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AN AUTONOMOUS INSTITUTION

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

TECHNICAL MAGAZINE

Issue 1 [DECEMBER 2025]

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE TECHNICAL MAGAZINE

Message from the Head of Department

The Department of Artificial Intelligence and Data Science, established in 2022 at Akshaya College of Engineering and Technology, offers a four-year B.Tech. Degree program with an intake of 60 students. The department is striving towards the goal of providing innovative and quality education to the students to achieve academic excellence. The department is committed to equip students with the necessary knowledge and skills to excel in the rapidly evolving fields of Artificial Intelligence and Data Science, empowering them to become future leaders and innovators in the industry. The motto of the department is to provide quality technical education to make the students industry-ready. Our goal is to ensure that our engineering graduates are well prepared to play the roles of problem solvers, project leaders, entrepreneurs, and above all ethical citizens of a global society.

Dr.M.Jenifer
Associate & Head,
Department of Artificial Intelligence and Data Science

Vision and Mission of the department

Vision of the Department

To foster industry cooperation and impart cognitive learning in order to develop professionals who can adapt to the shifting demands of new trends in Artificial Intelligence and Data Science

Mission of the Department

DM 1 : To provide an Excellent infrastructure that keeps up with modern trends and technologies for students and educators.

DM 2 : To impart knowledge in cutting edge technology for Artificial Intelligence and Data Science with industrial standards.

DM 3 : To impart high-quality education embedded with moral and ethical principles.

DM 4 : To encourage lifelong learning and research that benefit society as a whole.

Program Educational Objectives (PEOs)

PEO 1 : Apply the knowledge of basic sciences, mathematics, Artificial Intelligence, data science and statistics to build a system that requires in analysis of huge volumes of data.

PEO 2 : Product Development:Design a model using Artificial Intelligence to solve the critical problems in real world.

PEO 3 : Higher Studies: To enable the students to think logically and pursue life-long learning and collaborate with an ethical attitude in a multidisciplinary team.

Program Specific Outcomes (PSOs)

PSO 1 : Create, select and apply the knowledge of AI and Data Science to solve societal problems.

PSO 2: Develop data analytics and data visualization skills, skills pertaining to knowledge acquisition, knowledge representation and knowledge engineering, and hence be capable of coordinating complex projects.

Program Outcomes (POs)

PO 1 : Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2 : Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3 : Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO 4 : Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis

and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5 : Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6 : The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7 : Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8 : Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9 : Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10 : Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11 : Project management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these

to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12 : Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Message From the Editorial Team

Chief Editor:

Dr.M.Jenifer, Associate Professor & HoD-AI&DS

The department of Artificial Intelligence and Data Science is striving towards the goal of providing innovative and quality education to the students to achieve academic excellence.

Faculty Advisors:

Mr.S.Poorna Prakash, AP-AI&DS

Mrs.Lavanya.K, AP-AI&DS

Our goal is to ensure that our engineering graduates are well prepared to play the roles of problem solvers, project leaders, entrepreneurs, and above all ethical citizens of a global society.

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Dharvin Chandar.B, III- AI&DS
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S.Hari Kishore, II – AI&DS

