

AMITY UNIVERSITY MUMBAI
Amity Institute of Information Technology

Student Research Project Outcomes: Publications

Project 1:

Project Title: Blockchain-Based Smart Contracts for Decentralized E-Voting System

Technology Used: Solidity Programming.

Student Name : Prasad Jambukar, Sambhav Chaudhari (BCA)

Guide: Prof. (Dr.) Manoj Devare

Description:

This Project is about the discourse on the blockchain based E-Voting System to maintain fairness, transparency, and accessibility to overcome the challenges of the fraud, manipulation, and logistical inefficiencies. There is always lack of trust among stakeholders in the democratic electoral process. This project investigates and provides the technical solution to build such a blockchain based system and also looks into the further challenges in the implementation in the country where there are more than 143 cores of population, and 96.8 core voters in the diverse regions, and languages. It also compares the existing voting system available all over the world, and how the new system will be inclusive and accessible to all stakeholders. The smart contract in the Solidity programming is written for the E-Voting System for the immutable, distributed, decentralized storage of the voting data using the cryptographic hashing mechanism in the Ethereum platform.

Publication Link:

<https://www.igi-global.com/chapter/blockchain-based-smart-contracts-for-decentralized-e-voting-system/376155>

Project 2:

Project Title: Air Pollution Detection Using Image Processing

Technology Used: Image processing using OpenCV.

Student Name: Aparna Nishad (MCA).

Guide: Prof. (Dr.) Manoj Devare

Description: Air pollution has created significant implications for public health and well-being. The chapter looks into the major events of air pollution, its impact and various approaches to deal with the air pollution. Traditional methods of air pollution monitoring and intensity detection rely on stationary sensors and manual measurements, which are often limited in spatial coverage and real-time monitoring capabilities. This research project is about the discussion on a methodology that analyses images captured from various sources, such as satellite imagery or ground-based cameras, and accurately classify different types of air pollution, including smog, particulate matter, and industrial emissions. The goal is to provide an efficient and automated method for monitoring air quality, enabling early detection of pollution hotspots, and assisting in environmental management and public health efforts. The image and video processing model of air pollution detection has achieved the loss is 0.4434 and accuracy of 88.88%.

Project 3:

Project Title: CrookFoot: An Android-Based Deep Learning Application for Real-Time Foot Deformity Detection and Arch Index Estimation

Technology Used: Android Application Development

Student Name: Shivam Margaj (MCA)

Guide: Dr. C Kalpana

Description: Human footprint analysis has valuable applications across fields such as environmental monitoring, forensics, wildlife tracking, and medical diagnostics. Despite its importance, current models capable of accurately identifying and analysing human footprints from raw images remain limited—especially those that offer both high precision and a user-friendly interface. This research project presents a lightweight Android application, CrookFoot, which integrates a deep learning-based Convolutional Neural Network (CNN) to perform multi-output classification of barefoot images. The model predicts the user's age group, foot type (flat, normal, or high arch), and calculates the arch index using a single image input. The CNN architecture comprises 12 layers and is optimized for mobile deployment using TensorFlow Lite. Trained on an augmented dataset of 100+ footprint images, the model leverages 17 distinct features—spanning geometric (5), GLCM texture (6), LBP texture (3), statistical (3), and classification-based metrics (2)—to deliver robust and detailed predictions. Comprehensive evaluation metrics such as confusion matrices, precision, recall, F1 scores, and ROC curve analysis validate the model's performance. Designed for offline use, CrookFoot delivers real-time diagnostic results and personalized product suggestions, offering an affordable and accessible foot screening solution with potential for global healthcare integration.

Project Outcome: Kalpana, C., Devare, M., Margaj, S. (2026). CrookFoot: An Android-Based Deep Learning Application for Real-Time Foot Deformity Detection and Arch Index Estimation. In: Karsh, R.K., Murugan, R., Laskar, R.H., Schuller, B.W. (eds) Advances on Signal Processing and Computer Vision. SIPCOV 2025. Communications in Computer and Information Science, vol 2848. Springer, Cham. https://doi.org/10.1007/978-3-032-15809-3_28

https://link.springer.com/chapter/10.1007/978-3-032-15809-3_28

Project 4:

Project Title: Water Contamination Detection Using Image Processing

Student: Marilyn Mathai (MCA)

Guide: Dr. Manoj Devare

Description:

Water contamination, and pollution in the water bodies has affected the human life and danger to the aquatic life. Many Countries have the strict regulations to prevent the water contamination. It is important to monitor the water bodies for the sustainable life around the human beings and

animals. These projects focused on the use of recent advancements in image processing and machine learning techniques to detect water pollution. The color-based water pollution detection model is developed to predict the possible pollutants in the water. The water pollution ratio of the surface area is calculated using canny edge detectors and contour area marking techniques. The surface area covered by plastic bottles is marked and displayed as a percentage of pollution. Three different ML Models are used on the non-image dataset to predict the water quality. The non-deep learning model has shown accuracy of 97.53%. The deep learning based linear regression model has shown the loss of 0.0130 and Mean Square Error of 0.0130 after 50 epochs. The logistic regression has achieved an accuracy of 94.76%.

