IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Integrating Blockchain And Ai For Secure And Accurate Disease Detection In Healthcare

[1]V.Varalakshmi, [2]Dr.U.Hemamalini

[1]Research Scholar, [2]Assistant Professor,

[1]Department of Computer Science, [2]Department of Computer Applications,

[1]VELS Institute of Science, Technology & Advanced Studies(VISTAS), Pallavaram, Chennai.

Abstract: Blockchain technology is transforming the healthcare sector by offering safe, decentralized, and transparent data management solutions. The growing dependence on digital medical records, AI-based diagnostics, and interoperability among healthcare providers has heightened the necessity for stringent data security and privacy safeguards.[1] Blockchain guarantees immutable storage of medical data, mitigating the danger of data breaches, unauthorized alterations, and fraudulent actions. This article explores the disruptive impact of blockchain on disease detection, highlighting its integration with artificial intelligence (AI) and machine learning (ML) for early and precise diagnosis. Blockchain improves data integrity by utilizing decentralized ledgers, guarantees real-time access to verified medical records, and enables secure exchange across hospitals, research institutes, and patients. We investigate the uses of blockchain in early disease detection, namely in diagnosing severe health diseases such as cardiovascular disease, diabetes, renal disorders, and hepatic malignancies. AI-driven medical imaging and predictive models, integrated with blockchain technology, facilitate a more dependable, efficient, and privacy-conscious healthcare system. Additionally, we examine the potential obstacles, emerging trends, and future research avenues regarding the implementation of blockchain in the healthcare sector, facilitating a more secure, transparent, and AI-enhanced medical environment.

Index Terms - Blockchain in Healthcare, Medical Data Security, Disease Detection with AI, Decentralized Healthcare Systems, Blockchain for Medical Imaging, Liver Tumor Detection, AI-Blockchain Integration, Electronic Health Records (EHRs), Smart Contracts in Healthcare, Secure Medical Data Sharing, Interoperability in Healthcare, Tamper-Proof Medical Records, Decentralized AI for Diagnosis, Machine Learning in Medical Imaging, Privacy-Preserving Healthcare Systems

I. INTRODUCTION

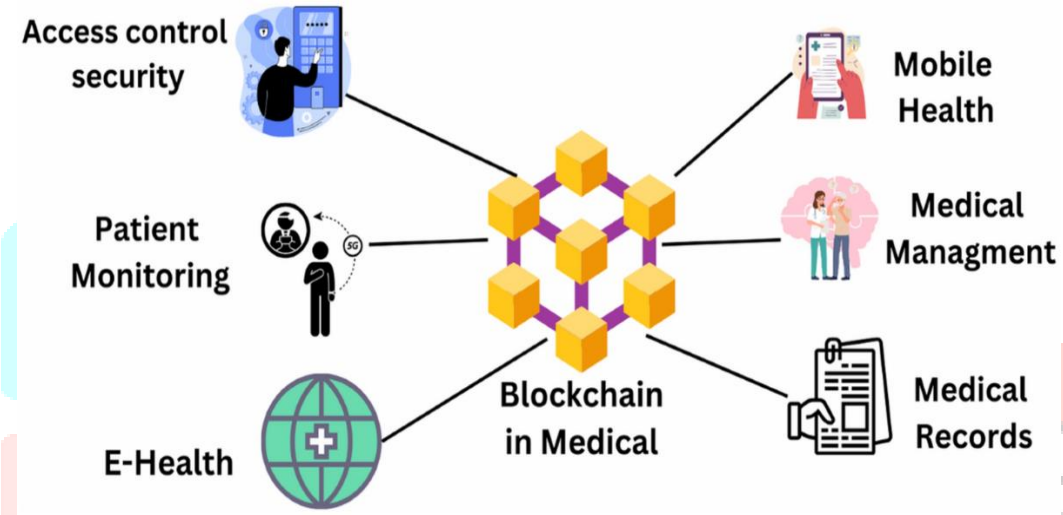
The healthcare business is changing a lot because new technologies like Blockchain, Artificial Intelligence (AI), and Machine Learning (ML) are being used. These improvements are changing how medical data is kept, accessed, and used. This is leading to better outcomes for patients, more accurate diagnoses, and more efficient medical research. But traditional healthcare systems still have a lot of problems, such as weak data security, healthcare providers that can't talk to each other, and people getting into private patient information without permission. In traditional systems, centralized databases are often open to cyber threats, data breaches, and delays, all of which can put patient privacy and trust at risk. Also, different healthcare institutions store data in different ways, which makes it harder for information to flow smoothly and speeds up the evaluation and treatment processes. Blockchain technology has become a hopeful way to deal with these important problems. Blockchain protects medical data from beginning to end because it is decentralized, can't be changed, and is cryptographically safe. It allows for permanent record-keeping, which stops any illegal or

