CONAMO

Continuous monitoring of cyclists to bring the cycling experience to the next level

The collection and analysis of (athlete) data is trending, just think of football games and Formule1 races. In cycling however, the realtime collection of data during trainings and races is not yet available. Today, popular cycling apps gather data, but report and analyze it offline; and technologies that are supposed to gather info in realtime, are based on the GSM network, which is not available in all circumstances and therefore existing solutions are not robust and realtime to the second.

The availability of realtime and reliable collection and interpretation of data would bring cycling to the next level: it would improve the cycling experience, training regimes and cycling races strategies. That is why CONAMO aims to enable the real-time monitoring of athletes. The project will offer a data-driven cycling experience through the development of a mobile network layer for data transmission and an analysis layer that interprets the data gathered in real-time – for instant updates on position and performance that can be vital to training approaches and strategic decision-making during events.

In the context of CONAMO, the project consortium investigated new technologies in the areas of long-range networks and data analysis, in order to extend the data-driven cycling experience from 'post event' into 'during event'. Next to this technical goal, the project also aims to bring training and mass cycling events to the next level by adding a social dimension. The partners explore how social interaction, storytelling, gamification and smart connections to professional cycling experiences can enhance user experience and motivate a wide group of cyclists to train in a healthy way. Finally, the project focuses on promoting an active lifestyle – cycling – to a wider group and making it more attractive as a sport.

THE OUTCOMES

1. An integrated solution for realtime processing and transmission of sensor data

Within the project, the 'CONAMO device' was developed, an integrated radio module to be attached e.g. under the bike's saddle. It supports both Bluetooth and ANT+ wireless communication to exchange data with the wireless sensors that the cyclist is wearing or that are attached on the bike. Dedicated software was developed to ensure that the radio module is low power, long range (up to 700m), and can deal with the highly variable density and velocity of a full peloton of bikes. It was demonstrated on a large scale in real life conditions, during a demonstration with the national Belgian junior and U23 cyclocross team during a training in Leuven.

2. A big data analysis approach for automatic generation of trainings

Collecting data is one thing, but how to make sense out of it? Algorithms and dedicated software were developed in order to combine all sorts of data (heart rate, weather conditions, number of hours training in the previous days, sleep quality etc.) and set up a personalized training scheme, preventing injuries and ensuring the best condition build up. In parallel, a user study was performed to check whether amateur cyclists are ok with automated training setups.

3. An app for interactive cycling routes

An app was developed to encourage people to make a cycle tour a pleasant pastime. The app suggests a specific route based on the distance one wants to cycle in a specific region. Also, the tour is linked to television fragments which were recorded in that part of the cycling tour. By adding a factor of entertainment, it is believed to get more people on the bike.

NEXT STEPS

IDLab will incorporate the knowledge from this project in its work on low-power networks and machine learning. The 'Inspanningsfysiologie en Trainingsleer' research group from UGent will use the technology to study larger groups of test persons whereas they now mostly worked per athlete. Rombit will add the results from the project into their hardware to ensure robust networks in desolate regions such as industrial sites. VRT will further test the cycling app and roll it out to the broad public. Energy Lab will use the developed software and big data analysis tools to better support their customers and set up better training schedules, based on realtime sensor data.

CONAMO project partners:

energy lab   Rombit
CONNECT THE FUTURE   vrt

FACTS

NAME	CONAMO
OBJECTIVE	CONtinuous Athlete Monitoring
TECHNOLOGIES USED	low-power networking, big data & machine learning, living lab experimentation
TYPE	imec.icon project
DURATION	01/10/2016 – 30/09/2018
PROJECT LEAD	Erwin Cornelis
RESEARCH LEAD	Steven Latré, IDLab, an imec research group at UAntwerpen
BUDGET	1,624,072 euro
PROJECT PARTNERS	Energy Lab, Rombit, VRT
RESEARCH GROUPS	IDLab, an imec research group at UAntwerpen and UGent; MICT, imec research group at UGent; SMIT, imec research group at VUB; imec.livinglabs; 'Inspanningsfysiologie en Trainingsleer' research group from UGent.

WHAT IS AN IMEC.ICON PROJECT?

The imec.icon research program equals demand-driven, cooperative research. The driving force behind imec.icon projects are multidisciplinary teams of imec researchers, industry partners and/or social-profit organizations. Together, they lay the foundation of digital solutions which find their way into the product portfolios of the participating partners.

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