

## HOSPITAL MANAGEMENT SYSTEM

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### ABSTRACT

Efficient management of patient data and secure handling of sensitive information are critical in modern healthcare systems. This project proposes a Hospital Management System integrated with deep learning and Optical Character Recognition (OCR) techniques to automate patient identification and data processing. The system utilizes YOLO (You Only Look Once) CNN algorithm to detect Aadhaar card regions and applies OCR to extract Aadhaar numbers. To ensure privacy, the Aadhaar number is masked when displayed to doctors and unmasked only for administrators. The system supports multiple users including patients, doctors, insurance providers, and administrators. Patients can register, upload medical history, book appointments, and view prescriptions. Doctors can manage appointments, access patient records, and generate prescriptions. Insurance users can verify billing details, while administrators manage system data and user access. The application is implemented using Python, MySQL, and deep learning frameworks. Experimental results show high accuracy in Aadhaar detection and extraction, improving efficiency and security. The system

provides a scalable and intelligent solution for healthcare management.

**Keywords:** *Hospital Management System, YOLO, OCR, Aadhaar Detection, Deep Learning, Healthcare System, Data Privacy, CNN*

### I.INTRODUCTION

Healthcare systems require efficient management of patient records, appointment scheduling, and secure handling of sensitive personal information. Traditional hospital management systems often rely on manual processes, which can lead to inefficiencies, errors, and data security risks. With the increasing use of digital technologies, there is a need for automated systems that can handle patient data securely and efficiently.

Deep learning techniques such as YOLO (You Only Look Once) have revolutionized object detection tasks by providing real-time and accurate detection capabilities. In this project, YOLO is used to detect Aadhaar card regions from uploaded images. Optical Character Recognition (OCR) is then applied to extract Aadhaar numbers from the detected regions.

To ensure data privacy, sensitive information such as Aadhaar numbers is masked when accessed by doctors and unmasked only for administrators. This approach enhances security while maintaining accessibility for authorized users.

The proposed system integrates multiple modules including user registration, patient profile management, appointment booking, prescription generation, billing, and insurance verification. It is implemented using Python for backend processing, MySQL for database management, and deep learning frameworks for image processing. The system improves operational efficiency, ensures data privacy, and enhances the overall healthcare experience, making it suitable for modern hospital environments.

## II SURVEY OF RESEARCH

[1] The study by Joseph Redmon et al. (2016) introduced the YOLO (You Only Look Once) object detection algorithm. The methodology processes images in a single pass through a convolutional neural network, enabling real-time detection with high accuracy. Results demonstrated that YOLO outperforms traditional object detection methods in speed while maintaining good accuracy. However, it may struggle with detecting small objects. In the proposed system, YOLO is used to detect Aadhaar card regions efficiently.

[2] The research by Ray Smith (2007) introduced the Tesseract OCR engine for text extraction from images. The methodology involves recognizing characters using pattern recognition and machine learning techniques. Results showed high accuracy in extracting printed text. However, performance may decrease with low-quality images. In the proposed system, OCR is used to extract Aadhaar numbers from detected card regions.

[3] The study by Geoffrey Hinton et al. (2012) highlighted the importance of deep learning in image recognition tasks. The methodology uses convolutional neural networks (CNNs) to learn hierarchical features from images. Results demonstrated significant improvements in image classification and detection accuracy. However, deep learning models require large datasets and computational resources. This research supports the use of CNN-based YOLO models in the proposed system.

[4] The research by Ian Goodfellow et al. (2016) introduced advanced deep learning techniques for pattern recognition. The methodology focuses on training neural networks with large datasets to improve prediction accuracy. Results showed improved performance in complex tasks such as image and speech recognition. However, interpretability remains a challenge. This research supports the use of deep learning in healthcare systems.

[5] The study by Abraham Silberschatz et al. (2011) introduced efficient database management techniques. The methodology involves structured data storage and query optimization. Results demonstrated improved performance in managing large datasets. However, database security must be ensured. In the proposed system, MySQL is used to store patient records and system data securely.