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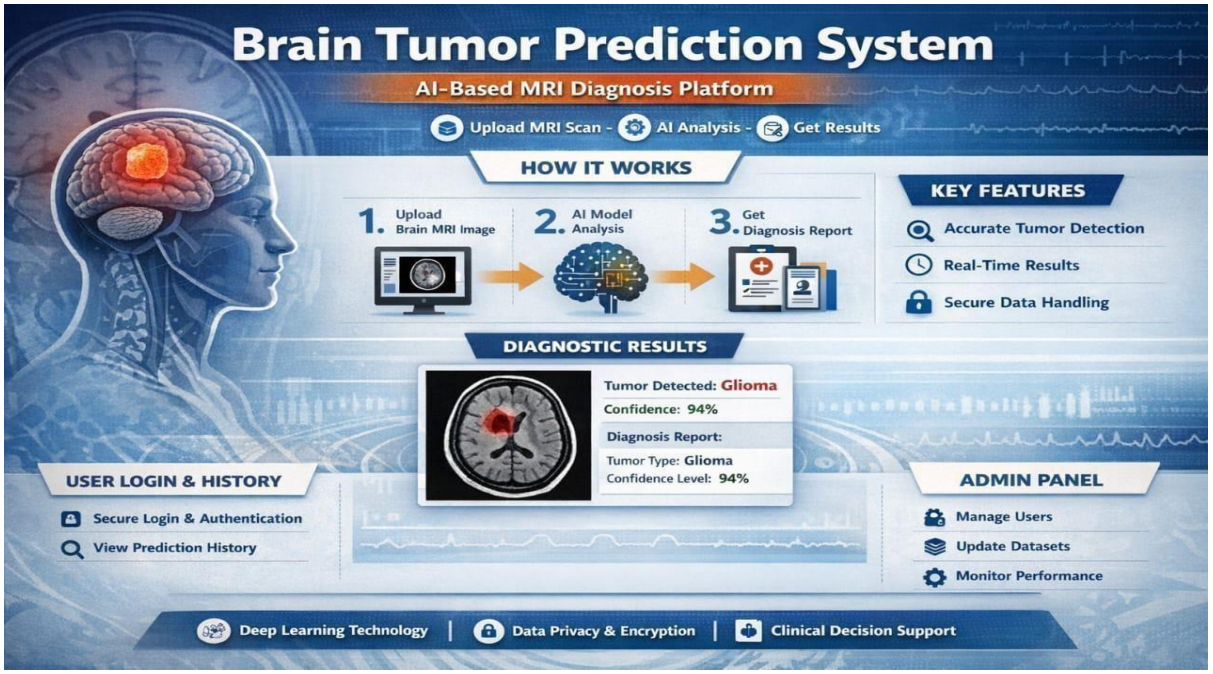
SMART FUEL PREDICTION

Smart Fuel Predictor is a machine learning–based system developed to estimate fuel consumption and cost using vehicle and trip-related parameters. The system analyzes historical data such as distance traveled, vehicle mileage, fuel type, and driving conditions to generate accurate fuel usage predictions. Data preprocessing and feature selection techniques are applied to improve prediction reliability and efficiency. The proposed model enables users to obtain real-time fuel consumption estimates through a simple input interface, assisting in better trip planning and cost management. Smart Fuel Predictor can be effectively used by individual vehicle owners and fleet management services to optimize fuel efficiency and reduce operational expenses. The system highlights the role of predictive analytics in supporting sustainable and economical transportation. This system can be beneficial for individual vehicle owners, fleet management services, and transportation organizations aiming to optimize fuel efficiency and promote sustainable mobility. Overall, Smart Fuel Predictor demonstrates how data-driven approaches and machine learning techniques can enhance decision-making in fuel management and contribute to cost-effective and eco-friendly transportation solutions.

DHARVIN CHANDAR .B
MONISHA.R
SHARVESHWARAN.P
SOFIA.N



BRAIN TUMOR PREDICTOR

The Brain Tumor Prediction System is a web-based intelligent medical application designed to assist in the early detection and classification of brain tumors using advanced deep learning techniques. Brain tumors are among the most critical neurological disorders, and their accurate diagnosis is essential for timely treatment and improved patient outcomes. Traditional diagnosis through manual analysis of MRI scans is time-consuming, requires high expertise, and is prone to human error. This system aims to overcome these challenges by automating the tumor detection process and providing reliable diagnostic support.

The primary objective of the Brain Tumor Prediction System is to offer a fast, accurate, and user-friendly platform where healthcare professionals and users can upload brain MRI images and receive prediction results in real time. The system minimizes dependency on manual examination while enhancing diagnostic accuracy through artificial intelligence

The system operates as a secure web application that supports user registration and authentication. Registered users, such as doctors, radiologists, or patients (under medical supervision), can create an account and log in securely using valid credentials. This authentication mechanism ensures data privacy and prevents unauthorized access to sensitive medical information. Once logged in, users can upload MRI scan images in supported formats and submit them for analysis.