fraudulent changes to patient information. Additionally, blockchain's ability to allow hospitals, study groups, and patients to share data in a safe and open way promotes greater interoperability and improves teamwork in healthcare.

This Article looks at how blockchain could be used to find diseases and keep an eye on people's health in real time, especially when combined with AI-powered testing systems. Medical workers can find diseases earlier, make better decisions, and keep data safe by using blockchain's security features along with AI and ML's predictive abilities. When AI, machine learning, and blockchain work together, they create a big change in healthcare. In the future, patient records will be safe, diagnoses will be faster and more accurate, and medical data will be available while still being safe.

2. Blockchain Applications in Medical Data Management

Adding blockchain technology to healthcare has changed the way that data is handled, stored, and shared. In contrast to traditional centralized systems, which can be attacked by hackers, have illegal access, and have data that isn't consistent, blockchain uses a distributed ledger system to keep medical data safe, clear, and efficient. Here are some of the best things about using blockchain to handle medical data:



$$\alpha + \beta = \chi. \qquad (1)$$

Fig 1: A Blockchain ledger storing encrypted patient data, emphasizing tamper-proof security, privacy, and interoperability.

I. Tamper-Resistant Records

A key property of blockchain is its immutability. once data is inscribed in the blockchain, it cannot be modified or erased without the network's consensus. This functionality is especially advantageous in electronic health records (EHRs), medical imaging, and clinical trial data, where preserving the integrity and precision of patient information is essential.

Prevents Data Manipulation: Modifications to medical records create a traceable audit trail, thereby diminishing fraud and illegal alterations.Augments Data Integrity: Guarantees that patient histories, laboratory reports, and diagnostic outcomes remain precise, unaltered, and verifiable. Safeguards Against Malicious Attacks: The decentralized nature of blockchain eradicates a singular point of failure, hence diminishing the likelihood of data breaches and cyberattacks.

II. Privacy Protection

Healthcare data is extremely sensitive, and its illegal disclosure can result in identity theft, insurance fraud, and breaches of privacy. Blockchain guarantees data secrecy via sophisticated cryptography methods and access control systems.

Encryption and Anonymization: Patient data is maintained in an encrypted format, rendering it available just to authorized parties.

Patient-Centric Authority: Utilizing self-sovereign identification (SSI) and smart contracts, patients can govern access to their medical records, so assuring adherence to HIPAA, GDPR, and other data protection

statutes.

• Reduced Risk of Data Breaches: In contrast to centralized databases, where a security breach might compromise extensive data, blockchain segregates access, thereby substantially mitigating risks.

Table 1: Benefits of Blockchain in Healthcare

Feature	Description
Data Security	Guarantees secure, tamper-resistant storage of patient records.
Interoperability	Facilitates uninterrupted data exchange among healthcare practitioners.
Patient Control	Enables patients to possess and control access to their medical records.
Fraud Prevention	Mitigates the dangers of illegal data alteration.

III. Efficient Data Sharing

A significant difficulty in conventional healthcare systems is data fragmentation, characterized by the storage of patient records in disparate systems across many hospitals, clinics, and laboratories. Blockchain addresses this challenge by facilitating secure and efficient data interchange among healthcare providers. Immediate and Secure Data Access: Physicians, experts, and researchers can retrieve real-time patient records without delay, enhancing diagnostic and therapeutic outcomes. Interoperability Among Institutions: Blockchain serves as a cohesive network enabling various healthcare institutions to share essential patient data without the need for third-party middlemen. Improved Collaboration in Research and Treatment: Secure access to anonymised patient data facilitates the development of superior AI models, clinical trials, and illness prediction systems by medical researchers.

