Smart Textiles

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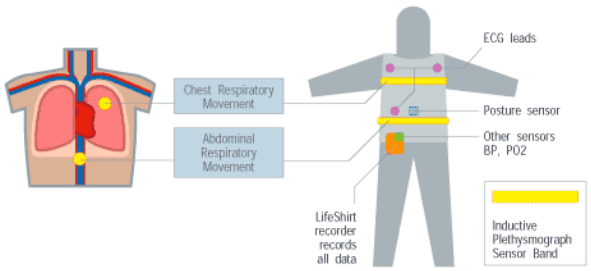
***Abstract*— Imagine having an continual ECG, a diagnostic test, or even having your heart rhythm continually monitored in the comfort of your own home. With the integration of clothing and medical devices, Smart Textiles makes it possible for people to have normal lives while still having their vitals being checked constantly.**

I. Introduction

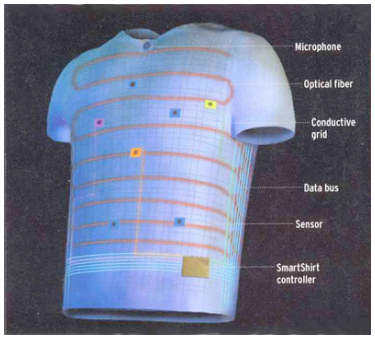
The use of Smart textiles have been increasingly used in the past few years – companies offering clothes that provide a method of collected important medical data all through the comfort of a person's own home. Smart Textiles help with sending information of someone's ECG or other physiological data and send it back to your doctor without the cramped situation of what a hospital brings. With smart textiles, you are always monitored and free to continue on with your life rather than taking days away from being at the hospital.

II. Methods

The smart textiles technology focuses on the use of Biotelemetry. This processes measures human physiological functions by means of separation. ECG, posture and other sensors are placed in the clothing. These sensors collect the data, which is then sent to, wirelessly or with wire, a PDA, or a computer where the records are stored.



Above: VivoMetric's *LifeVest*'s sensor placement in their smart textile. Most other smart textiles use this same placement in order to obtain the best results. Sensatex's *Smart Shirt* also uses the same set-up of sensors, except this piece of biomedical technology is mainly used for obtaining vitals for military use.



III. Advantages and Disadvantages

The smart textile technology has greatly improved since the beginning of their first use back in the early 1990s. The main advantage to the smart textile technology is that you can be monitored from outside the hospital. This lets one have the freedom to be at home worry-free, knowing that you can still continue your weeks normally, knowing that you're still being monitored. Another advantage to the smart clothing is that it's lightweight and portable. This allows movement and comfort to the patient. With all the positive advantages to the devises there are disadvantages. The systems are neither waterproof nor weather resistant, and some, if not most, of the costs may not be covered by one's insurance provider. Additionally, under FDA law, calibrations to the machine/medical device must be done yearly. This constricts the patient to a single area. If calibrations have to be completed, the patient would have to take time off of their day to meet with the doctor.

IV. Future Technology

The future of smart textiles is improvements on the current technology that we already have. The first would be waterproof and weatherproof systems. Additionally, since some smart textiles use Bluetooth technology, the use of the systems to collect data outside 4G networks. This will allow people to continually use the smart textiles even when there are no signals to deliver information. Secondly, the commercialization of smart clothing could help more people with health problems to have a faster way of obtaining data. This could then open up a gateway to have smart textiles for children. Since yearly calibrations have to be conducted, in the future automatic calibrations can be completed by the system. Additionally, we can hope to expect that the information gathered could be sent to the doctor by a smart phone or tablet application. This could let the doctor know real time information, rather than information that is days old.

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