

FAKE CURRENCY DETECTION USING YOLO-CNN

Mrs. V. Yamuna*¹, T. Usharanisahu*², A. Brundavani*³, R. Giribabu*⁴, R. Vinod*⁵

*¹Assistant Professor, Liet Computer Science Engineering, Lendi Institute Of Engineering And Technology, Vizianagaram, Andhra Pradesh, India.

*^{2,3,4,5}B.Tech Student, Liet Computer Science Engineering, Lendi Institute Of Engineering And Technology, Vizianagaram, Andhra Pradesh, India.

ABSTRACT

The Indian economy suffers greatly from counterfeit money. The integrity of the Indian economy must be preserved. The development of color printing technology has led to a significant rise in the production and large-scale replication of counterfeit banknotes. It is quite hard to tell what is false from what is true. Because people differentiate based on outward appearance, it becomes impossible for common individuals to tell whether the money is real or phony. We're using a smart computer system called a Convolutional Neural Network (CNN) using YOLO V5 algorithm. We trained this system using a bunch of pictures containing real and fake money of different types. The dataset is pre-processed by resizing images to a uniform size and normalizing pixel values, optimizing them for CNN analysis. The preprocessed images are then split into training and validation sets for training and testing the model, respectively.

Keywords: Indian Currency, YOLO, Convolutional Neural Network, Recognition, Features Of Note.

I. INTRODUCTION

Counterfeit currency is a pervasive global issue, facilitated by advanced printing and scanning technologies. Machine learning, particularly convolutional neural networks (CNNs) and YOLO (You Only Look Once) algorithms, presents a promising solution. The process begins with dataset collection, where a diverse set of genuine and counterfeit currency images is gathered. Pre-processing steps are then applied to clean and enhance the dataset, optimizing it for CNN analysis. During the training stage, the CNN is trained using supervised learning to recognize distinctive patterns and features that differentiate genuine from fake currency. The YOLO algorithm's object detection capability complements the CNN, allowing for efficient localization of counterfeit features. As the CNN processes more data and undergoes iterations, its accuracy improves. Together, CNNs and YOLO form an automated system capable of accurately detecting counterfeit currency, thereby aiding in combating this global problem.



Fig.1 Classify the Currency either original or fake

II. LITERATURE SURVEY

- The project for determining if currency is real or fake is introduced in the research article "Detection of Counterfeit Currency through Python Programming and Web Framework" (2020) by Prof. Chetan, Monu, Rupesh, and Raushan . The methodology outlined in the paper leverages Flask, a lightweight Python web framework, for its implementation in web programming. The study focuses on the application of basic Python programming techniques to achieve the goal of counterfeit currency detection.
- The research paper titled "Identification of Counterfeit Indian Currency Note Using Image Processing," by Vivek Sharan and Amandeep Kaur in 2019, puts forth an all-encompassing strategy for identifying fake Indian currency notes. The study zeroes in on three pivotal attributes—Latent image, Reserve Bank of India

(RBI) logo, and denomination numeral accompanied by the Rupee symbol—by meticulously scrutinizing the color components of the currency notes.

- The research paper titled “Indian Paper Currency Detection,” presented by Aakash S. Patil, in 2019, introduced an innovative technique aimed at improving the recognition capability and transaction speed for classifying Indian currency. The approach incorporates the utilization of the OpenCV library, a set of computer functions primarily tailored for real-time computer vision tasks. This involves functions such as note identification, segmentation, recognition, alongside the integration of the NumPy module in Python for numerical processing. Additionally, argparse is employed for parsing command line arguments, and cv2 serves as the OpenCV bindings in the implementation of this methodology.

III. ARCHITECTURE AND WORKFLOW

As the new Indian currency notes 500,200,100,50,20,10 of images were utilized for the identification of various notes. YOLO v5 architecture based on CNN family architecture is a pre-trained model to obtain the results in a faster mode. So, the considered dataset was utilized on the YOLO v5 architecture. The utilization of YOLO v5 CNN algorithm for counterfeit currency detection has yielded promising results, showcasing its effectiveness in discerning genuine banknotes from counterfeit ones. Through a meticulous process of data collection, preprocessing, model selection, and training, the YOLO v5 architecture has been adeptly fine tuned to recognize subtle features indicative of authenticity. Leveraging its real-time processing capabilities and object detection prowess, the model can swiftly analyze currency notes with remarkable accuracy. By scrutinizing various denominations and incorporating diverse perspectives and conditions into the training dataset, the model has demonstrated a robust ability to differentiate between genuine and counterfeit notes, achieving a notable success rate. This advancement holds significant implications for financial security, offering a reliable means to safeguard against counterfeit currency proliferation and uphold the integrity of monetary systems.