Real-World Applications of Blockchain in Medical Data Management

Decentralized Electronic Health Records (EHRs): Blockchain facilitates a cohesive, patient-governed EHR system that is accessible across many healthcare providers. Medical Supply Chain Monitoring: Guaranteeing the authenticity and traceability of medications, vaccines, and medical devices.Ensure the integrity of clinical trials and research data: Mitigating the risk of result manipulation and scientific misconduct in medical research. Implementing blockchain in medical data management enables healthcare facilities to establish a safe, efficient, and patient-centric system, while effectively addressing critical issues pertaining to data privacy, integrity, and interoperability.

3. Blockchain-Enabled Disease Detection

By providing a safe and dependable framework for data storage, blockchain technology significantly contributes to the improvement of AI-based disease diagnosis, which in turn enhances prediction accuracy and healthcare decision-making. AI and blockchain integration guarantees that machine learning models are trained on authentic, high-quality medical information, resulting in more accurate and reliable predictive modeling. This is especially crucial for illness detection, since precise diagnosis and patient outcomes depend on data integrity.Furthermore, by allowing real-time access to patient health data while upholding strict security standards, blockchain promotes effective disease monitoring. Healthcare practitioners may easily access and review patient records without worrying about data breaches or illegal changes because to decentralized and secured storage. By enabling physicians and researchers to monitor the course of diseases, compare prior data, and make more informed clinical decisions, this real-time accessibility improves medical responsiveness.

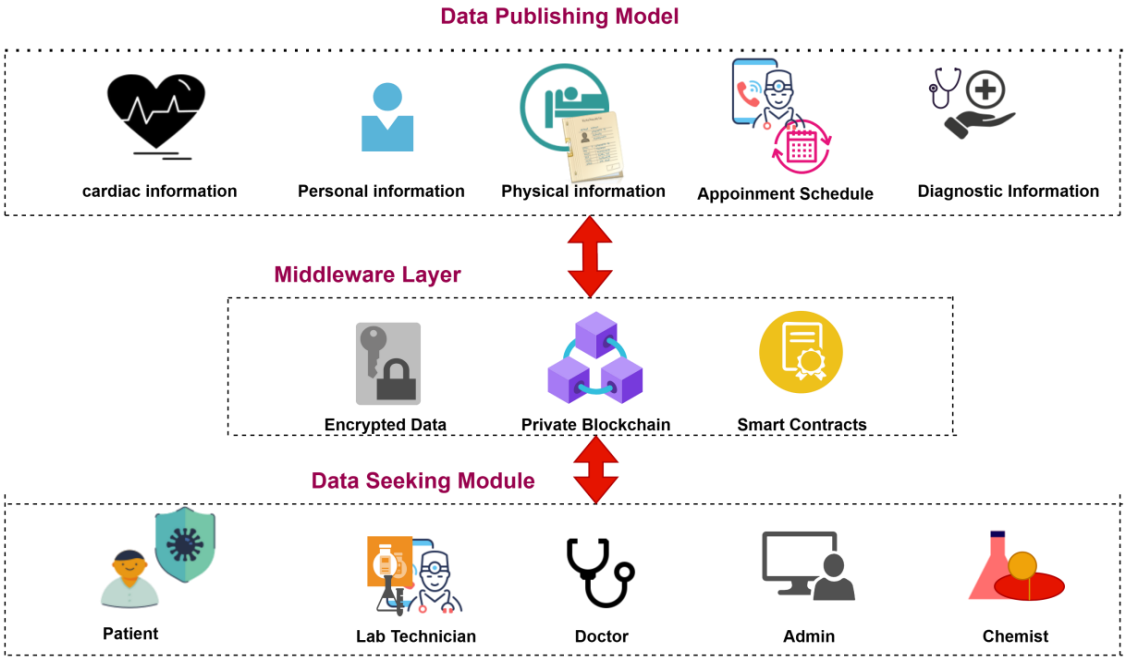


Fig 2: Blockchain-Enabled Secure Healthcare Data Exchange Framework

The ability to guarantee reliable AI-driven diagnoses is another significant benefit of using blockchain technology into AI-based healthcare systems. The possibility of data tampering or biased training sets, which can greatly affect diagnosis accuracy, is one of the main obstacles in AI-based disease identification. By establishing an unchangeable, visible, and verifiable audit trail of medical data, blockchain removes this risk and guarantees that AI models are trained on real, unmodified data. This increases patient confidence in AI-driven suggestions, resulting in more accurate disease detection and individualized treatment regimens.The industry may improve disease prediction and monitoring security, accuracy, and efficiency by integrating blockchain technology into AI-based healthcare systems. This will ultimately transform contemporary medical diagnostics.