After submission, the uploaded MRI image is processed by the deep learning model integrated into the system. The model has been trained on a large dataset of labeled brain MRI images, allowing it to recognize patterns associated with

different tumor types. Through convolutional neural networks (CNNs), the system performs image preprocessing, feature extraction, and classification. This automated feature analysis significantly reduces the chances of human oversight and improves the consistency of diagnostic results.

Upon completion of analysis, the system generates a diagnostic report that includes the predicted result, tumor type (if detected), and a confidence score indicating the reliability of the prediction. The MRI image along with the prediction output is displayed on the user interface, enabling users to visually verify the uploaded scan while reviewing the results. The real-time response capability of the system ensures quick decision-making, which is crucial in medical scenarios.

Data security is a key aspect of the Brain Tumor Prediction System. The system implements secure data handling mechanisms to protect medical images and user information. Uploaded MRI images and prediction results are stored securely in the database with controlled access. Encryption and authentication measures ensure that sensitive data remains confidential and is only accessible to authorized users.

Another important feature of the system is the maintenance of prediction history. Each prediction made by a user is stored along with relevant details such as date, MRI image, predicted result, and confidence score. This historical data allows users and healthcare professionals to review previous diagnoses, monitor disease progression, and track patient outcomes over time. Such longitudinal data is valuable for follow-up analysis and clinical decision support.

Administrators can monitor system performance, model accuracy, and usage statistics to ensure reliable operation. Model updates and performance evaluation help maintain high prediction accuracy and system efficiency. This modular design allows future enhancements, such as integrating additional tumor categories, improving prediction accuracy, or expanding the system to support other medical imaging tasks.

SWATHI ROOPINI.J

ROHINI.A

RESUME SCREENING

In the present recruitment environment, organizations receive a large number of resumes for each job opening, making manual screening a slow and inefficient process. Human-based evaluation can lead to inconsistency, bias, and the possibility of overlooking qualified candidates. To address these challenges, this project focuses on the development of an AI-based Resume Screening System that automates the process of analyzing and shortlisting resumes based on job requirements.

The proposed system uses Natural Language Processing techniques to extract important information such as skills, education, and experience from resumes submitted in formats like PDF and Word documents. The extracted resume data is compared with the job description using feature extraction techniques such as TF-IDF and similarity measurement using cosine similarity. Based on the matching score, resumes are ranked to identify the most suitable candidates for the given role.

This system helps reduce screening time, improves accuracy, and ensures a fair and unbiased shortlisting process. The project demonstrates the practical application of Artificial Intelligence and Machine Learning in recruitment

systems. The developed solution is efficient, reliable, and can be further enhanced by integrating advanced analytics and automation features..

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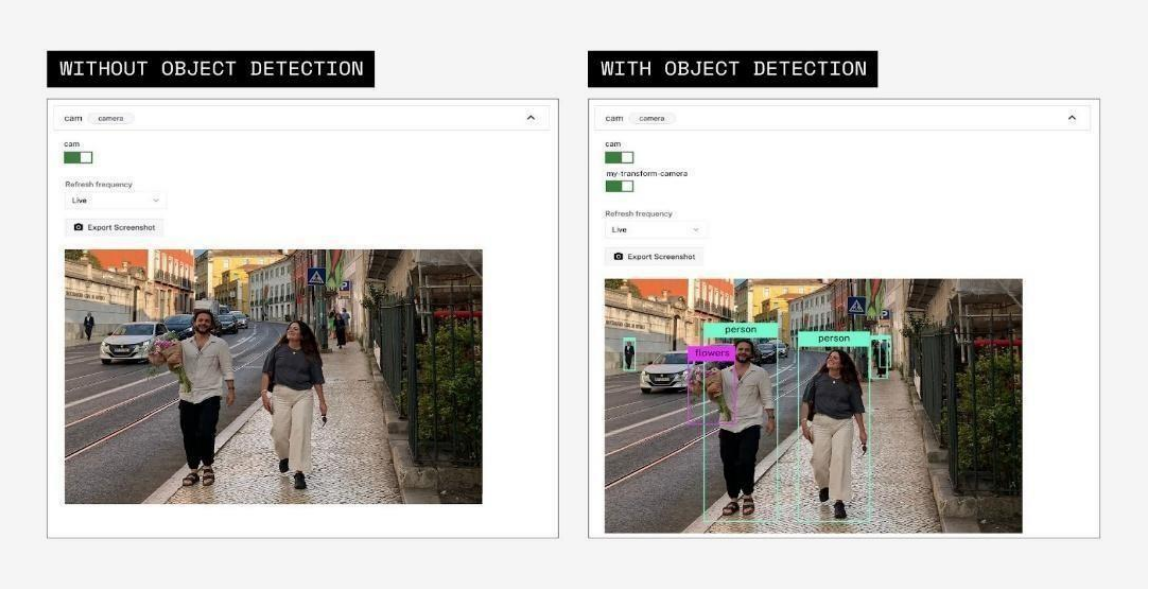


