Footfalls & Heartbeats

Technical Profile

Footfalls & Heartbeats has developed a revolutionary and patent-pending process for manufacturing smart fabric which uses nano-scale interactions within the textile to make the fabric itself the sensor.

Footfalls & Heartbeats was founded by New Zealand chemist Simon McMaster who brings many years' experience researching intelligent textiles. It is well positioned to become a leader in the provision of smart textiles for a diverse range of applications in global markets that are increasingly demanding truly intelligent fabrics.

The Footfalls & Heartbeats technology combines mathematically determined textile structures using electrically conductive yarn to form a repeatable and robust sensor network. The technology uses the three-dimensional complexity of a textile structure, including interactions of fibres within the yarn itself, to control the electrical resistance characteristics of the sensor structure.

The technology brings a level of sophistication to smart textiles through the integration of computer controlled knitting design and conductive fibre technology to produce textile structures that are capable of registering external environmental stimuli in the form of electrical signals. These signals can be filtered, amplified, analysed or stored in real-time to produce multiple data sets relating to physiological output.

The technology in its current form can measure either tensile or compressive force within or upon organic or man-made structures. In addition, further patented technology allows the integration of optical sensors for measuring physiological output such as heart rate, SpO_2 (blood oxygen saturation) and relative humidity. This functionality will lead to a multipoint sensing platform for wound care.

The use of a knitted textile sensor network allows ease of manufacture and customisation for any required design. The Footfalls & Heartbeats system allows for innumerable sensor shapes and sizes as well as a redundancy capability hitherto difficult to achieve in textile environments. The sensor technology can be manufactured on a range of knitting machines from flatbed and circular to the new seamless technology of Shima Seiki and Stoll.

The process developed by Footfalls & Heartbeats allows control of both yarn-to-yarn interaction and the movement of the micro-mechanical structures that form core networks of knitted fabrics. This control heralds the emergence of the next generation of smart textiles where sensor functionality is integrated into the fabric structure for real-time monitoring whilst ensuring comfort, personal privacy, wearability and durability.

Footfalls and Heartbeats (UK) Limited
12 Stamford Road, Colsterworth, Grantham NG33 5JD, Lincs., UK
P +44(0)7743558942
E simon@footfallsandheartbeats.com