Blockchain systems process medical data transactions, ensuring security and integrity. The total time required to validate and add a transaction to the blockchain can be estimated as:

Ttotal = Thash + Tsignature + Tverification T_{total} = T_{hash} + T_{signature} + T_{verification}

Where:

- **ThashT_{hash}** is the time taken to generate a cryptographic hash of the medical record.
- **TsignatureT_{signature}** is the time taken for digital signature generation.
- **TverificationT_{verification}** is the time taken to validate and add the transaction to the blockchain.

For example, if:

- Thash=0.5T_{hash} = 0.5 ms
- Tsignature=1.2T_{signature} = 1.2 ms
- Tverification=2.3T_{verification} = 2.3 ms

Then, the total transaction processing time:

Ttotal=0.5+1.2+2.3=4.0 msT_{total} = 0.5 + 1.2 + 2.3 = 4.0 \text{ ms}

4. Blockchain for Specific Disease Diagnosis

4.1 Heart Disease

To securely store and manage cardiovascular disease (CVD) records, a blockchain-based framework has been developed, meeting the vital requirements of data accessibility, privacy, and integrity in the medical field. The accuracy of diagnosis and treatment plans may be jeopardized by traditional methods of preserving medical records, which are susceptible to tampering, data breaches, and illegal access. Medical data is kept safe and unaffected by using blockchain technology to keep patient records in a decentralized, immutable ledger. Blockchain technology has been used with artificial intelligence (AI) models, namely the sine cosine weighted K-nearest neighbor (SCA_WKNN) algorithm, to improve the predictive accuracy of CVD diagnosis. Through the optimization of distance computations and weighting methods, this sophisticated AI model enhances classification and prediction skills, resulting in a more precise diagnosis of heart disease risks.

A reliable system where predictions are based on high-quality, unaltered medical data is made possible by the integration of AI with blockchain, which lowers the possibility of errors brought on by inconsistent data. Furthermore, by providing real-time, authorized access to patient records, blockchain enables safe collaboration between medical experts. Researchers, cardiologists, and doctors can access encrypted and validated data without jeopardizing patient privacy. Only authorized workers can access certain medical data thanks to smart contracts, which impose predetermined criteria for data access and exchange. By strengthening the overall dependability of CVD detection systems, this blockchain and AI combo opens the door to better patient outcomes and more effective disease management techniques.

4.2 Diabetes

Diabetes prediction models powered by blockchain technology have been created to improve patient data confidentiality, privacy, and accessibility while facilitating real-time condition monitoring. Inefficient data sharing between hospitals and other medical facilities, security flaws, and fragmented data storage are common problems with traditional healthcare systems. By offering a decentralized and unchangeable ledger, blockchain technology solves these issues and guarantees that patient records are safe, impenetrable, and available to authorized parties only. By utilizing both past and present patient data, blockchain technology combined with artificial intelligence (AI) enables more precise diabetes prediction. To find early warning signals of diabetes, AI systems examine enormous datasets that include genetic predispositions, lifestyle factors, medical history, and data from continuous glucose monitoring. Blockchain guarantees that this data is reliable and unchangeable, which is essential for AI algorithms to produce accurate forecasts.Blockchain's capacity to provide safe and easy data exchange across clinics, hospitals, and healthcare professionals is one of its many noteworthy benefits for diabetes treatment. Predetermined rules are set up to control data access through smart contracts, protecting patient privacy while granting pertinent parties—including physicians, endocrinologists, and researchers—access to the data they need for diagnosis and treatment planning. In addition to improving professional collaboration, this interoperability speeds up early detection and individualized treatment plans. Additionally, blockchain-supported Internet of Things (IoT) gadgets like wearable health trackers and continuous glucose monitors (CGMs) enhance real-time diabetes patient monitoring. These gadgets gather information and send it to the blockchain network, where AI-powered analytics reveal details like medication compliance, blood sugar swings, and possible issues. Timely signals are sent to patients and medical professionals, allowing for preventative measures to stop serious illnesses like diabetic ketoacidosis or neuropathy. All things considered, the combination of blockchain technology and AI-powered diabetes prediction models guarantees the safety and accuracy of medical data, promotes effective communication between healthcare organizations, and improves real-time patient monitoring. A more resilient, patient-centered healthcare system that places a higher priority on data integrity, precise forecasting, and individualized illness treatment plans is made possible by this creative approach.

