Project Results

LIFEWEAR
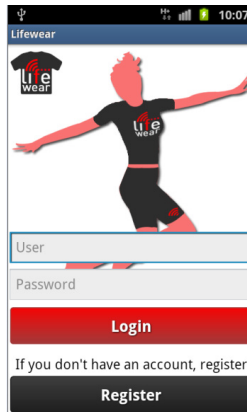## New platform gives boost to mobile devices and applications

The need for users of technology to interact on a daily basis with a host of electronic devices is often hindered by the bulkiness and complexity of the interfaces of these devices, including mobile phones. This requires a more interactive environment, especially for mobile applications. The answer: wearable computers that not only offer new possibilities and ways of interaction but are also more mobilised, adapted and natural.

READY AND AVAILABLE

The ITEA 2 LIFEWEAR project took up the challenge to develop a new platform based on the results of previous EU research projects whereby wearable electronics work in conjunction with mobile computers to enhance the mobile lifestyle of users and create new market opportunities. LIFEWEAR examined various technologies, such as wearable computers and sensors, new ways of human-machine (HMI) and human-computer (HCI) interaction, machine learning and ubiquitous computing focusing on personalisation, privacy and seamless interaction. Furthermore, wearable equipment has to be always ready and available, or be able to 'wake up' manually (pressing a button) or automatically (sensor response) and, importantly, be personal – equipment should act as natural extensions of body and user experience, and be private in all applications.

MONITORING BODY FUNCTIONS

A major goal of wearable equipment is the online physiological monitoring of human body functions in different natural and safety-critical environments. For example, tracking the blood pressure, pulse or temperature of a patient for whom these functions are life-critical and transmitting the data to medical staff to enable the appropriate treatment to be constantly controlled. Such data can be used in very different application areas, such as monitoring motorcyclist or car driver exhaustion and state of alertness, observing workers in critical situations that demand a high state of alertness or following sports training to optimise level or performance.

AMBIENT INTELLIGENCE AND REAL TIME

This project explored a number of innovations and developed new algorithms, based on learning and reasoning gestures, for WSN (wireless sensor network) gesture-based ambient intelligence applications and for the adaptive user interfaces in human-computer and human-machine interaction as well as machine learning systems able to recognise existing gesture patterns or learn new ones.

vital measures
hearth rate, muscle tone, body temperature, sweat, motion, oximetry

wear able

environmental measures
location, illumination, ambient temperature, humidity, toxicity

LIFEWEAR Application area

Project Results

In sport, the combination of data from body posture detection sensors and LIFEWEAR middleware with location and other technologies enables distance, calorie consumption and average speed to be calculated in real time. In the field of eHealth, too, an app from Mobilera enabled LIFEWEAR to work on chronic disease management, giving the user and doctor real-time information about the user's health status. Two apps produced within the project are geared to monitoring sleep in humans and suggesting sporting exercise versus diet.

IN CASE OF FIRE ...

In the fire-fighting area, the development of a wearable device, like a polo shirt, with sensors to collect all the vital signs is a life-saving innovation. Sensor data from the wearable device and other sources (cameras, etc.) help to monitor all the vital parameters of the fireman so that an audio or vibration warning kicks in before potentially lethal parameters are reached. Several prototypes were developed and tested, and even reused for other applications like heavy industry. The project partners are planning to exploit the prototypes for commercial production.

The RO-LIFEWEAR web platform that serves as a portal for the supervision of fire situations was designed as a standalone system that can function without an internet connection. Also, middlewares specialised in different fields can be converged in a unique platform so that 'wearable' services foster component re-use and decrease the number of errors required to implement a new application. Although just a prototype, preliminary experiments have proved the validity of the proposed platform: low-power consumption, reduced complexity, high compatibility and extendibility.

EXPLOITING THE RESULTS

The Spanish consortium partners expect to launch eHealth pilots in five hospitals in Spain as well as a sports app in Google store while the Turkish Mobilera is developing an eHealth management application prototype that will be integrated with the selected devices and the middleware developed by the Spanish partners to ease the burden of patient and disease management, monitor real-time health status and improve the interaction between hospital, doctors and patients. The Czech company GiTy is developing and selling a videoconferencing system whereby the use of wearable devices developed in the LIFEWEAR project will improve the comfort of the videoconferencing system users while Proficomms is focusing its efforts on fibre-optics based sensors as a component for applications in both personal/wearable and heavy industrial environments.

LIFEWEAR demonstrator
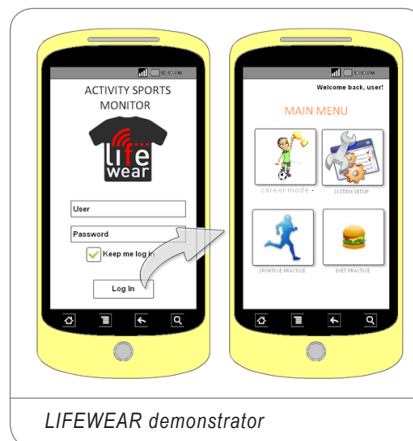
LEAPFROG EFFECT

The exploitation of the outcomes in future technological products will have a great impact on the standardisation of wearable equipment as well as new HMI and HCI methods that can be applied to a great variety of devices such as mobile phones, medical equipments and domotics, helping to create new business models and integrated applications. In turn, these will boost the position of European technology in the new generation wearable solutions in the global arena and, as importantly, improve the quality of life for users and bring happiness to industry and the community.

Major project outcomes

DISSEMINATION
- 4 publications
- 7 presentations at conferences/fairs

EXPLOITATION (SO FAR)
- 4 new products
- 3 new systems

■ ITEA 2 – Information Technology for European Advancement – is Europe's premier co-operative R&D programme driving pre-competitive research on embedded and distributed software-intensive systems and services. As a EUREKA strategic Cluster, we support co-ordinated national funding submissions and provide the link between those who provide finance, technology and software engineering. Our aim is to mobilise a total of 20,000 person-years over the full eight-year period of our programme from 2006 to 2013.

■ ITEA 2-labelled projects are industry-driven initiatives building vital middleware and preparing standards to lay the foundations for the next generation of products, systems, appliances and services. Our programme results in real product innovation that boosts European competitiveness in a wide range of industries. Specifically, we play a key role in crucial application domains where software dominates, such as aerospace, automotive, consumer electronics, healthcare/medical systems and telecommunications.

■ ITEA 2 projects involve complementary R&D from at least two companies in two countries. We issue annual Calls for Projects, evaluate projects and help bring research partners together. Our projects are open to partners from large industrial companies and small and medium-sized enterprises (SMEs) as well as public research institutes and universities.

LIFEWEAR
(ITEA 2 ~ 09026)   March 2015