Project Outcome: Devare, M. H., Devare, A. M., & Mathai, M. (2025). Water Contamination Detection Using Image Processing. In A. Sharma, V. Mansotra, & P. Singh (Eds.), *Citizen-Centric Artificial Intelligence for Smart Cities* (pp. 391-408). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3693-7832-8.ch015>

<https://www.igi-global.com/chapter/water-contamination-detection-using-image-processing/378895>

Project 5:

Project Title: Air Quality Index Monitoring System Using Arduino Nano (IoT)

Student: Muhammed Hasin P; Prabhav Mishra MCA)

Guide: Dr. Karuna Kirwale, Dr. Narayan Kulkarni

Description: India is facing significant health hazards, as evidenced by recent rapid scientific and technological breakthroughs that are all focused on a global environmental concern regarding the air quality system. According to recent studies, over ten Indian cities are ranked first. The Indian Air Quality Index (AQI), which was introduced in 2014 as part of the Swachh Bharat Abhiyan, monitors air pollution on ten scales, ranging from low (green) to moderate (yellow) to serious (red), using data analysis of many air polluting elements, including PM 2.5, O₃, NO₂, SO₂, and CO. This project work developed a mobile air quality monitoring device that measures carbon PM, smoke, and monoxide levels and analyses real-time environmental data using the Internet of Things (IoT). The system can measure the amount of air pollution in the area and generate data that is analysed by means of an integrated buzzer device. The system technology may be installed in houses and other small locations because it is so easy to operate and maintain.

Project Outcome: K. S. Kirwale, N. N. Kulkarni, S. K. Kotkar, M. H. P and P. Mishra, "Air Quality Index Monitoring System Using Arduino Nano (IoT)," *2025 2nd International Conference on Integration of Computational Intelligent System (ICICIS)*, Lohegaon, India, 2025, pp. 1-4, doi: 10.1109/ICICIS65613.2025.11371149.

Project 6:

Project Title: Design and Implementation of a Blockchain-based Certificate Generation and Validation Framework using PHP

Student: Mayank

Guide: Dr. C Kalpana

Description: The dependency with respect to digital certification systems is steadily rising in thousands of industries, where efficiency in traditional practices of issuing certificates is found to be quite weak. Paper certificates have the disadvantage that they can be forged as well as lost, and they are easily damaged. Central storage in digital format also poses similar threats, among them are cyber undertakings unauthorized change of data, and operational inefficiency, such limitations are some of the major hurdles with which institutions, employers, and regulators grapple to check the validity of qualifications. The paper finally offers an alternative; set up a service based upon blockchain technology and incorporated with a PHP Web application so that digital certificates could be securely generated and validated. In short, a new system based on the blockchain refers to an idea proposed in this report for a tool intended for creating or verifying automated certificates through PHP. Through the inherent properties of the blockchain like immutability, decentralization and transparency, this system guarantees that the certificates so provided are going to be tamperproof and verifiable without the need of centralized authorities. The interface is user-friendly which will enable the issuer to input the details of the certificate, generate cryptographic hashes and store this hash on a blockchain network with the help of the PHP application. Then a verifier can use the same hashes and cross reference in real time to find out if a presented certificate is authentic. Thus, decentralization of the system increases confidence, optimizes efficiency in operations and minimizes costs. Administrative overhead amounts to that. Smart contracts also automate the management of certificate data for retrieval, making them consistent, reducing human error, and enhancing the reliability of the system. The present research provides a scalable, secure, and efficient model for managing digital credentials that could end up being used in many more applications such as licensing health practitioners, academic degrees, government records, and professional certifications. Indeed, the proposed solution has a huge capability to solve the problems that traditional credentialing has.

Project Outcome: C. Kalpana, M. Devare, and Mayank, "Design and Implementation of a Blockchain-based Certificate Generation and Validation Framework using PHP," *International Journal of Research Publication and Reviews*, vol. 6, no. 9, pp. 2083–2091, Sep. 2025. [Online].