4.3 Kidney and Liver Diseases

Researchers are becoming more and more aware of how blockchain could change medical data management and AI-driven tests. However, blockchain use in kidney and liver disease detection is still in its early stages. When it comes to dealing private patient data, the current healthcare system has a lot of problems. These include weak security, broken data, and healthcare institutions that can't talk to each other. Blockchain technology provides a decentralized, open, and unchangeable solution that keeps patient records safe, allowing only approved parties to access them, and allowing verification without compromising privacy. One of the best things about using blockchain to find kidney and liver diseases is that it can make medical data safer and more reliable. Frameworks driven by blockchain make it possible to store patient histories in a way that can't be changed. This makes sure that diagnostic information, test results, and treatment records aren't changed or tampered with. This dependability is very important for AI-based diagnostic systems that need clean, high-quality data to make correct guesses and suggestions. By making sure that data is correct, blockchain builds trust in AI-driven results, which lets healthcare professionals make choices with more confidence. Another important way that blockchain helps find and treat kidney and liver problems is by allowing different systems to talk to each other. Doctors have a hard time getting a full picture of a patient's medical background because patient data is often spread out among many hospitals, labs, and healthcare systems. Through encrypted, permissioned access, blockchain technology makes it easy for healthcare institutions to share data with each other. This means that only authorized professionals can view and change patient records in real time. With this decentralized method, there is no need for middlemen. This cuts down on administrative delays and speeds up the process of finding diseases and planning treatments. Smart contracts that use blockchain can also improve patient care by automating important tasks like verifying medical records, filing insurance claims, and managing permission. These contracts that run themselves make sure that patient information is only shared safely with the right people, keeping it private and in line with

healthcare rules. This kind of technology also cuts down on paperwork, which frees up doctors and nurses to focus on caring for patients instead of doing paperwork. Blockchain technology can also help researchers work together to find better ways to identify kidney and liver diseases. Blockchain encourages new ways of diagnosing and treating medical problems by making it safe for hospitals, study centers, and drug companies to share data. Researchers can use big, anonymous datasets to train AI models, make predictive analytics, and find early biomarkers for disease diagnosis without putting patients' privacy at risk. In conclusion, using blockchain to find kidney and liver diseases is still new, but it has the potential to make data safer, build trust in AI-based diagnostics, and make decentralized cooperation easier. Blockchain-powered healthcare systems solve problems with data management and connectivity, making it possible for faster, more accurate, and patient-centered ways to find and treat diseases.

4.4 Liver Tumor Detection

Hepatocellular carcinoma (HCC) and other liver cancers are very hard to diagnose early and treat effectively because they are very complicated and grow very quickly. Artificial intelligence (AI) and machine learning (ML) have made it possible for more advanced diagnostic tools to be made. These tools use medical imaging methods like computed tomography (CT), magnetic resonance imaging (MRI), and ultrasound to improve the accuracy of detection. Several machine learning models, such as deep learning architectures, random forests, and convolutional neural networks (CNNs), have shown amazing results in finding liver tumors by analyzing imaging patterns and accurately telling the difference between cancerous and noncancerous lesions. Concerns about data security, privacy, and interoperability are stopping AI-based liver tumor detection tools from being widely used, even though they are getting better. In traditional healthcare systems, private patient information is often kept in centralized databases, which leaves them open to cyberattacks, illegal access, and data manipulation. Another big problem is that there isn't a safe and clear way to handle medical imaging data. This is because AI models need a lot of different, high-quality datasets to get better at making predictions. If there aren't enough security measures in place, patient privacy could be at risk and medical information could be misused. Blockchain technology can help with these problems because it creates a decentralized, unchangeable, and unhackable method for managing data. Health care organizations can protect the accuracy, integrity, and privacy of medical imaging data by combining blockchain with AI-powered liver tumor detection models. Diagnostic reports and image records for each patient can be kept safely on a blockchain network. This network has strict access controls, such as encryption and permission-based systems. This keeps people from making changes to medical records without permission and makes sure that only approved groups, like radiologists, oncologists, and researchers, can access and change the information.