[6] The research by Whitfield Diffie and Martin Hellman (1976) introduced secure communication techniques using cryptography. The methodology focuses on secure data transmission and encryption. Results showed improved data security and privacy. However, key management remains a challenge. This research supports the implementation of data masking techniques for Aadhaar numbers in the proposed system.

### III. WORKING METHODOLOGY

The proposed Hospital Management System integrates deep learning, OCR, and web-based modules to manage patient data efficiently and securely. Initially, the system allows multiple users such as patients, doctors, insurance providers, and administrators to register and log in. Patient users create their medical profiles by entering personal details, uploading medical history documents, and uploading Aadhaar card images. The uploaded Aadhaar image is processed using the YOLO (You Only Look Once) object detection algorithm, which

identifies and extracts the Aadhaar card region from the image. This extracted region is then passed to an Optical Character Recognition (OCR) module to read and extract the Aadhaar number automatically.

In the next phase, the extracted Aadhaar number is validated and stored in the database along with patient medical details. To ensure privacy, the system applies masking techniques to hide sensitive information when accessed by doctors. Only administrators have permission to view unmasked Aadhaar details. Patients can then browse available doctors and book appointments by selecting suitable dates and entering symptoms. Doctors log into the system to view scheduled appointments, access patient medical history, and generate prescriptions. The prescription details are stored in the system and made available to patients, along with automatically generated billing information.

Finally, the system supports additional functionalities such as insurance verification and data management. Insurance users can log in and verify patient billing details for claim processing. The admin manages user data, monitors system activities, and ensures secure access control. The YOLO model is trained using annotated Aadhaar card images, and its performance is evaluated using metrics such as precision and loss. As the number of training epochs increases, the model achieves higher

precision and lower loss, indicating improved detection accuracy. The entire system is implemented using Python, MySQL, and deep learning frameworks, providing a secure, scalable, and intelligent healthcare solution.

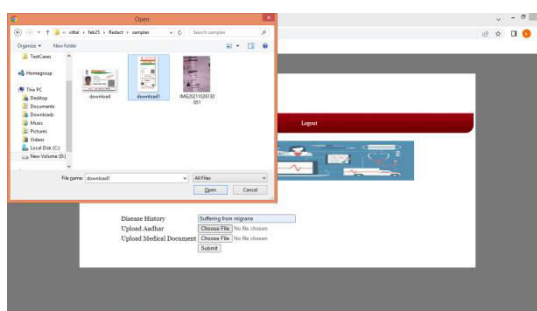
#### IV RESULTS EXPLANATIONS

In this project as per your instructions we have used YOLO11 CNN algorithm to detect Aadhar card number and then apply OCR algorithm to read number from detected card region. Card number region will be masked when displaying Aadhar card to doctor and then get unmask when displaying to admin.

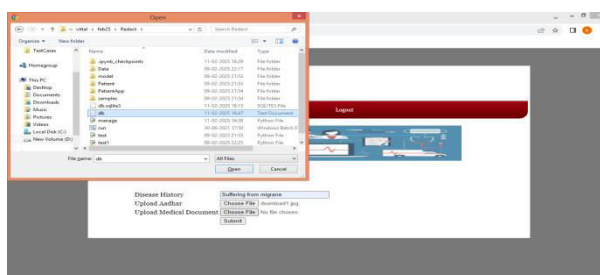
To implement this project we have designed following modules

- 1) New User Sign up: new users like Doctor, Patients, Insurance companies get register with the application
- 2) Patient: Patient can login to system and then create profile by entering disease history, upload medical history documents, upload Aadhar card and then these details will get saved in database along with Aadhar number extracted from uploaded card. Patient can view list of available doctors and can book appointments with desired doctors and can view prescription generated by doctor. Once prescription generated then bill will also get generated

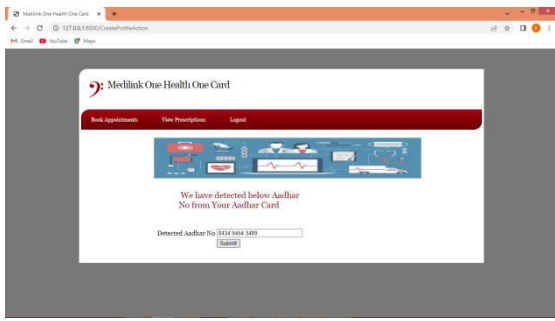
- 3) Insurance: insurance user can login to system and then search bill by entering patient names
- 4) Doctor Login: doctor can login to system and then view list of appointments for today's date and then generate prescription. Doctor can view Aadhar card in mask format and can download and view patient medical document history.



