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**FACULTY OF ENGINEERING AND TECHNOLOGY****DEPARTMENT OF COMPUTER ENGINEERING****SPECIALIZATION: SOFTWARE ENGINEERING****COURSE TITLE: SOFTWARE QUALITY TOOLS AND TESTING**
**ASSESSMENT AND FEATURE REQUIREMENT FOR TELEMEDICINE APP:  
 MEDIK**

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## I. INTRODUCTION

Telemedicine applications, also known as telehealth apps, have emerged as transformative tools in the healthcare landscape. These mobile applications enable individuals to access healthcare services remotely, bridging geographical distances and overcoming mobility challenges. By leveraging the power of smartphones and other digital devices, telemedicine applications are revolutionizing the way healthcare is delivered and consumed.

MEDIK, a leading telemedicine application, stands at the forefront of this transformative movement. MEDIK offers a comprehensive suite of services designed to provide convenient and accessible healthcare to individuals from all walks of life. The application's core functionalities include:

- **Real-time video and audio consultations:** MEDIK empowers patients to connect with licensed healthcare providers via secure video or audio calls, enabling face-to-face interactions for diagnosis, treatment planning, and follow-ups.
- **Secure messaging:** MEDIK facilitates seamless communication between patients and healthcare providers through a secure messaging platform, allowing for asynchronous exchanges of information, questions, and concerns.
- **Online prescription generation:** MEDIK streamlines the prescription process by allowing healthcare providers to electronically generate and send prescriptions directly to pharmacies, eliminating the need for paper prescriptions.
- **Pharmacy services:** MEDIK integrates with partner pharmacies, enabling patients to conveniently order and receive medications directly through the application.
- **Appointment scheduling:** MEDIK simplifies appointment scheduling, allowing patients to browse available time slots and book appointments with their preferred healthcare providers directly from the app.
- **Personalized health notifications:** MEDIK goes beyond consultations and prescriptions by providing personalized health notifications based on a patient's medical history, lab test results, and diagnoses. These notifications may include health tips, medication reminders, and follow-up appointment prompts.

MEDIK's comprehensive suite of features caters to a wide range of healthcare needs, from routine checkups and prescription renewals to chronic disease management and mental health counseling. The application's user-friendly interface and secure communication protocols make it accessible to individuals of all ages and technical proficiency.

In a world where healthcare accessibility is often hindered by geographical barriers, mobility limitations, and time constraints, telemedicine applications like MEDIK are paving the way for a more equitable and inclusive healthcare system. By bridging the gap between patients and healthcare providers, these applications are empowering individuals to take control of their health and well-being.

## II. PROJECT DETAILS, REQUIREMENT DESCRIPTION AND STANDARDS ANALYSIS

### 1) NON-FUNCTIONAL REQUIREMENTS

#### ➤ User Authentication and Security:

- Secured user registration and login using multiple authentication factors, including username, password, and biometric fingerprint.
- Enforced password complexity and change requirements.
- Secure storage and encryption of user credentials and personal data.
- Implementation of role-based access control (RBAC) to restrict access to sensitive information.
- Regular security audits and vulnerability assessments.

#### ➤ Patient-Healthcare Provider Communication and Consultation:

- Real-time video, audio, and messaging communication between patients and healthcare providers.
- Scheduling and management of virtual consultations.
- Secure file sharing for exchanging medical records, images, and other relevant documents.
- Integration with third-party communication platforms.
- Real-time translation services for multilingual communication.

#### ➤ Payment Processing and Transactions

- Integration with secure payment gateways for online transactions.
- Support for multiple payment methods (credit cards, debit cards, mobile wallets).
- Generation of detailed transaction receipts for consultations, diagnosis, and medication purchases.
- Secure storage and processing of payment information.
- Compliance with relevant payment industry standards (PCI DSS).

#### ➤ Appointment Scheduling and Management

- Real-time scheduling and management of appointments for both patients and healthcare providers.

- Availability of appointment slots based on healthcare providers' schedules.
- Synchronization with healthcare providers' calendars and scheduling systems.
- Automated appointment reminders and notifications.
- Waitlist management for oversubscribed appointments.
- Integration with patient calendars for seamless scheduling.

➤ **Medical Records Management**

- Secure and centralized storage of patient medical records, including test results, prescriptions, and other relevant health information.
- Patient-controlled access to their medical records.
- Sharing of medical records with healthcare providers with patient consent.
- Data encryption and access logging for audit purposes.
- Compliance with relevant data privacy regulations (HIPAA, GDPR).
- Integration with electronic health record (EHR) systems for comprehensive patient data management.