Table 2: *Machine Learning Techniques for Liver Tumor Detection*

Technique	Description	Accuracy (%)
CNN	Derives spatial characteristics from medical photos for classification purposes. .	92.5%
Random Forest	Employs several decision trees for tumor categorization.	89.7%
Support Vector Machine	Identifies the best hyperplane for tumor segmentation.	88.2%
Deep Neural Networks	Employs multi-layered learning to identify patterns in image data.	93.1%

Additionally, blockchain makes it easy and safe for many people involved in healthcare to share data with each other, which allows for group study and real-time access to patient records. Smart contracts let healthcare companies automate agreements to share data while still following rules like the General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA). This improves interoperability, which means that AI models can be taught on different sets of data from different institutions without putting patient privacy at risk. This means that more accurate and broad models for finding liver tumors can be made, which will lead to more accurate diagnoses and more personalized treatment plans. Along with this, blockchain technology gives patients more power by giving them more control over their medical records. Patients have the power to give or take away entry permissions from healthcare providers. This keeps their private health information safe. This openness makes people more likely to believe AI-based diagnostic systems and more likely to use new technologies in clinical practice. In conclusion, combining blockchain with AI-powered liver tumor spotting is a revolutionary way to solve important problems in medical imaging. Blockchain makes AI-based diagnostics more reliable and efficient by protecting patient data, ensuring interoperability, and allowing collaborative research. This leads to earlier detection, better patient outcomes, and more effective treatment strategies for hepatocellular carcinoma and other liver tumors.

