

Cardiovascular health assessment from a common electronic weighing scale

An easy-to-use and affordable system able to quickly assess physiological parameters related to cardiac and vascular health of a subject from the force sensors of a common electronic weighing scale.

The challenge

Personal health systems often rely on implantable, wearable or portable devices able to acquire physiological signals, which are well-suited to continuous monitoring but are unpractical for periodic monitoring, less for eventualities. Hence, there is a need for easy-to-use devices that do not interfere with daily routines neither result in any discomfort yet can quickly provide valuable information about personal health condition when required.

The technology

Weighing scales are very common devices in our daily routine and enable cost-effective periodic monitoring at home and eventual fast checks. We have designed a measurement system able to obtain the ballistocardiogram (BCG) from the same strain gauges of weighing scales, from which we are able to extract the aortic pulse transit time (PTT) and the aperture and closure of the aortic valve. The aortic PTT reflect the stiffness of the aorta and can be related to several factors such as ageing, hypertension, and risk of cardiovascular events. Further, the aortic PTT can be calibrated to provide beat-to-beat measurements of arterial blood pressure. The aperture and closure of the aortic valve, combined with an electrocardiogram (ECG) that can be obtained from feet or handheld electrodes, can be used to calculate the pre-ejection period (PEP) and left ventricular ejection time (LVET), whose quotient reflects the status of myocardial health.

Innovative advantages

- Only the force sensors of a common electronic weighing scale are required and the additional necessary hardware and software is easily embeddable in the device.
- No auxiliary personnel is required to use the scale
- Provides information about aortic stiffness non-invasively and in a short time by using only the BCG.
- Provides information about myocardial health non-invasively and in a short time from the BCG plus an additional ECG.
- Can be adapted to any wireless technology.

Current stage of development

A laboratory sensor prototype is available.

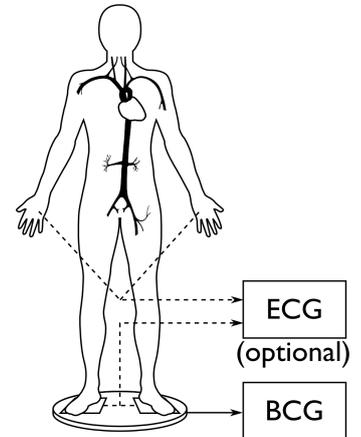
Applications and target market

Personal healthcare, m-health, e-health, remote physiological monitoring, drug testing, drug dose adjustment, home health care, health promotion programs, fitness, physical activity monitoring, sports medicine, fitness centers, labor medicine, groups screening, primary care centers, community health centers, hotels, and spas.

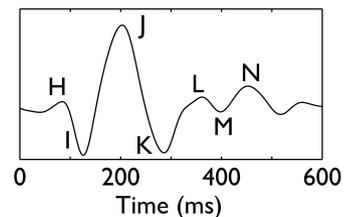
Reference number

MKT16_BALISTOCAR_H

A system embedded in a common electronic bathroom scale



The BCG reflects mechanical information related to cardiac and vascular health



The parameters obtained from the BCG are related to ageing, hypertension, risk of cardiovascular events, and myocardial health

Business Opportunity

Technology available for licensing with technical cooperation

Patent Status

Priority application

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