OBJECT DETECTION IN A VIDEO USING FEATURE EXTRACTION AND SHIFT

Object detection in video sequences is a critical task in computer vision, playing a vital role in applications such as video surveillance, autonomous navigation, traffic analysis, sports analytics, and human–computer interaction. Unlike static image-based detection, video object detection introduces additional challenges due to motion blur, illumination changes, occlusion, scale variation, and background dynamics. This project presents an effective approach for object detection in videos using feature extraction techniques combined with the Scale-Invariant Feature Transform (SIFT).

The proposed system operates by first converting the input video into a sequence of frames. Each frame undergoes preprocessing steps such as resizing, noise reduction, and grayscale conversion to enhance feature detection. SIFT is then applied to extract distinctive keypoints and corresponding feature descriptors from each frame. These keypoints represent unique and stable regions in the image that are invariant to scale, rotation, and moderate changes in illumination, making them highly suitable for video-based object detection.

To detect and track objects across frames, the extracted SIFT descriptors are matched between consecutive frames using similarity measures such as Euclidean distance. Consistent matches indicate the presence and movement of the same object over time. By analyzing the spatial distribution of matched keypoints, the system is able to localize objects, differentiate them

from the background, and maintain detection even under partial occlusion or changes in viewpoint. The motion of objects is inferred through the displacement of matched features across frames, enabling robust object tracking.

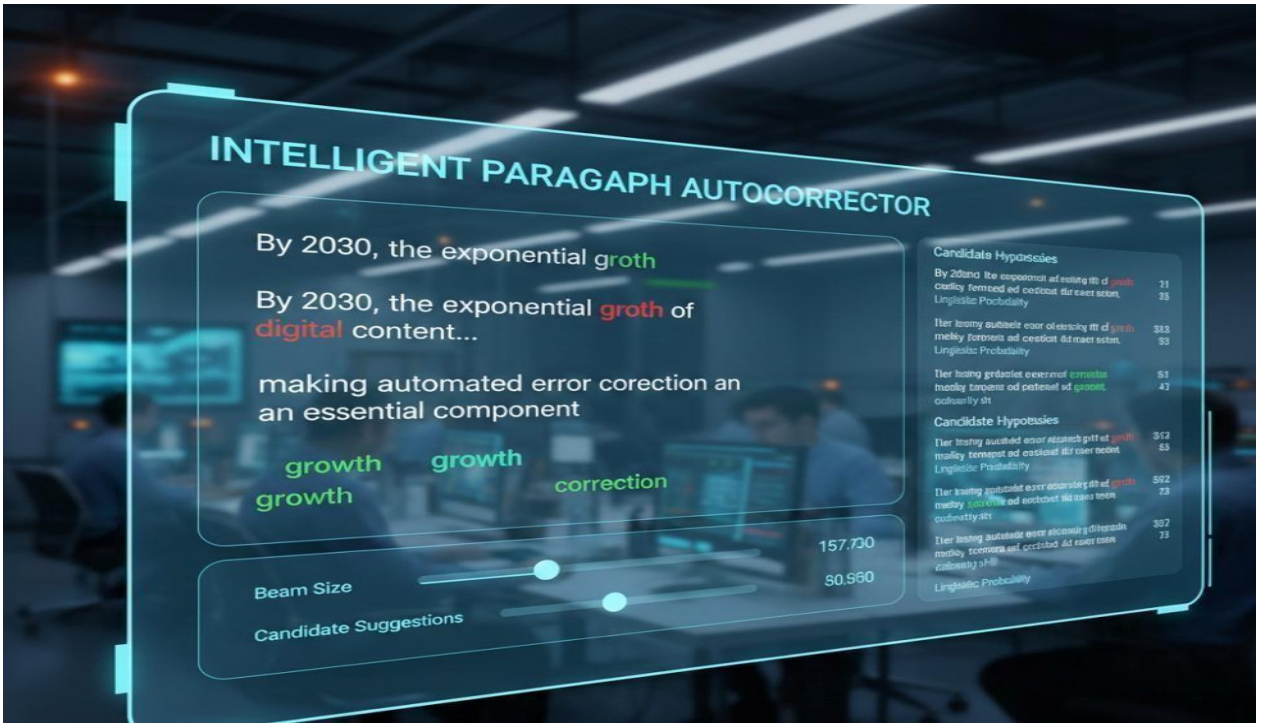
Experimental observations show that the proposed SIFT-based feature extraction approach provides reliable and accurate object detection in dynamic video environments. The method performs well without the need for large labeled datasets or extensive training, making it computationally efficient and suitable for real-time or resource-constrained systems. This project demonstrates that classical feature-based techniques, when carefully implemented, remain powerful tools for video object detection and tracking, offering a strong foundation for further enhancements using hybrid or learning-based approaches.

