System for mobile monitoring of vital functions and environmental context

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MOTIVATION:

1. Lack of widely accepted mHealth solutions that can provide improved medical care with reduced costs. Weakness of current solutions - majority of attention is focused on the technology.
2. Acceptance of mHealth solutions can greatly be increased by an extensive involvement of users and their caregivers.
3. High added value and great market potential of mHealth products, services and networks.

The developed system must be CE certified as a medical device before commercialization, which represents a significant effort in terms of investment and human resources.

EXPECTED IMPACT:

Increased health care efficiency & Reduced health care costs

TODAY PROBLEM

OUR SOLUTION

Introduction

Solution

Personal computer software for processing & analysis

- Measured ECG channel (red curve) & detected individual heart beats (blue x-es)
- The example shown atrial fibrillation

Technology platform for follow-up of patients

wearable device with integrated sensors
Android application
software for processing, storage and analysis
cloud based applications tailored to groups of users
secure data storage server
authorized users: careivers, medical personnel

wears (subjects)
portable personal terminal
data transfer protocols

WIRELESS BODY SENSOR EVOLUTION

2009
2012
2014
2015
2016

• Measures ECG
• 2.4 GHz radio
• SimplicTI wireless protocol

• Measures ECG
• Low energy Bluetooth 4.0

• Measures ECG
• + temperature sensor
• + accelerometer

• New flexible design

lightweight, unobtrusive, low cost

Final product with casing

Pilot studies

<table>
<thead>
<tr>
<th>Requirements/performances</th>
<th>POAF - University Medical Center Ljubljana</th>
<th>Personal doctor - Community Health Centre Ljubljana</th>
<th>Monitor – Health Resort &quot;Terme Dobrna&quot;</th>
<th>Muscular Dystrophy Association - Rehabilitation Isola</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of concurrently monitored users</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Measurement length per user</td>
<td>6 days</td>
<td>3 days</td>
<td>up to 5 days</td>
<td>up to 5 days</td>
</tr>
<tr>
<td>Number of medical experts involved</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Study of performance</td>
<td>Atrial fibrillation warning sign recognition</td>
<td>Palpitation detection</td>
<td>Short or long term health state assessment</td>
<td>Short or long term heart condition assessment</td>
</tr>
</tbody>
</table>

TARGETS:

- Near zero obtrusiveness and intuitive operation with the sensor
- Ease of use of the software
- Minimal overhead for the medical personnel
- Data security and safety

Technology transfer

Production and sales:

In final CE Certification phase for medical device:
Directive: MDD 93/42/EEC
Standards: EN 60601 and EN ISO 14971

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