➤ **Prescription Services**

- Electronic prescription (eRx) generation and management.
- Direct transmission of prescriptions to pharmacies.
- Patient consent management for sharing prescription information with pharmacies.
- Integration with pharmacy management systems.
- Medication affordability and delivery options, including generic drug recommendations and pharmacy discounts.

## 2) NON-FUNCTIONAL REQUIREMENTS

Non-functional Requirements describe the desired qualities of the system, such as performance, reliability, security, and usability. Non-functional requirements are typically expressed in terms of constraints or goals.

- **Security and Privacy:** MEDIK adheres to strict security standards (e.g., HIPAA compliance) to ensure the confidentiality, integrity, and privacy of patient data.
- **Backup Features:** MEDIK provide assurance and sustainable database to store and duplicate data of patients for medical and research
- **Usability and User Experience:** MEDIK has an intuitive and user-friendly interface, making it easy for users to navigate, schedule appointments, communicate, and access their information.
- **Performance and Scalability:** MEDIK is capable of handling concurrent users and provide a smooth and responsive experience, even during peak usage times.
- **Reliability and Availability:** MEDIK is reliable, ensuring consistent availability and minimal downtime to avoid disruptions in accessing healthcare services.
- **Compatibility and Integrations:** The app should be compatible with various devices, operating systems (e.g., iOS, Android), and browsers to cater to a wide range of users. It should also support integrations with other healthcare systems, such as electronic health records (EHR) or pharmacy systems.
- **Accessibility:** MEDIK will comply with accessibility standards to ensure that individuals with disabilities can access and use the app effectively.
- **Regulatory Compliance:** The app should adhere to relevant regulations and guidelines, such as HIPAA, GDPR, and local telemedicine practice guidelines.
- **Language accessibility:** MEDIK is lingual friendly and can be used across 50+ international languages.

### 3) INTERNATIONAL QUALITY STANDARDS FOR TELEMEDICINE APPS

Internationally socially used standards include:

- **Health Insurance Portability and Accountability Act (HIPAA):** HIPAA sets the standards for protecting sensitive patient health information in the United States. If your telemedicine app serves users in the U.S., compliance with HIPAA regulations is crucial to safeguard patient privacy and security.
- **General Data Protection Regulation (GDPR):** GDPR is a comprehensive data protection regulation that applies to the European Union (EU) and European Economic Area (EEA). If your telemedicine app serves users in EU/EEA countries, compliance with GDPR is necessary to ensure the lawful and secure processing of personal data.
- **International Organization for Standardization (ISO) 27001:** ISO 27001 is an internationally recognized standard for information security management systems. Adhering to ISO 27001 guidelines helps ensure that your telemedicine app implements robust security controls, risk management processes, and data protection measures.

The professional descriptions of most commonly international standards for telemedicine apps:

- **Health Level 7 (HL7) :** HL7 is an international standard for the exchange of electronic health record (EHR) data. It is a comprehensive standard that covers a wide range of clinical and administrative data, including patient demographics, diagnoses, medications, allergies, and laboratory results. HL7 is widely used in telemedicine applications to exchange data between different healthcare systems.
- **Digital Imaging and Communications in Medicine (DICOM):** DICOM is an international standard for the exchange of medical images, such as X-rays, CT scans, and MRI scans. DICOM is widely used in telemedicine applications to transmit medical images from one location to another for consultation or diagnostic purposes.
- **Fast Healthcare Interoperability Resources (FHIR):** FHIR is a newer standard that is based on modern web technologies, such as JSON and HTTP. FHIR is designed to be more flexible and easier to implement than HL7, and it is gaining popularity in the telemedicine industry.

### **III. ANALYSIS AND RESEARCH ILLUSTRATION FOR MEDIK**

#### **1) OVERVIEW**

Telemedicine is the use of telecommunications technology to provide healthcare services remotely. The telemedicine app, MEDIK, is out to provide patients with convenient and affordable access to healthcare services, especially for those in rural or underserved areas.