MADESH. P

SATHEESH. S

ARUN.R.S

SHIVASHANMUGAM .M



TEXT AUTO CORRECTOR

The rapid expansion of digital communication platforms, educational technologies, and data-driven systems has significantly increased the volume of unstructured textual data generated daily. As human–computer interaction becomes increasingly text-centric, the accuracy and clarity of written content play a critical role in ensuring effective communication, data quality, and user experience. Typographical errors, spelling mistakes, and contextual inaccuracies remain common in real-world text due to human error, informal writing styles, and noisy input sources. Consequently, intelligent autocorrection systems have emerged as a fundamental component of modern natural language processing (NLP) applications. This project presents the design and implementation of a context-aware paragraph-level autocorrector that combines probabilistic language modeling with beam search optimization to enhance textual accuracy beyond traditional word-level spell checkers.

Unlike conventional autocorrect systems that operate in isolation on individual words, the proposed approach performs sentence-level correction by leveraging both unigram and bigram language models trained on a corpus of natural language text. Candidate corrections are generated using edit-distance–based transformations, including insertion, deletion, replacement, and transposition

operations, enabling the system to account for common typographical and keyboard-related errors. Each candidate word is evaluated using a weighted scoring function that integrates unigram probability, contextual bigram probability, normalized edit distance penalties, and identity preservation bonuses.

To address the combinatorial explosion of possible corrections at the sentence level, the system employs beam search, which maintains a fixed number of high-probability correction hypotheses at each step of the decoding process. This strategy allows the autocorrector to explore multiple correction paths simultaneously while efficiently pruning low-quality candidates. By optimizing corrections at the sentence level rather than making greedy word-by-word decisions, the system effectively resolves ambiguities arising from homophones, contextual spelling variations, and word-order inconsistencies. Punctuation handling and case preservation mechanisms are incorporated to ensure grammatical consistency and readability in the corrected output.

The autocorrector is deployed through an interactive web-based interface built using Streamlit, enabling users to input noisy text and visualize corrected output in real time. Adjustable parameters such as beam size allow users to balance correction quality and computational efficiency, while optional candidate inspection enhances transparency and interpretability of the correction process.

While the system demonstrates strong performance in correcting common spelling and contextual errors, it faces challenges related to corpus dependency, scalability for large texts, and limited handling of domain-specific vocabulary. Nevertheless, the proposed framework offers a scalable and extensible foundation that bridges classical statistical NLP techniques with modern interactive systems.

