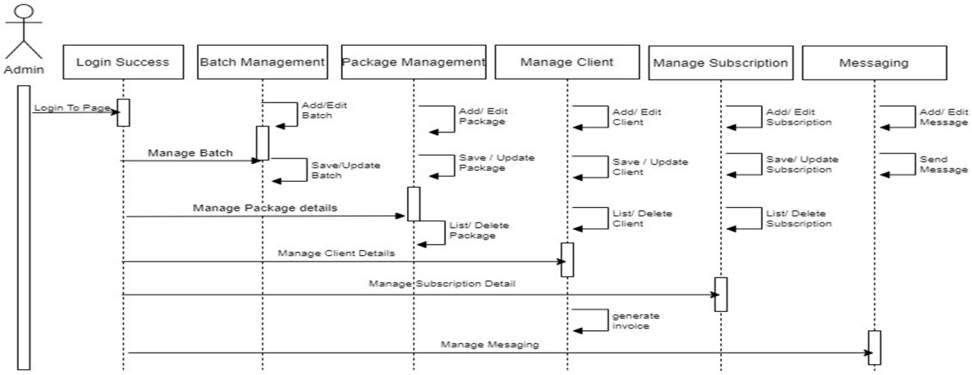


Fig -4: Sequence Diagram

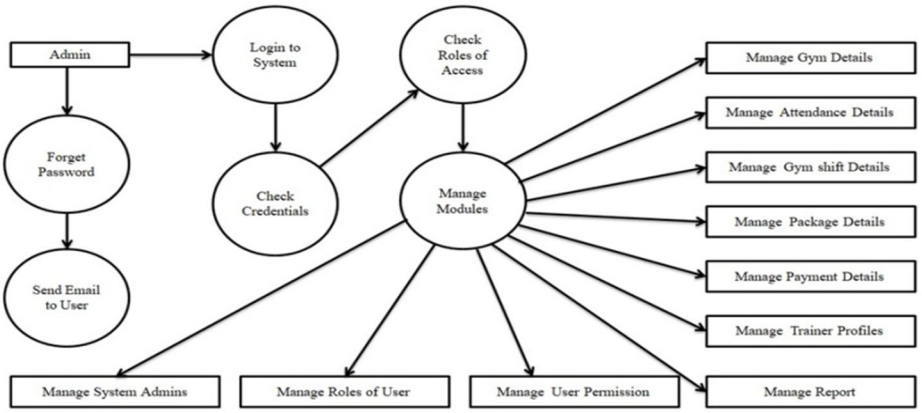


Fig -5: Data flow diagram

A. creating A Browser-Based Web Application

The browser-based web application is a content management portal created using HTML, CSS, javascript and angualr.js. The web application contains containers for entering and viewing data and sends and receives data to the web server via REST API methods.

B. Creating A Node.Js Web Server Application

The web server application consists of face recognition application that register the attendance of the student. The server-side application is coded using node.js and receives requests from the web application. The requests are executed and data is sent to the web application.

C. Creating A Back4app Database

The database hosts the data, saves and furnishes the member data requested by the web and server application. This database also consists of the registered face data values useful for face recognition and attendance monitoring.

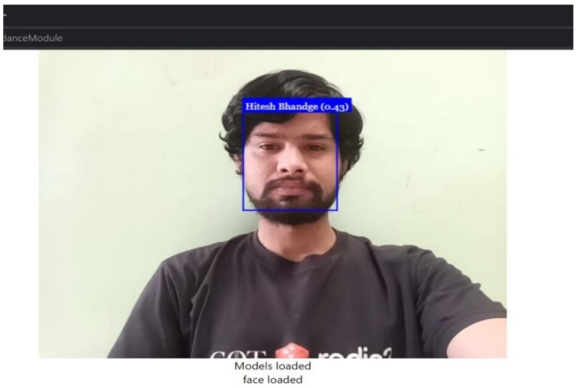
D. Face Recognition

In [4], a method is discussed about Smart attendance using facial recognition. The authors used different algorithms such as Viola-Jones for face detection, The Region of Interest (ROI) is used to extract snippets of the image, The feature selection is done using Principal component analysis (PCA) Support Vector Machines (SVM) is used for the classification. The experiment invovlved taking pictures of the subject in different conditions, from different angles and in different lighting. This resulted in the system becoming more efficient by using above algorithms in capturing, analyzing and marking attendance in the database.

