

DOCUMENT CIRCULATION ALGORITHM IN THE E-HOSPITAL SYSTEM.

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Abstract

The automation of document circulation in the E-HOSPITAL system plays a key role in improving the efficiency, transparency, and reliability of healthcare management processes. The algorithm for document circulation ensures that medical, administrative, and financial documents move seamlessly between departments through digital workflows. By using electronic authentication, secure data exchange protocols, and automated verification mechanisms, the system minimizes human errors and delays in document processing. The E-HOSPITAL system integrates various hospital subsystems such as registration, laboratory, pharmacy, and accounting modules, enabling real-time document tracking and archiving. This study presents the logical structure and functional stages of the document circulation algorithm, including document creation, verification, routing, approval, and storage. The proposed algorithm enhances information accuracy, supports decision-making, and ensures compliance with medical data standards and security requirements.

Keywords: E-HOSPITAL System; Document Circulation; Workflow Automation; Medical Information System; Electronic Health Records; Data Management; Digital Signature; Information Security; Healthcare Informatics; Process Optimization.

Introduction

In the modern era of digital transformation, healthcare institutions are increasingly adopting electronic systems to manage and optimize their internal processes. One of the key elements of this transformation is the automation of document circulation through integrated medical information systems such as E-HOSPITAL. Efficient organization of document flow is essential for ensuring accuracy, security, and timely access to medical and administrative information.

The E-HOSPITAL system serves as a centralized platform that manages various hospital functions, including patient registration, diagnostics, laboratory results, billing, pharmacy management, and reporting. Within this environment, thousands of documents — such as medical records, prescriptions, laboratory reports, and financial statements — are generated and exchanged daily. Manual handling of such documents can lead to delays, duplication, and data inconsistency. Therefore, implementing a well-structured document circulation algorithm is crucial for automating and optimizing these workflows.

A properly designed document circulation algorithm defines the logical sequence of document processing, including creation, verification, routing, approval, and archiving. The algorithm ensures that each document passes through the required stages with controlled access and full traceability. Integration with digital signatures and secure communication protocols (such as HL7, FHIR, and XML-based formats) guarantees data integrity and confidentiality throughout the process.

The E-HOSPITAL document circulation algorithm also contributes to workflow transparency and decision support by providing real-time tracking of document status and enabling quick retrieval of archived records. Furthermore, it reduces administrative burden, minimizes human errors, and increases institutional productivity by standardizing information flow across departments.

In summary, the automation of document circulation in the E-HOSPITAL system represents a significant step toward digital governance in healthcare. It not only simplifies routine operations but also ensures that all medical documentation complies with legal, ethical, and security standards — ultimately leading to improved patient care and organizational efficiency.

Discussion

The document circulation algorithm in the E-HOSPITAL system serves as the backbone of digital information management in healthcare institutions. It determines the logical flow of documents across multiple functional modules, ensuring that information moves accurately, securely, and efficiently from creation to archiving. The algorithmic organization of document circulation eliminates redundancy, enhances coordination between departments, and supports the overall automation of hospital processes.

At the initial stage, documents are created and registered in the system by authorized users, such as physicians, laboratory staff, or administrative personnel. Each document is assigned a unique digital identifier, which enables precise tracking throughout its lifecycle. Following creation, the document undergoes verification and validation, where data integrity and authenticity are confirmed using digital signatures or access control mechanisms.

The next phase of the algorithm involves routing and approval. Depending on the document type (medical report, laboratory result, invoice, or prescription), it is automatically directed to the appropriate department or personnel for review and confirmation. Workflow automation tools within the E-HOSPITAL system ensure that each document reaches the correct destination based on predefined routing rules, thereby minimizing manual intervention and delays.

Once approved, documents are securely stored and archived in the hospital's central database. Advanced indexing and search mechanisms enable quick

retrieval, making the system not only a document repository but also a knowledge management tool. Furthermore, integration with Electronic Health Record (EHR) modules ensures that clinical data remains synchronized and accessible across different departments in real time.

An important aspect of the algorithm is information security. The E-HOSPITAL system employs encryption protocols, user authentication, and access control policies to protect sensitive medical data. Audit logs record every transaction, allowing administrators to monitor document activity and ensure compliance with privacy regulations such as GDPR and national healthcare data standards.

The algorithm also facilitates interoperability between hospital systems. By supporting data exchange protocols like HL7 and FHIR, E-HOSPITAL can communicate with external healthcare systems, laboratories, and insurance services. This integration improves coordination between institutions, promotes efficient data sharing, and supports evidence-based decision-making.

However, the effective operation of the document circulation algorithm depends on several critical factors, including system configuration, staff training, and adherence to standardized workflows. Users must possess digital literacy skills to ensure accurate data entry and document handling. In addition, periodic evaluation and optimization of the algorithm are necessary to adapt to technological changes and evolving healthcare requirements.

In summary, the document circulation algorithm in the E-HOSPITAL system plays a pivotal role in transforming healthcare document management. It supports transparency, traceability, and security while ensuring that medical data are processed efficiently and in compliance with legal standards.

Conclusion

The development and implementation of a document circulation algorithm within the E-HOSPITAL system mark a significant advancement in the

digitalization of healthcare institutions. By automating the creation, verification, routing, approval, and storage of documents, the algorithm ensures efficient information flow, minimizes human errors, and enhances transparency across all stages of hospital management.

Through the integration of secure data exchange protocols, digital signatures, and authentication mechanisms, the E-HOSPITAL system guarantees the confidentiality and integrity of medical information. Its ability to support interoperability through international standards such as HL7 and FHIR further promotes seamless communication between different healthcare entities and external organizations.

The algorithm also contributes to improved decision-making and operational efficiency by providing real-time access to accurate and structured medical data. This digital workflow significantly reduces administrative burdens, accelerates document processing, and ensures compliance with legal and ethical data management requirements.

In conclusion, the document circulation algorithm in the E-HOSPITAL system serves as a foundation for the smart management of healthcare documentation. Its systematic approach not only streamlines internal hospital operations but also supports the broader goals of healthcare digital transformation — improving service quality, patient safety, and institutional accountability.

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