AKASH. T

BARATH.KS

SIDDARTHGIRISH.S

NITHIN.S

FAKE NEWS DETECTION

This project explores how artificial intelligence can help society navigate the growing problem of online misinformation by automatically classifying news articles as real or fake. Using a large, labeled dataset of news reports with rich metadata such as source, sentiment, and political bias, the system first merges the title, author, and full text of each article into a single content field and converts this text into numerical TF-IDF vectors. □□ A Logistic Regression model is then trained on these features to learn patterns that distinguish fake news from trustworthy reporting, and evaluated using metrics like accuracy, confusion matrix, and classification report. □□ On a test set of 1000 articles, the model achieves an accuracy of 51.3%, correctly flagging all fake articles but struggling to recognize real ones, which highlights both the potential and the challenges of building reliable AI systems for news verification. □□ The work demonstrates a complete end-to-end pipeline—from data cleaning and feature engineering to model training and analysis—and points toward future improvements using more balanced data, advanced models, and explainable AI to support journalists, platforms, and readers in combating fake news.

DEEPAK. G

DHARAN. TR

HARISH. R

NAVANEETHAN. S

AI - DRIVEN RECIPE ANALYZING SYSTEM

The AI-Driven Recipe Analyzing System is an intelligent application developed to analyze, understand, and extract valuable insights from recipe data using artificial intelligence and machine learning techniques. The primary objective of this system is to automate the processing of recipe information by converting unstructured textual data into structured and meaningful outputs. This enables efficient analysis of ingredients, cooking instructions, nutritional relevance, and similarity between different recipes.

During the internship, the system was implemented using Natural Language Processing (NLP) techniques such as text cleaning, tokenization, stop-word removal, and vectorization. Machine learning and deep learning models were utilized to generate semantic representations of recipes, allowing accurate comparison and classification. The system also supports functionality such as identifying common ingredients, recommending similar recipes, and analyzing recipe complexity based on preparation steps.

Additionally, the project integrates document processing techniques to handle recipe data from various sources, including text files and PDF

documents. By applying AI-based similarity algorithms, the system effectively matches recipes based on content relevance rather than keyword dependency. The AI-Driven Recipe Analyzing System enhances user

experience by reducing manual effort, improving analysis accuracy, and enabling intelligent recipe recommendations.

This project highlights the real-world application of AI technologies in the food and culinary domain and demonstrates the practical skills gained during the internship in areas such as data preprocessing, model training, and system evaluation.

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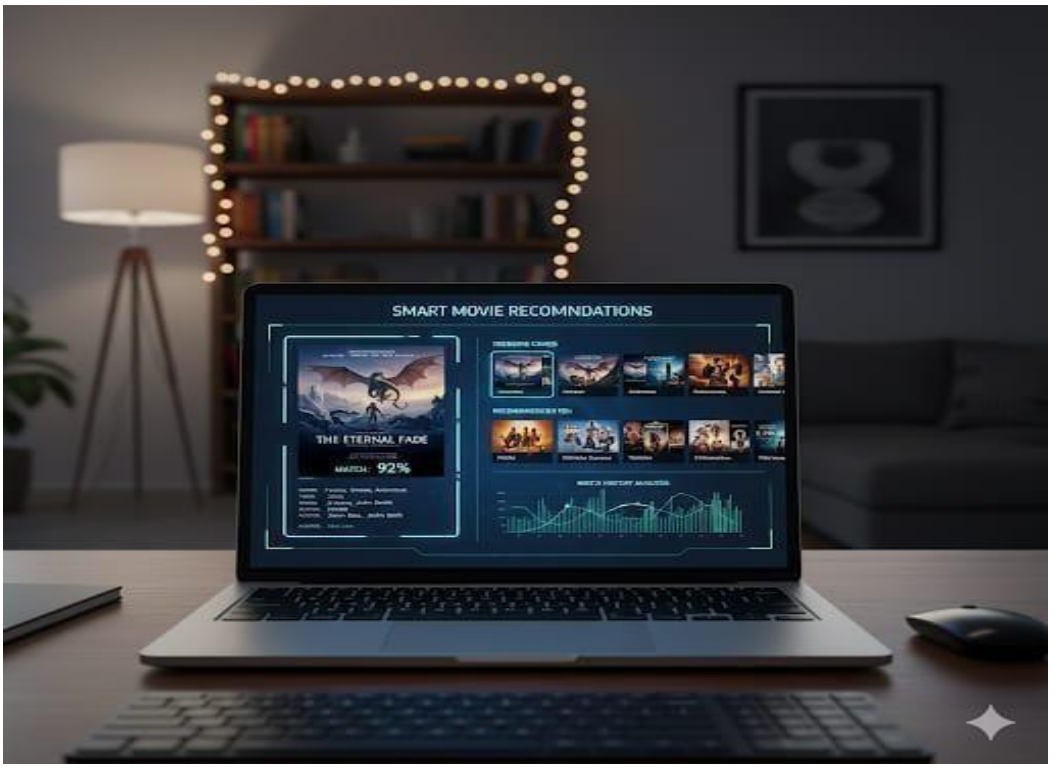