In [5], the authors used a different approach by creating a dataset of images, and converting colour space to HIS using image decomposition, curvlet transform, saturation layer, and principal component analysis for feature extraction. The face recognition is carried out using Elman neural network. This proposed algorithm gives a face recognition rate of 85%

©IJRASET: All Rights are Reserved

V. EXPECTED RESULTS



The Expected benefits of this system are:

A. Automates gym resource management with attendance monitoring, checking health vitals and other key data regarding the gym member.
B. This reduces the close contact between the gym members and the staff.
C. The system data can be accessed from remote locations and is easily accessible for the members too.

VI. CONCLUSION

The recent growth of infectious diseases, majorly coronavirus, has affected a lot of business around the world with Gyms being one of the worst-hit. This has weakened the businesses, however, has impacted a lot of individuals who regularly go to the gym to stay fit and healthy. The reopening and normal functioning of the gym proved to be a major problem as there are various points of contact while entering the gym. This task can be risky for both the members and the gym staff as it requires them to come in close contact with each other. In the above-proposed system, we were able to showcase a touch less Gym ERP and health vitals checking system which can help in social distancing and reducing point of contact while entering the Gym.

The recent developments in machine learning and face detection methodologies have enabled us to recognise human face within a short time and mark attendance without the requirement of any physical identification. This has reduced human contact. It can prove to be an essential way of reducing the risk of contamination in the gym. The ERP capabilities of the system allow the admin and the super admin to monitor and manage the gym without needing to come in close contact with the user and send all the requested data to them via messaging.

REFERENCES

[1] W. L. Wang, K. J. Lin, C. T. Huang and C. H. Chiu, "A RFID-enabled gym management system," *2010 7th International Conference on Service Systems and Service Management*, Tokyo, Japan, 2010, pp. 1-4, doi: 10.1109/ICSSSM.2010.5530117.

[2] R. C. Damale and B. V. Pathak, "Face Recognition Based Attendance System Using Machine Learning Algorithms," 2018 Second International Conference on Intelligent Computing and Control Systems (ICICCS), Madurai, India, 2018, pp. 414-419, doi: 10.1109/ICCONS.2018.8662938.

[3] S. Bhattacharya, G. S. Nainala, P. Das and A. Routray, "Smart Attendance Monitoring System (SAMS): A Face Recognition Based Attendance System for Classroom Environment," *2018 IEEE 18th International Conference on Advanced Learning Technologies (ICALT)*, Mumbai, India, 2018, pp. 358-360, doi: 10.1109/ICALT.2018.00090.

[4] Abdullah, Ahmed SS, Majida Ali Abed, and Israa Al Barazanchi. "Improving face recognition by elman neural network using curvelet transform and HSI color space." Periodicals of Engineering and Natural Sciences 7.2 (2019): 430-437

[5] Kumar, Neela Ashish, et al. "Smart Attendance Marking System using Facial Recognition." Research Journal of Science and Technology 11.2 (2019): 101-108.

[6] J. Redmon, S. Divvala, R. Girshick, and A. Farhadi, "You Only Look Once: Unified, Real-Time Object Detection," 2016 IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Jun. 2016.

[7] Veer, N. D., & Momin, B. F. (2016). An automated attendance system using video surveillance camera. 2016 IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology (RTEICT). doi:10.1109/rteict.2016.7808130

[8] Varadharajan, E., Dharani, R., Jeevitha, S., Kavinmathi, B., & Hemalatha, S. (2016). Automatic attendance management system using face detection. 2016 Online International Conference on Green Engineering and Technologies (IC-GET). doi:10.1109/get.2016.7916753

[9] Koppikar, U., Hiremath, S., Shiralkar, A., Rajoor, A., & Baligar, V. P. (2019). IoT based Smart Attendance Monitoring System using RFID. 2019 1st International Conference on Advances in Information Technology (ICAIT). doi:10.1109/icait47043.2019.8987434

©IJRASET: All Rights are Reserved

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

BIOGRAPHIES

Prof. Rohit Ravindra Nikam

Completed graduation from Sanjivani College of Engineering, Kopargaon University of Pune in the year 2008, Master's of Computer Science and Engineering, from Marathawada Institute of Technology , BAMU University Aurangabad in the year 2012. He is currently working with Sanjivani College of Engineering, Kopargaon as Assistant Professor and has more than 13 year of Academic experience.

Mr. Bhandge Hitesh K.

He is currently working on Machine Learning for Enterprise Resource Planning with Internet Of Things in Information Technology Department in Sanjivani College Of Engineering, Kopargaon, India.

