Smart Wheelchair

Background and challenges

Challenges
- Solution to decrease healthcare costs.
- Solution to increase quality of healthcare services.
- Solution to increase persons quality of life

Background
A. Worldwide increase in healthcare system costs.
B. Healthcare costs for disabled people is 5-6 times higher than for common people.
C. Wheelchair use
   - 1.6 millions wheelchairs users in U.S.A.
   - Elders with less mobility: (~60 000 wheelchair users in Portugal)
   - People with neuromuscular incapacity
   - Transportation of patients in Hospitals.
D. Wheelchair customization for more functionalities
   - Electric powered wheelchair
   - Accessories for better posture
   - Devices for better or automatic movement control of motorized wheelchair
   - Devices for respiratory assistance

Description and main innovation

Innovations
- Unobtrusive ECG
- BCG signal acquisition and processing
- Remote motor activity and daily activity monitoring of wheelchair user
- Unobtrusive autonomic nervous system monitoring

Capacities
- Unobtrusive ECG and BCG sensing
- Remote communication of health signals
- Heart rate, heart rate variability, respiration, skin conductivity, autonomic nervous system sensing
- Vital signs, stress and motor activity monitoring

Achievements
- 3 prototypes
- 1 patent
- 12 publications
- 2 FCT projects
- Instrument for better management of cardiovascular and respiratory diseases of wheelchair users.
- Instrument for better healthcare services in ageing society.
- Instrument and methods with potential to decrease healthcare costs.