MOVIE RECOMMENDATIONS SYSTEM

In contrast to a traditional camera, the light-field camera features micro-lens arrays positioned before the image sensor, enabling the camera to be compact enough for a smartphone, while capturing both the spatial and directional details of light in a single capture. The method has garnered interest because it can recreate images in various forms such as multi-view, refocusing, and 30 image capture, leading to numerous possible uses. The collaborative research team utilized a vertical-cavity surface-emitting laser (VCSEL) in the near-infrared range to enhance the precision of 30 image reconstructions that were previously reliant on ambient light. When an external light source illuminates a face at angles of 0, 30, and 60 degrees, the light field camera decreases image reconstruction errors by 54%. Moreover, by placing a light-absorbing layer for visible and near-infrared wavelengths between the micro-lens arrays, the team was able to reduce optical crosstalk and enhance image contrast by 2.1 times. The team managed to surpass the constraints of current light-field cameras and successfully created their NIR-based light-field camera (NIR-LFC), specifically optimized for the reconstruction of 30 facial expression images.

Utilizing the NIR-LFC, the group obtained high-quality 30 reconstruction images of facial expressions conveying different emotions, irrespective of

the ambient lighting conditions. The facial expressions in the collected 30 images were identified using machine learning with an average accuracy of 85% -- a statistically significant number in comparison to when 20 images were utilized. Additionally, by assessing the interrelationship of distance data that fluctuates with facial expressions in 30 images, the team was able to pinpoint the information leveraged by a light-field camera to differentiate human expressions. It could emerge as the new platform for quantitatively assessing human facial expressions and emotions. It may be utilized in multiple areas such as mobile health, onsite diagnosis, social understanding, and human-computer interactions.

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NIVETHA SREE.V

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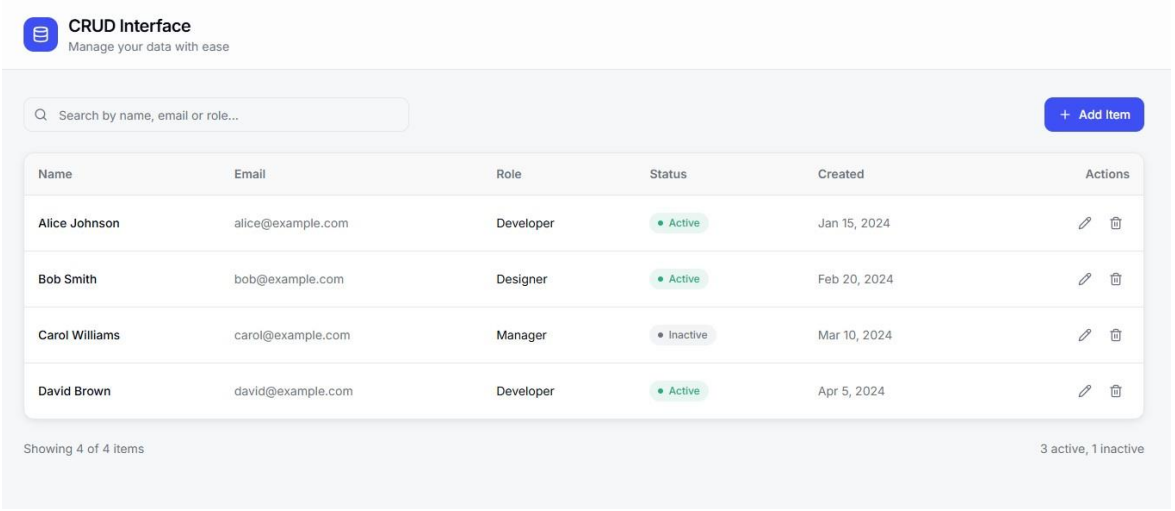