Mr. Bidave Ashish S.

He is currently working on Machine Learning for Enterprise Resource Planning with Internet Of Things in Information Technology Department in Sanjivani College Of Engineering, Kopargaon, India.

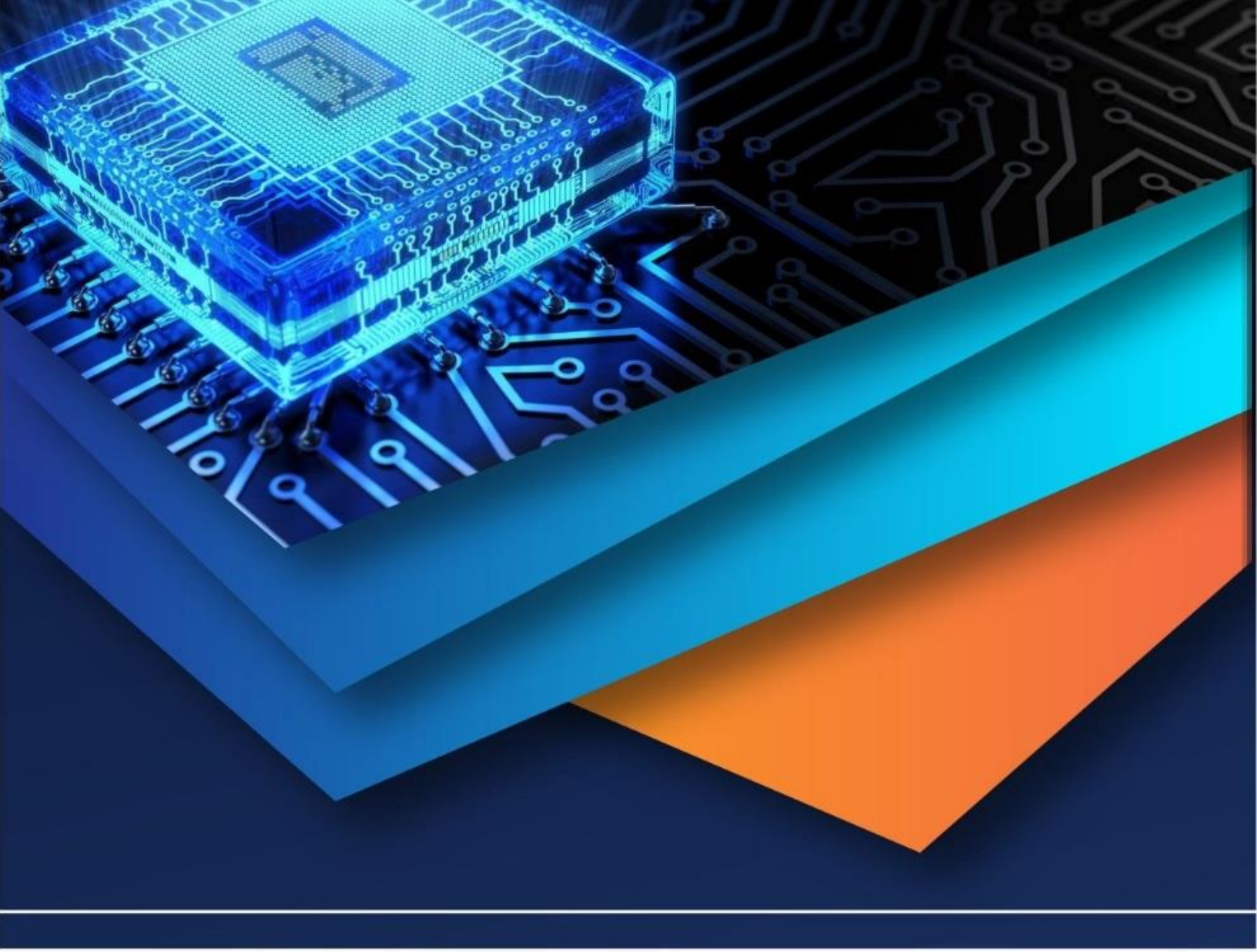
Mr. Gadakh Mahesh J.

He is currently working on Machine Learning for Enterprise Resource Planning with Internet Of Things in Information Technology Department in Sanjivani College Of Engineering, Kopargaon, India.

Mr. Jadhav Shailesh M

He is currently working on Machine Learning for Enterprise Resource Planning with Internet Of Things in Information Technology Department in Sanjivani College Of Engineering, Kopargaon, India.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)