#### **2) ANALYSIS**

MEDIK is a telemedicine app that provides patients with a variety of services, including:

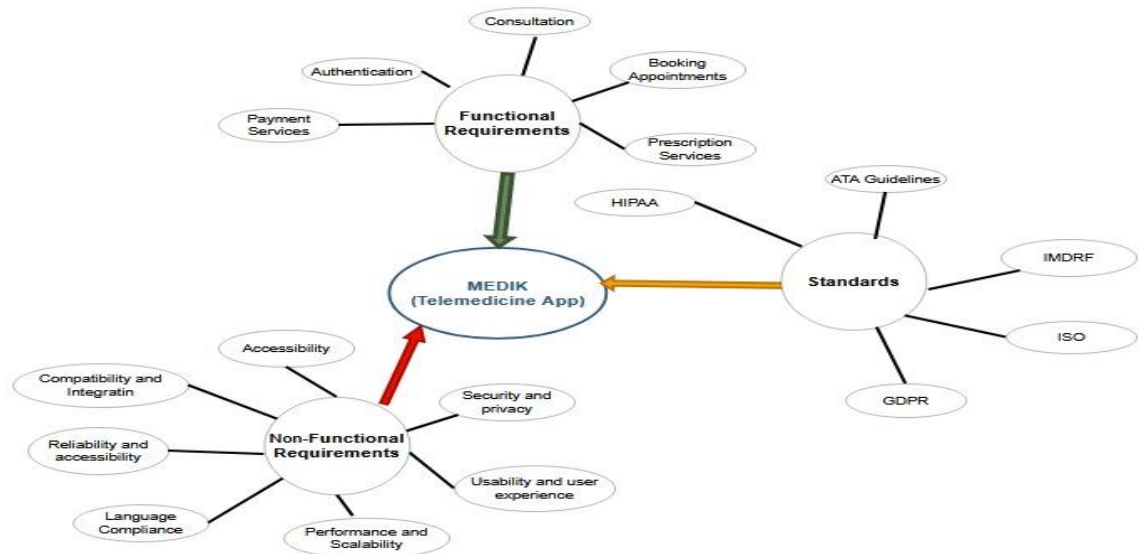
- Video, audio and messages consultations with healthcare providers
- Prescription management
- Medical records management
- Secure communication
- Appointment scheduling
- Patient education materials
- Pharmacy services

MEDIK is a user-friendly app that is easy to navigate. The app is also secure and compliant with all applicable privacy regulations.

#### **3) RESEARCH**

There is a growing body of research that supports the effectiveness of telemedicine apps. For example, a study published in the Journal of the American Medical Association found that telemedicine was as effective as in-person care for a variety of conditions, including chronic diseases and mental health conditions. And Fig 1. Below shows an illustration of MEDIK's details





#### 4) ILLUSTRATION

Imagine a patient named Sarah who lives in a rural area. Sarah has a chronic disease that requires regular monitoring. In the past, Sarah had to drive for hours to see her doctor. However, now that she has MEDIK, she can schedule a video consultation with her doctor from the comfort of her own home.

#### 5) Benefits of MEDIK To The Cameroonian Society

MEDIK will offer a number of benefits including:

- **Increased access to healthcare:** MEDIK will provide patients with access to healthcare services that they might not otherwise have. This is especially beneficial for patients in rural or underserved areas.
- **Convenience:** MEDIK will allow patients to see their doctor from the comfort of their own home. This can save patients time and money.
- **Affordability:** MEDIK will be more affordable than traditional in-person care.
- **Improved quality of care:** MEDIK will improve the quality of care by providing patients with more timely and convenient access to healthcare services.

### III. CONCLUSION

In conclusion, MEDIK presents a comprehensive solution that addresses the evolving needs of healthcare delivery in the digital age. By leveraging the power of technology, we aim to revolutionize the way patients and healthcare providers connect and interact, ultimately enhancing access to quality healthcare services.

MEDIK offers a user-friendly interface that enables patients to conveniently access virtual consultations with licensed healthcare professionals from the comfort of their homes. Through secure video calls and messaging systems, patients can receive medical advice, diagnoses, and even prescriptions, saving time and eliminating the barriers of distance and transportation.

With a strong focus on patient privacy and data security, our app complies with international professional standards such as HIPAA and GDPR. We have implemented robust encryption protocols and stringent access controls to ensure the confidentiality and integrity of patient information, instilling trust and confidence in our users.

Furthermore, MEDIK integrates seamlessly with existing healthcare systems through adherence to HL7 standards, enabling efficient sharing and exchange of electronic health information. This interoperability enhances care coordination and streamlines the healthcare workflow, leading to improved patient outcomes and operational efficiency.

Our team of experienced healthcare professionals, software developers, and user experience designers are collaborating for the production of MEDIK that prioritizes user satisfaction and clinical effectiveness. We have incorporated evidence-based guidelines from reputable organizations like the ATA and WHO to ensure that our app adheres to the highest industry standards.

In summary, MEDIK offers a transformative solution that empowers patients and healthcare providers alike. By embracing technology and adhering to international professional standards, we are redefining healthcare delivery, making it more accessible, efficient, and patient-centric. Join us on this journey as we shape the future of healthcare through our innovative telemedicine app.

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