CRUD APPLICATION

In today's digital era, web-based applications play a crucial role in managing and processing large volumes of data efficiently. One of the fundamental requirements of such applications is the ability to perform CRUD operations—Create, Read, Update, and Delete—on persistent data. This project focuses on the design and development of a CRUD application using the MERN Stack, which consists of MongoDB, Express.js, React.js, and Node.js, a popular and powerful JavaScript-based technology stack for building full-stack web applications. The primary objective of this project is to develop a scalable, responsive, and user-friendly web application that enables users to create new records, view existing data, update previously stored information, and delete unwanted records seamlessly.

The application follows a client–server architecture, where the frontend is built using React.js to provide a dynamic and interactive user interface, while the backend is implemented using Node.js and Express.js to handle server-side logic and API requests. MongoDB, a NoSQL document-oriented database, is used for data storage due to its flexibility, scalability, and efficient handling of unstructured data.

The frontend of the application utilizes React components, hooks, and state management techniques to ensure smooth user interaction and real-time updates without reloading the page. Communication between the frontend and backend is achieved through RESTful APIs, which facilitate secure and efficient data exchange using HTTP methods such as POST, GET, PUT, and DELETE. The backend incorporates middleware for

request validation, error handling, and cross-origin resource sharing (CORS), ensuring robust and secure operations

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R POOJA S SUNANDA R
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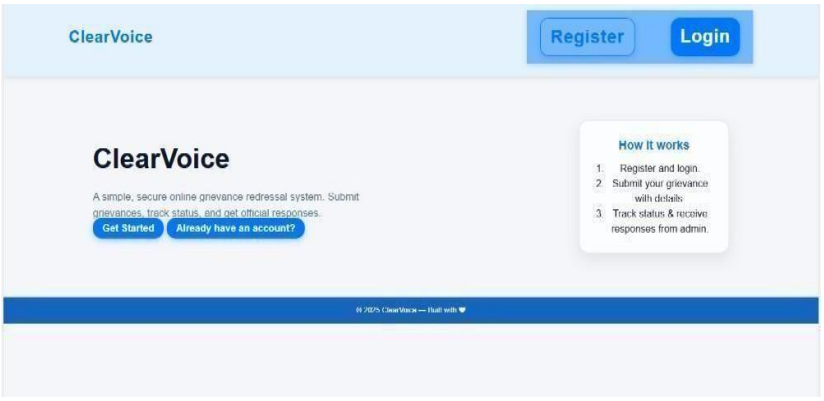

CLEAR VOICE – ONLINE GRIEVANCE REDRESSAL SYSTEM

Clear Voice is an online grievance redressal system designed to provide a centralized, transparent, and efficient platform for individuals to register, track, and resolve grievances in a systematic manner. The system aims to replace conventional manual complaint-handling processes with a digital solution that enhances accessibility, accountability, and responsiveness. Through a secure web-based interface, users can submit grievances along with supporting documents such as images or files, categorize their complaints, and receive real-time updates on the status of their submissions. Clear Voice incorporates automated grievance routing to ensure that complaints are directed to the appropriate authorities based on predefined rules and priority levels, thereby reducing delays and mismanagement. escalation mechanisms for unresolved complaints, and performance monitoring tools to evaluate response time and resolution efficiency. Notification services through email or SMS keep users informed throughout the grievance lifecycle, while a feedback and rating mechanism enables continuous improvement of service quality. By ensuring data security, maintaining detailed action logs, and promoting transparent communication between users and authorities, Clear Voice improves trust, efficiency, and effectiveness in grievance management, making it a reliable and scalable solution for organizations and institutions seeking to enhance their redressal processes.

SRIAMIRTHA S
HARINI M

Prepared By **Verified By**