People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research

Ferhat Abbas University



Faculty of Sciences

Department of Computer Science

Master's Thesis – StartUp

SmartVitals

Remote Monitoring Platform for Chronic Diseases

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Academic year: 2025/2026

Résumé

La gestion efficace de la collecte, de la transmission et de la sécurisation des données de santé est essentielle pour garantir la continuité des soins et la qualité de la prise en charge des patients atteints de maladies chroniques. Ce mémoire examine les principes fondamentaux tels que la télésurveillance médicale, l'intégration des objets connectés médicaux (IoMT), la sécurité des données de santé et l'aide à la décision basée sur l'intelligence artificielle, dans le but d'améliorer le suivi des patients diabétiques et cardiovasculaires en Algérie.

Une attention particulière est accordée à la problématique de la discontinuité du suivi traditionnel, fondé sur des consultations médicales espacées et l'utilisation d'un carnet de mesures papier. Cette étude met en évidence l'importance de la mise en place de mécanismes de détection précoce des situations critiques ainsi que de protocoles avancés de protection des données conformes aux exigences réglementaires relatives aux informations médicales.

Dans le cadre d'une plateforme telle que **SmartVitals**, ces approches technologiques jouent un rôle déterminant dans le renforcement de la collaboration entre patients et professionnels de santé. Elles permettent d'assurer une transmission fiable et sécurisée des données médicales, d'améliorer la réactivité face aux complications potentielles et de favoriser une prise en charge médicale plus personnalisée.

Grâce à l'utilisation de solutions technologiques innovantes et à une gestion rigoureuse des données de santé, **SmartVitals** contribue à l'amélioration du suivi médical des maladies chroniques et participe à la modernisation du système de santé numérique en Algérie.

Mots-clés : Télésurveillance médicale, Maladies chroniques, Objets connectés médicaux (IoMT), Sécurité des données de santé, Intelligence artificielle, SmartVitals.

Abstract

The effective management of the collection, transmission, and security of health data is essential to ensure continuity of care and improve the quality of healthcare provided to patients suffering from chronic diseases. This thesis examines fundamental concepts such as medical remote monitoring, the integration of Internet of Medical Things (IoMT) devices, healthcare data security, and artificial intelligence-based decision support, with the aim of improving the follow-up of diabetic and cardiovascular patients in Algeria.

Particular attention is given to the issue of discontinuity in traditional medical follow-up, which is mainly based on periodic consultations spaced several months apart and the use of paper-based monitoring records. This study highlights the importance of implementing early detection mechanisms for critical situations, as well as advanced data protection protocols that comply with healthcare information security requirements.

Within the framework of a platform such as **SmartVitals**, these technological approaches play a key role in strengthening collaboration between patients and healthcare professionals. They enable reliable and secure transmission of medical data, improve responsiveness to potential complications, and promote a more personalized and efficient healthcare management approach.

Through the use of innovative technological solutions and rigorous health data management, **SmartVitals** contributes to improving chronic disease monitoring and supports the digital transformation and modernization of the healthcare follow-up system in Algeria.

Keywords: Medical remote monitoring, Chronic diseases, Internet of Medical Things (IoMT), Healthcare data security, Artificial intelligence, SmartVitals.

الملخص العام

تُعد الإدارة الفعّالة لجمع ونقل وتأمين البيانات الصحية أمرًا أساسيًا لضمان استمرارية الرعاية الصحية وتحسين جودة التكفل بالمرضى المصابين بالأمراض المزمنة. يتناول هذا البحث المبادئ الأساسية المتعلقة بالمراقبة الطبية عن بُعد، ودمج أجهزة إنترنت الأشياء الطبية (IoMT)، وأمن البيانات الصحية، ودعم اتخاذ القرار بالاعتماد على الذكاء الاصطناعي، بهدف تحسين متابعة المرضى المصابين بمرض السكري وأمراض القلب والشرايين في الجزائر.

يولي هذا العمل اهتمامًا خاصًا لمشكلة انقطاع المتابعة الطبية التقليدية، التي تعتمد بشكل أساسي على الاستشارات الدورية المتباعدة واستخدام سجل ورقي لتسجيل القياسات الصحية. كما يبرز أهمية إنشاء آليات للكشف المبكر عن الحالات الحرجة، بالإضافة إلى تطبيق بروتوكولات متقدمة لحماية البيانات تتوافق مع متطلبات أمن المعلومات الصحية.

في إطار منصة مثل **SmartVitals**، تلعب هذه الحلول التكنولوجية دورًا مهمًا في تعزيز التعاون بين المرضى ومهنيي الصحة، حيث تتيح نقل البيانات الطبية بطريقة موثوقة وآمنة، وتحسين سرعة الاستجابة للحالات الصحية الخطرة، ودعم نموذج أكثر تخصيصًا وفعالية في متابعة المرضى.

ومن خلال الاعتماد على حلول تكنولوجية مبتكرة وإدارة صارمة للبيانات الصحية، تساهم منصة **SmartVitals** في تحسين متابعة الأمراض المزمنة والمشاركة في تحديث وعصرنة نظام الرعاية الصحية الرقمية في الجزائر.

الكلمات المفتاحية :المراقبة الطبية عن بُعد، الأمراض المزمنة، إنترنت الأشياء الطبية(IoMT) ، أمن البيانات الصحية، الذكاء الاصطناعي، SmartVitals

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