

UISPA – System Integration and Process Automation Unit, Universidade do Porto

REPORT ON ACTIVITY 2008

Aims of the group

The aim of the group is to address research topics in decentralised motion control systems for manufacturing and process control applications.

Structure and Staffing

The research of this group is mainly focussed on the intersection between control engineering, real time communications and advance sensor/ actuators. Their goal is to develop tools and techniques required for the next generation of manufacturing and process control applications. Therefore the group has three sub groups: Advanced Control Methodologies, Real Time Communications, and Sensors & Actuators. Sensors & Actuators is the largest subgroup consisting of 7 researchers, Advanced Control Methodologies has 6 researchers and Real Time Communications currently has 2 chief researchers.

Research Funding

In this one year period, the group has been successful in attracting around 115,000 Euros of research funding of which around 65% comes from Government sources. The remaining funding is largely drawn from industry and services sources, and is largely secured by the Sensors & Actuators group.

Research Outputs

Publications

In total over 60 papers have been published in this period, 10 of which are in peer-reviewed international research journals with good reputations. These journals include *IEEE Transactions on Industrial Informatics*, *Sensors & Transducers Journal*, *Biotechnology & Bioengineering* and the *Journal of Clinical Anaesthetics*. The group also contributed to a major publication in the *Journal of Instrumentation* on 'The ATLAS Experiment' at the CERN Large Hadron Collider. One text book was also published.

Impact

The group has had many significant achievements this year. These include the establishment of an industrial lab for quality assessment and control of car cables manufacturing, a Remote and Virtual Laboratory for the remote use of haptic devices and new architectures, and the development of a variety of transducers for health assessment and industrial and medical applications. There has also been substantial work into traffic separation mechanisms, especially suited to industrial environments and new approaches for the use of wireless sensor networks in high density scenarios.

One patent, several prototypes and four software applications have been developed. They also attracted First Place in a competition involving eLearning laboratories for instrumentation and measurement.

Research Degrees

Over the period 2 PhD programmes were successfully completed and 10 MSc projects have been reported on.

Esteem

This is a very active Group and is involved in a number of international conferences and journals. The Group provided the International Programme Chair for the IEEE International Conference on Emerging Technologies and Factory Automation; members also held IPC memberships for eight international conferences. The Group is also represented on the Boards of three important international journals and members act as reviewers for a wide range of conferences and journals.

Summary

This is a very active and vibrant group pursuing research of strong industrial interest and relevance, securing a healthy 35% of their income from industry. They are active on a variety of fronts from eLearning through to conference organisation and quality research. Their encouraging future plans build on their strengths and include real-time and wireless communication, industrial automation and robot manipulators.

Peter Fleming
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