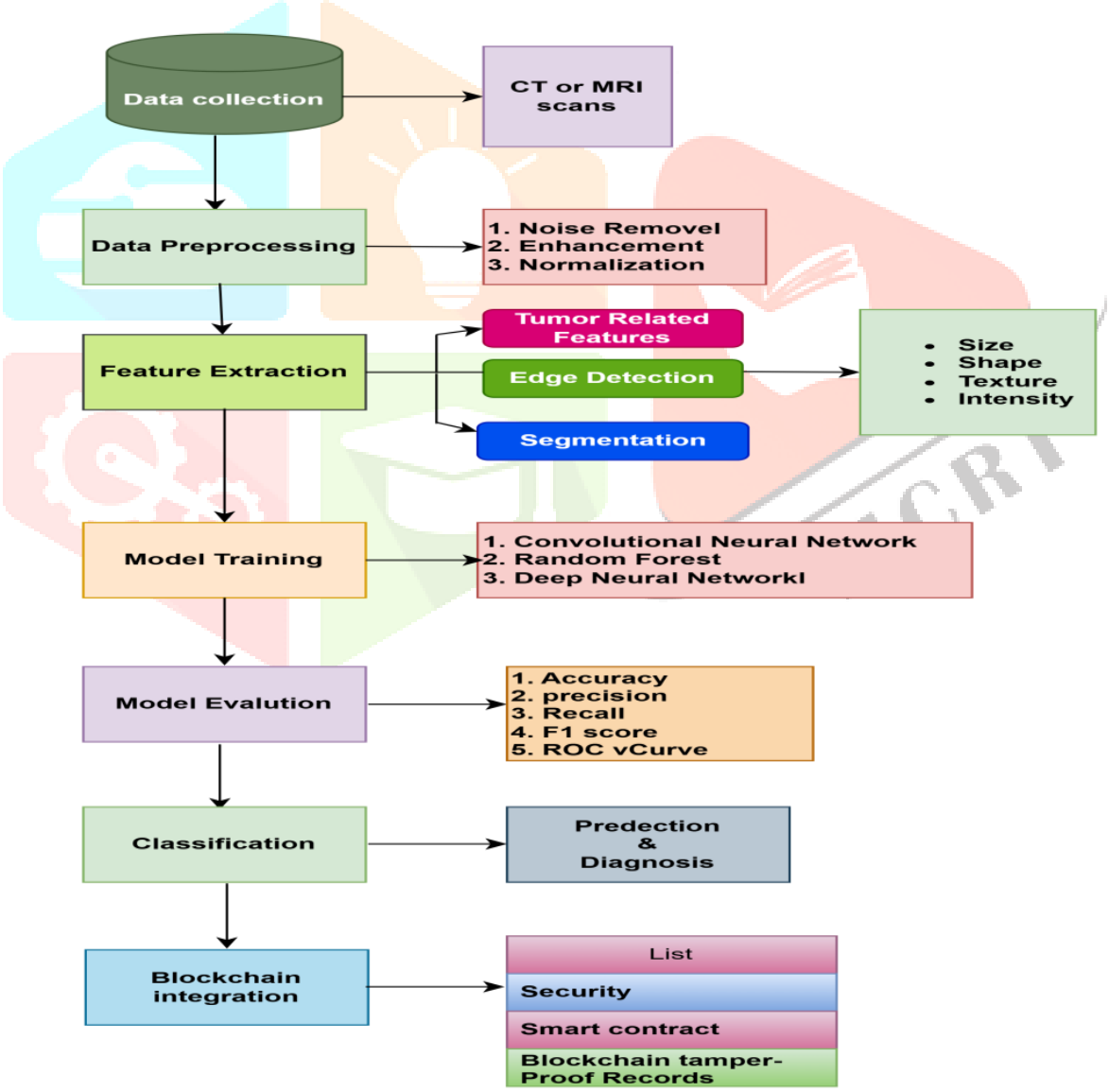


Fig 3: *Machine Learning Workflow for Liver Tumor Detection*

Accuracy Calculation for Liver Tumor Detection Models

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN} \times 100$$

Where:

- TPTP = True Positives (correctly detected tumors)
- TNTN = True Negatives (correctly identified non-tumors)
- FPFP = False Positives (incorrect tumor detections)
- FNFN = False Negatives (missed tumors)

For example, if a model detects **80 true tumors, 150 non-tumors correctly**, but **5 tumors incorrectly (FP) and 10 missed cases (FN)**:

$$\text{Accuracy} = \frac{80 + 150}{80 + 150 + 5 + 10} \times 100 = \frac{230}{245} \times 100 = 93.88\%$$

5. Future Prospects of Blockchain in Healthcare

The healthcare industry will change a lot because blockchain technology will solve important problems with data security, collaboration, and patient privacy. As the use of blockchain grows, a number of important new technologies are appearing that could improve healthcare processes, make patient care easier, and make AI-driven diagnostics more accurate. One of the most important new ideas is the use of smart contracts, which are very important for automating healthcare tasks, especially managing patient permission. Smart contracts are agreements that are saved on the blockchain and take action when certain conditions are met. In healthcare, they can make sure that patients give their permission and that this permission is kept permanently, which makes sharing medical data safer. This gets rid of the need for manual approval of data access, which makes administration easier and keeps people from getting into private medical information without permission. The Health Insurance Portability and Accountability Act (HIPAA) and the General Data Protection Regulation (GDPR) are two data protection laws that smart contracts make sure are followed. Smart contracts build trust between patients and healthcare providers by allowing automated and clear consent mechanisms. Decentralized identity verification is another important step forward. It makes it possible for safe and authorized access to patient information. Traditional healthcare systems often store patient information in centralized databases, which leaves them open to hacking and changes made without permission. Blockchain, on the other hand, provides a decentralized framework for managing identities. Patient records are kept in an unchangeable ledger and can only be viewed by cryptographic authentication. This makes sure that only authorized people, like doctors, experts, and patients, can get to or change medical records.

Table 3: *Comparison of Traditional vs. Blockchain-Based Medical Data Storage*

Feature	Traditional Healthcare Systems	Blockchain-Based Healthcare Systems
Data Security	Centralized storage, vulnerable to cyberattacks	Decentralized and encrypted, enhancing security
Interoperability	Limited data sharing between providers	Seamless, secure interoperability across healthcare systems
Patient Data Ownership	Controlled by hospitals and institutions	Patients have control over their medical records
Tamper Resistance	Data can be altered or deleted	Immutable records prevent unauthorized modifications
Fraud Prevention	High risk of data breaches and manipulation	Reduces fraudulent activities through transparency
Access Control	Role-based access with possible breaches	Smart contracts enable secure and automated access