<https://doi.org/10.55248/gengpi.6.0925.3323>

Project Title: A Computational Study on Text Quality and Citation Frequency in Research Papers

Technology Used: NLP and Python Programming

Student Name : Mr. Debesh Das

Guide: Prof. (Dr.) Manoj Devare

Description:

The abstract and conclusions are the important sections of any published paper. Based on the comprehension of the content written in these sections, other sections of the paper are read by researchers. Various factors, such as the number of citations, social transformations, and

intellectual property rights, are considered indicators of research impact. This research project utilizes Natural Language Processing techniques to analyze a dataset of 50 highly cited research papers from 2020, aiming to understand the relationship between text quality and citation count. The correlation coefficient indicates that high-citation papers tend to have longer abstracts and shorter conclusions. The results show that when the citation of the paper is low, the words used in the abstract and conclusion have high similarity. As citations are increasing, the similarity of the words used in the abstract and conclusion is reducing. This indicates that those articles with a higher Type Token Ratio (TTR) in the abstract and a unique number of words used in conclusion have high citations.

Publication Link:

<https://www.igi-global.com/chapter/a-computational-study-on-text-quality-and-citation-frequency-in-research-papers/413853>

Devare, M. H., Das, D., Devare, A. M., & Yannawar, P. L. (2027). A Computational Study on Text Quality and Citation Frequency in Research Papers. In P. Yu, J. Mulli, Z. Syed, & L. Umme (Eds.), *The Foundations and Future of AI: Methods, Models, and Machine Intelligence* (pp. 229-268). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-2600-2373-0.ch008>

Project Title: Design of Comprehensive Mobile Device Vulnerability Checking Application

Technology Used: Android programming and Cyber security

Student Name : Dhruv Jonathan Athaide

Guide: Prof. (Dr.) Manoj Devare

Description:

A hacker uses tricks to access unauthorized data and perform malicious attacks on Android mobile devices. This research project is design of mobile comprehensive applications to help users with the vulnerability of a device, unprotected public Wi-Fi networks, test weak Wi-Fi passwords, and port scanning to identify open and closed ports on a mobile device. It also shows the device vulnerability assessment and real-time threat monitoring. It provides the network cracking module and analyses the malicious permissions in an Android app. The research work addresses technical details of all features implemented, Android architecture, and its loopholes from the security point of view.

Publication Link:

<https://www.igi-global.com/chapter/design-of-comprehensive-mobile-device-vulnerability-checking-application/406276>

Devare, M. H., Athaide, D. J., Devare, A. M., & Nagpal, V. (2026). Design of Comprehensive Mobile Device Vulnerability Checking Application. In S. Khan, A. Almutairi, & J. Lloret (Eds.), *Advanced Cybersecurity for Threats Exploitation and Digital Risk* (pp. 159-210). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-2600-0747-1.ch006>

Project Title : Automated Curriculum Vitae Validation Through NLP and Machine Learning

Technology Used: NLP and Python Programming

Student Name : Rahul Anantha Singh

Guide: Prof. (Dr.) Manoj Devare

Description:

The recruitment department regularly face difficulties in confirmation of the originality of a Curriculum Vitae. The human judgment may result into errors, delays and appointed person might be go under suspect due to undetected irregularities in CV. The automated CV authenticity verification discovers errors and inconsistencies. The parsing of ATS compliant PDFs extracts personal data, education, employment details, and skills. The NLP, and ML identifies an overlapping employment, gaps, mismatched skills, and other irregularities in CV. The system determines the timeline inconsistency of the resume and the validation of the LinkedIn URL. Finally, a CV is classified as authentic, partially authentic, need to do cross-check manually, or not authentic, depending on a genuinity score. The genuinity score is adjusted using bonuses, penalties and timeline information. Explainable AI SHAP manifests the interpretability and transparency in the decision-making process of AI.

Publication Link:

<https://www.igi-global.com/chapter/automated-curriculum-vitae-validation-through-nlp-and-machine-learning/410577>

Devare, M. H., Singh, R. A., Devare, A. M., & Yannawar, P. L. (2026). Automated Curriculum Vitae Validation Through NLP and Machine Learning. In S. Poddar, P. Siddhey, N. Shafighi, & A. Bhaumik (Eds.), *Harnessing AI and Predictive Analytics for Decision-Making and Competitive Advantage* (pp. 155-196). IGI Global Scientific Publishing. <https://doi.org/10.4018/979-8-3373-3648-0.ch006>