Cardiovascular signals acquisition and analysis using smartphones: potential, pitfalls and future perspectives

Creative use of new mobile and wearable health information and sensing technologies has the potential to reduce the cost of health care and improve well-being in numerous ways. Smartphones and mobile applications (‘apps’) have the potential to profoundly changing the practice of medicine and the way health decisions are made. The role of e-patient, an empowered individual who uses online resources to obtain knowledge, to connect with other people in the same situation, and to communicate with different health care providers during the care process, is representative of this change: not anymore passive recipient of care in a patriarchal relation with the physician, but more active partners in the health care team.

With the constant progress of technology, the measurement of vital signals becomes easier, cheaper, and practically a standard approach in clinical practice. Nowadays, the interest in measuring vital signals (self-tracking) goes beyond medical professionals to the general public, patients, informal caregivers, and healthy individuals, who frequently lack any formal medical training. On smartphone platforms, a proliferation of health or medical ‘apps’ that acquire and analyze a variety of vital signs through embedded sensors, interconnected devices or peripherals are available.

While US and EU regulatory bodies are setting and revising rules for these new technologies, in the absence of robust validation results, clinicians are hesitant in embracing this technology. This review focuses on current use of smartphone apps for the acquisition and analysis of cardiovascular signals. The potential, pitfalls, and perspectives on mobile devices and smartphone apps for health management by patients and healthy individuals will be discussed.