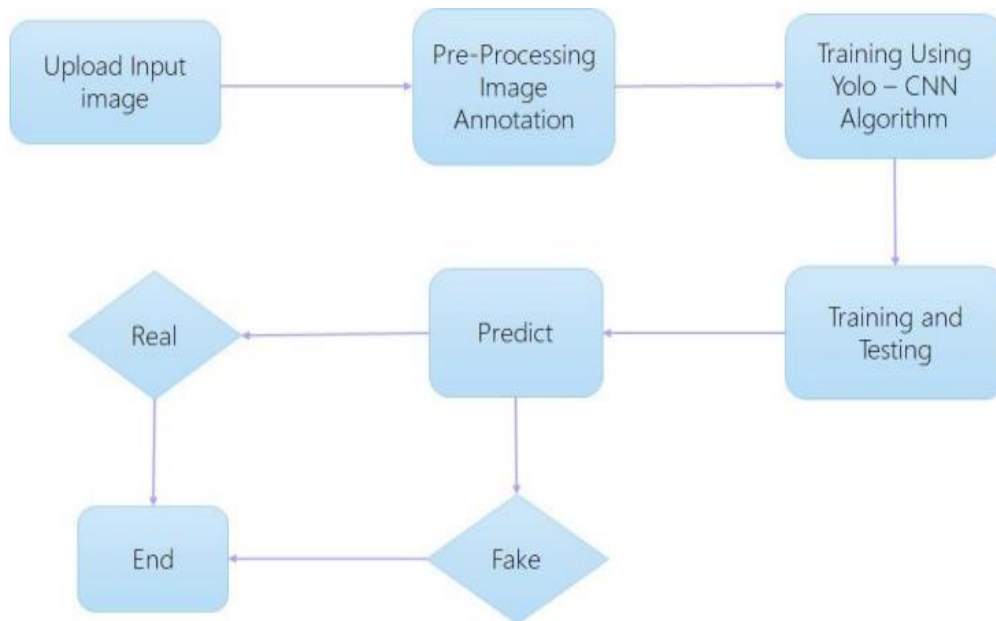


Fig.2 System Architecture

IV. CONCLUSION

In this work, we have discussed that how our proposed system detects the fake bank currency using machine learning algorithms. The proposed system is also scalable for detecting the whether the currency is fake or not by image processing. The system is not having complex process to detect the whether the data contains fake bank currency like the existing system. Proposed system gives genuine and fast result than existing system. Here in this system we use CNN algorithm to detect whether currency is fake or not.

ACKNOWLEDGEMENTS

We extend our gratitude to the Department of Computer Science and Engineering, Lendi Institute of Engineering and Technology, Vizianagaram, for their continuous support and assistance throughout our work.

V. REFERENCES

- [1] T. Mohana Priya, Dr. M. Punithavalli, and Dr. R. Rajesh Kanna developed a machine learning algorithm to enhance the Support Vector Machine technique for stress prediction. Published in the Global Journal of Computer Science and Technology: C Software & Data Engineering, Volume 20, Issue 2, 2020, pp. 12-20.
- [2] Ganesh Kumar and P. Vasanth Sena proposed a novel approach using artificial neural networks and logistic methods to detect credit card fraud. Published in the International Journal of Computer Science and Network Security.
- [3] Gyusoo Kim and Seulgi Lee conducted payment research in 2014, published by the Bank of Korea in 2015, providing insights into payment systems.
- [4] Hitesh D. Bambhava, Prof. Jayeshkumar Pitroda, and Prof. Jaydev J. Bhavsar compared bamboo scaffolding with metal scaffolding in the construction industry using statistical methods. Published in the International Journal of Engineering Trends and Technology (IJETT), Volume 4, Issue 6, June 2013, pp. 2330-2337.
- [5] P. Ganesh Prabhu and D. Ambika conducted a study on the behavior of workers in the construction industry to enhance production efficiency. Published in the International Journal of Civil, Structural, Environmental and Infrastructure Engineering Research and Development (IJCSEIERD), Vol. 3, Issue 1, Mar 2013, pp. 59-66.
- [6] Pande S., Khamparia A., Gupta D., Thanh D.N.H. (2021) developed a technique for DDoS detection using machine learning.
- [7] A.A. Mandankandy, K.E. Kannammal conducted a survey on fake currency detection, published in Gedrag en Organisatie, 33(4), pp. 622–638, 2020.
- [8] M. Laavanya and V. Vijayaraghavan developed a system for real-time detection of fake currency notes using deep learning. Their work was published in the International Journal of Engineering and Advanced Technology (IJEAT), Vol. 9, Issue 1S5, 2019, with ISSN: 2249-8958.
- [9] G. Navya Krishna, G. Sai Pooja, B. Naga Sri Ram, V. Yamini Radha, and P. Rajarajeswari developed a system for the recognition of fake currency notes using convolutional neural networks. Published in the International Journal of Innovative Technology and Exploring Engineering, 8(5), pp. 58–63, 2019.