

Web-based Vital Signs Monitoring and Early Warning/Detection System for Hospitalised Older Adult Patients

Mirza Mansoor Baig¹, Hamid Gholamhosseini¹, Martin J. Connolly² and Peyman Sabouri¹

¹Department of Electrical and Electronics Engineering, School of Engineering
Auckland University of Technology
Private Bag 92006, Auckland 1142, New Zealand
mirza.baig@aut.ac.nz, hgholamh@aut.ac.nz and peyman.sabouri@aut.ac.nz

²Freemasons' Professor of Geriatric Medicine, University of Auckland
North Shore Hospital, Takapuna, Auckland, New Zealand
martin.connolly@waitematadhb.govt.nz

Abstract: Advanced engineering and information technology combined with medical and clinical knowledge enable evolutionary solutions for remote, wireless and continuous monitoring of vital signs. Such approach facilitates implementation of enhanced monitoring systems everywhere: at home, hospital and outdoor (on the move). It is estimated that more than 50 billion devices will be connected to the Internet by 2020. Among them would be devices for medical surveillance and diagnostic purposes. Vital signs are often considered as critical information to assess initial health condition and underlying health issues. They are monitored and analysed by clinicians for planning appropriate health interventions. Moreover, vital signs can be processed by computerised decision support systems, diagnostic models or expert systems to assist medical professionals by presenting early warning/alert or highlighting any significant changes of patients' health conditions. The proposed study deals with the web-based and wireless monitoring of vital signs using advanced wireless data collection devices. The proposed system aims to aid in the diagnosis of patients' health conditions from the collected vital signs and assist clinicians with better healthcare delivery. Data collection is currently undertaken at North Shore Hospital and Waitakere Hospital (Auckland, New Zealand) under local and national ethics approvals. The system collects blood pressure, pulse rate, heart rate, oxygen saturation (SpO₂), ear temperature and blood glucose from hospitalised patients and transfers to web-based software called VitelMed by Medtech Global Ltd for remote monitoring and possible diagnosis. Ultimately this system can potentially achieve a high level of agreement with physicians when assessing specific physical signs such as bradycardia, tachycardia, hypertension, hypotension, hypoxemia, fever and hypothermia, and will be able to generate early warnings.

Keywords: Vital Signs Monitoring, Decision Support System, Fuzzy Diagnosis system, Patient Monitoring.

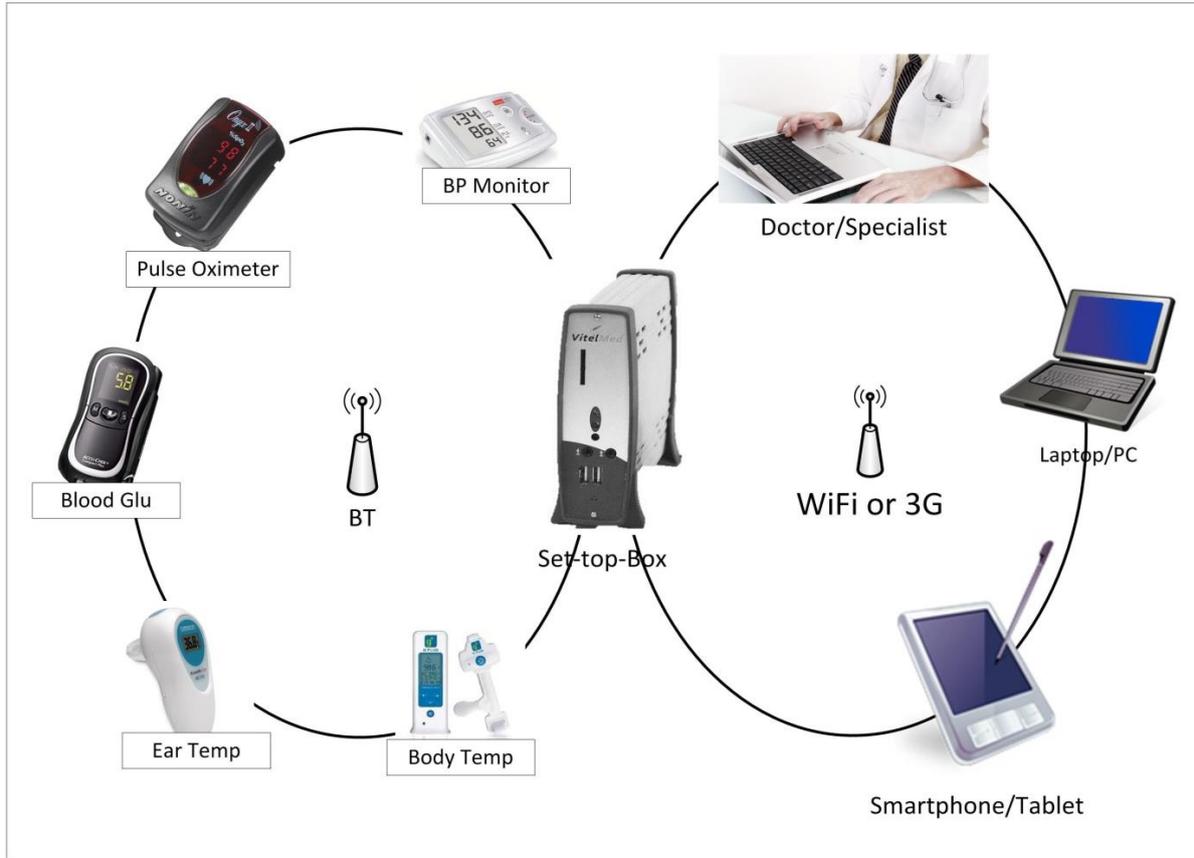


Figure 1 – The proposed monitoring system including a set-top-box (centre) connected wirelessly to various medical devices (left circle) and transmits the collected data to various devices (right circle) in real-time, BT is class 2 Bluetooth connectivity and Blood Glu is blood glucose monitor.