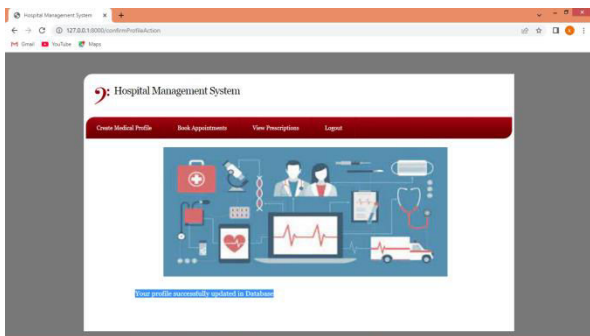
In above screen uploading sample Aadhar card and now click on 'second button' to upload medical history report like below page



In above screen uploading medical history report and then click on 'Open and submit' button to load all documents and then application will extract Aadhar card number and then display below confirmation screen



In above screen we are displaying confirmation screen to patient that extracted Aadhar correct then they can submit button or can alter to correct number and then press submit button to create profile and get below page

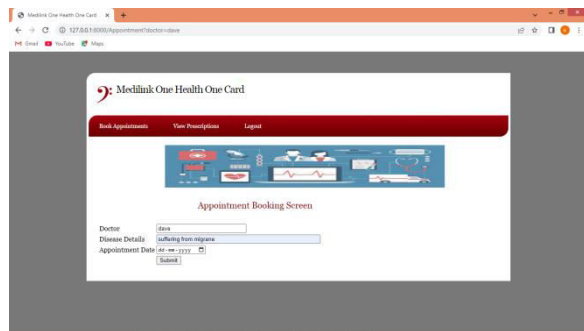


In above screen profile successfully created and now clicks on 'Book Appointments' link to create appointment like below page

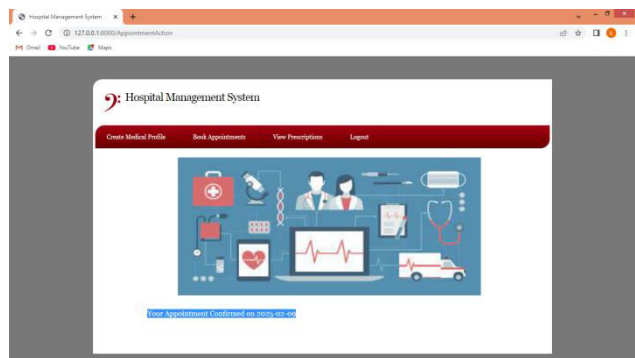


In above screen patient can view list of doctors and can click on 'Click Here' link to book

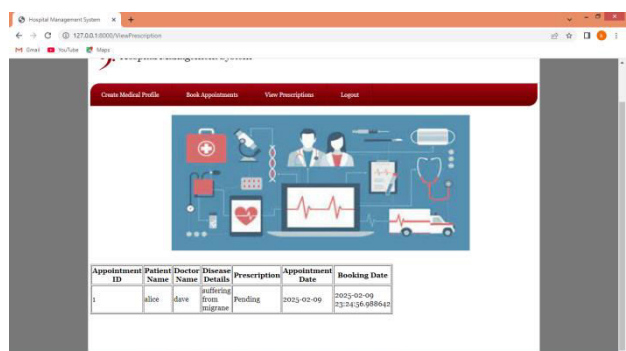
appointment with desired doctor and get below page