Decentralized identity solutions also give people more power by letting them decide who can see their health information. This makes privacy safer and lowers the risk of identity theft or data breaches. One of the most interesting ways that blockchain could be used in healthcare is to connect it to systems that use artificial intelligence (AI) to find diseases. Through the analysis of large amounts of patient data, medical images, and clinical histories, AI has shown to be very good at identifying diseases like cancer, diabetes, and heart problems. But for AI models to make accurate predictions, they need high-quality information that can't be changed. Blockchain is the best way to protect and verify these datasets, making sure that medical records used to train AI are kept safe and unchanged. Blockchain makes AI-driven diagnoses more reliable by stopping people from changing data. This leads to more accurate disease prediction and early discovery. Blockchain also makes it safer for healthcare institutions to work together by letting them share data without compromising patient privacy. Hospitals, study groups, and drug companies can safely share patient data that has been anonymized. This lets AI models learn from different sets of data and improves the accuracy of diagnoses for a wide range of medical conditions. This ability to work with other systems makes precision medicine better by letting doctors create better treatment plans that are specific to each patient. To sum up, blockchain technology is changing healthcare by adding smart contracts that automatically get patients' permission, digital identity verification that makes it safe to access medical records, and AI-blockchain integration that makes it easier to find diseases. These improvements not only make data safer and protect patients' privacy, but they also help build trust and openness in AI-driven healthcare solutions. As the use of blockchain grows, it becomes clearer how it can be used to improve patient outcomes and streamline healthcare processes.

6. Conclusion

Blockchain technology is a revolutionary way to keep medical data safe while also making it easier to find diseases and make accurate diagnoses. Adding blockchain to healthcare solves some of the biggest problems that have been stopping medical systems from being efficient and open for a long time. These problems include data privacy, security holes, and problems with how different systems can talk to each other. Blockchain has the potential to change the global healthcare ecosystem by making sure that patient records stay private, can't be changed, and are easy for approved stakeholders to access. This is because it is decentralized and can't be changed. The safety of private patient data is one of the most important issues in healthcare right now. Cyberattacks, unauthorized access, and data breaches are very likely to happen with traditional centralized systems. This can put patients' privacy and trust at risk. There are some risks with blockchain, but they are lessened by using cryptography and private storage. Every medical record on the blockchain is encrypted and tied to a chain of transactions that can't be changed. This makes sure that no one who isn't supposed to can change or manipulate the data. This protects the privacy of patients and builds trust between healthcare workers and patients, making the healthcare system more open. Interoperability is another

important problem that blockchain can help solve. In the current system for healthcare, patient records are often spread out among several hospitals, clinics, and study centers. This makes it hard to share important health information easily. Blockchain technology creates a decentralized ledger where patient records can only be accessed by cryptographic authentication. This makes data sharing safe and quick. This makes sure that doctors and nurses can get accurate, up-to-date information about patients in real time, which helps them make better choices about diagnosis and treatment. Additionally, blockchain-powered interoperability makes it easier for researchers from around the world to work together on medical projects. This is because it lets AI models be taught on a wider range of datasets, which improves their ability to predict diseases. When blockchain is combined with artificial intelligence (AI), it opens up a huge chance to improve finding diseases and making medical decisions. For correct predictions, AI-driven diagnostic systems need a huge amount of high-quality medical data that can't be changed. Healthcare organizations can make sure that AI systems are taught on reliable datasets by storing medical images, patient histories, and diagnostic results on a blockchain. This integration can greatly enhance early disease diagnosis, especially for conditions like cancer, heart disease, and neurodegenerative disorders, where prompt treatment is very important for patient survival. As blockchain continues to change in the healthcare field, more study should be done to make blockchain frameworks better so that they can be used by many people. This includes fixing problems with scalability, lowering transaction costs, and making interfaces that healthcare workers can easily use. Additionally, work should be done to make AI integration as smooth as possible, making sure that AI models can easily access and study medical records that are encrypted on the blockchain without slowing down computers. Through improving these technological areas, blockchain can help make healthcare decision-making safer, more open, and based on data. This concludes that blockchain technology could completely change how medical data is managed and diseases are found by creating a safe, open, and compatible system. By solving problems with data privacy, security, and access, blockchain can make it possible for AI to make more accurate diagnoses and improve health results. In the future, researchers should work on improving blockchain platforms, making it easier to integrate AI, and making sure that this technology can be used easily to change healthcare systems around the world.

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