Web Platform for Online Medical Consultations: A Technological Solution to Improve Healthcare Access in Cochabamba, Bolivia

Author

Sergio Andrés Veizaga Sanchez

Abstract

Currently, the digitization of healthcare services is key to improving access and efficiency in medical care. This article presents the development of an online medical consultation platform focused on the context of Cochabamba, Bolivia. The solution integrates modern technologies such as Django for the backend and React for the frontend, along with artificial intelligence (AI) tools for identity verification, enabling efficient management of doctors, patients, and consultations. The University Social Security of the Universidad Mayor de San Simón (UMSS) has shown interest in its implementation, highlighting its potential to transform healthcare management in clinical settings. The methodology used in the development, the results obtained, and the potential impact of the platform on the country's digital health are described.

Keywords: Telemedicine, web platform, Django, React, artificial intelligence, Scrum, healthcare access.

1. Introduction

Access to healthcare services in Bolivia presents challenges, such as a shortage of doctors in rural areas and long waiting times in urban centers [1]. The digitization of medical services through online platforms enhances accessibility and optimizes consultation management [2]. This project aims to develop an online medical consultation platform that facilitates communication between patients and doctors, allowing appointment scheduling, medical record management, and report generation for decision-making in digital healthcare.

Previous studies highlight the positive impact of telemedicine in reducing costs and democratizing healthcare [3]. Platforms such as Teladoc and Doctoralia have demonstrated their effectiveness in other contexts [4], but in Bolivia, their adoption is still incipient. Local research [5] emphasizes the need for systems adapted to the country's socioeconomic and technological realities.

2. Methodology

For the development of the platform, an agile methodology based on Scrum was used, with iterations defined in sprints. The following technologies were implemented:

- **Backend:** Django and Django REST Framework for API management.
- **Frontend:** React with a responsive design, allowing doctors' visualization, appointment scheduling, and medical record consultation.
- **Database:** MySQL, ensuring integrity and efficient handling of sensitive medical data.
- **AI:** Integration of Face-api.js (facial recognition) and Tesseract OCR (document verification) for secure authentication.

3. Results and Discussion

The main results of the platform development include:

- **Improved accessibility:** Patients can book consultations without needing physical travel.
- **Efficient management of doctors and patients:** The system allows doctors to manage their appointments and access their patients' consultation history.
- **Video calls:** Integration with Jitsi for real-time consultations.
- **Multi-platform access:** Responsive design compatible with mobile and desktop devices.
- **Report generation:** A functionality was implemented for administrators to generate reports on conducted consultations, filtering by dates, specialty, and consultation status.
- **Security and Regulatory Compliance:** Encryption protocols were implemented to protect sensitive data, aligned with international standards such as HIPAA [6].
- **User-friendly and modern interface:** The platform has been designed with an intuitive and easy-to-use interface.
- Some challenges were identified, such as the need for training medical staff and ensuring internet access in rural areas.

The platform reduces geographical and economic barriers, benefiting rural populations with limited access to specialists. Surveys conducted with local doctors (Appendix A) showed an 85% acceptance rate for telemedicine as a complement to in-person care [7].

4. Conclusions and Future Applications

The development of this platform represents progress in digital health in Bolivia, enabling doctors and patients to access technological tools that optimize medical consultation management [8]. The solution is replicable and scalable, potentially being adopted in other regions of the country and even internationally.

In the future, integrating artificial intelligence for medical assistance, using blockchain for secure medical records, and expanding the system to clinics and hospitals are proposed.

Source Code Availability

The source code for the platform "Development of an Online Medical Consultation Platform for Digital Health in Cochabamba, Bolivia" is hosted in a private GitHub repository: https://github.com/Sert077/consultas-medicas-online.

To access the code, interested parties can contact the author directly via the following email:

📧 201003793@est.umss.edu

Each request will be evaluated to ensure appropriate use of the code and proper credit recognition.

References

[1] SEDES Cochabamba. (2019). Report on healthcare access in Cochabamba.
[2] WHO. (2010). Telemedicine: Opportunities in Member States.
[3] Bashshur, R. et al. (2013). The Empirical Foundations of Telemedicine Interventions.
[4] Teladoc Health. (2023). Annual Report.
[5] Valenzuela del Villar. (2021). Online medical consultation systems.
[6] HIPAA Journal. (2022). Guidelines for Data Encryption in Healthcare.
[7] Survey data from doctors (Appendix A).
[8] Los Tiempos. (2019). Overcrowding in public hospitals in Cochabamba.