In above screen patient will enter some symptoms and then choose appointments date and then press button to complete appointment and get below page



In above screen appointment is confirmed on selected date and now clicks on 'View Prescription' link to view generated prescription



In above screen appointment is confirmed but prescription is pending as doctor not yet generated prescription. Now logout and login as doctor to generate prescription

## V. CONCLUSION

The proposed Hospital Management System integrates deep learning and OCR techniques to provide an efficient and secure healthcare solution. By utilizing YOLO for Aadhaar card detection and OCR for extracting identification details, the system automates patient data processing and reduces manual effort. The implementation of data masking ensures privacy by restricting access to sensitive information based on user roles, thereby enhancing security. The system supports multiple users including patients, doctors, insurance providers, and administrators, enabling seamless interaction, appointment management, prescription generation, and billing. Experimental results demonstrate high accuracy in detection and extraction tasks, improving system reliability. Overall, the system offers a scalable, secure, and intelligent approach to hospital management, contributing to improved healthcare services and data protection.

## RE.FERENCES

[1] J. Redmon, S. Divvala, R. Girshick, and A. Farhadi, "You Only Look Once: Unified, Real-

Time Object Detection," *Proc. IEEE CVPR*, 2016, pp. 779–788.

[2] R. Smith, "An Overview of the Tesseract OCR Engine," *Proc. ICDAR*, 2007, pp. 629–633.

[3] G. Hinton, A. Krizhevsky, and I. Sutskever, "ImageNet Classification with Deep Convolutional Neural Networks," *NIPS*, 2012.

[4] I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*. MIT Press, 2016.

[5] A. Silberschatz, H. Korth, and S. Sudarshan, *Database System Concepts*. McGraw-Hill, 2011.

[6] W. Diffie and M. Hellman, "New Directions in Cryptography," *IEEE Transactions on Information Theory*, 1976.

[7] C. M. Bishop, *Pattern Recognition and Machine Learning*. Springer, 2006.

[8] K. P. Murphy, *Machine Learning: A Probabilistic Perspective*. MIT Press, 2012.

[9] F. Chollet, *Deep Learning with Python*. Manning Publications, 2017.

[10] A. Géron, *Hands-On Machine Learning with Scikit-Learn and TensorFlow*. O'Reilly Media, 2017.

[11] S. Raschka and V. Mirjalili, *Python Machine Learning*. Packt Publishing, 2017.

- [12] M. Abadi et al., "TensorFlow: Large-Scale Machine Learning on Heterogeneous Systems," 2016.
- [13] J. Brownlee, *Machine Learning Mastery with Python*. 2016.
- [14] D. Jurafsky and J. Martin, *Speech and Language Processing*. Pearson, 2009.
- [15] T. Hastie, R. Tibshirani, and J. Friedman, *The Elements of Statistical Learning*. Springer, 2009.
- [16] J. Han, M. Kamber, and J. Pei, *Data Mining: Concepts and Techniques*. Morgan Kaufmann, 2011.
- [17] R. Kohavi, "A Study of Cross-Validation and Bootstrap for Accuracy Estimation," *IJCAI*, 1995.
- [18] L. Rokach, "Ensemble-Based Classifiers," *Artificial Intelligence Review*, 2010.
- [19] H. Liu and H. Motoda, *Feature Selection for Knowledge Discovery*. Springer, 1998.
- [20] Y. LeCun, Y. Bengio, and G. Hinton, "Deep Learning," *Nature*, 2015.
- [21] A. Krizhevsky et al., "ImageNet Classification with Deep CNNs," *NIPS*, 2012.
- [22] K. He et al., "Deep Residual Learning for Image Recognition," *CVPR*, 2016.
- [23] O. Ronneberger et al., "U-Net: Convolutional Networks for Biomedical Image Segmentation," *MICCAI*, 2015.
- [24] R. Szeliski, *Computer Vision: Algorithms and Applications*. Springer, 2010.
- [25] H. Greenspan et al., "Deep Learning in Medical Imaging," *IEEE Transactions on Medical Imaging*, 2016.