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Overall Research Unit Quality VERYGOOD

Comments and recommendations regarding the Unit activities, research orientation. organization and application of funds

Overall Research Unit Quality: 3.5

The R&D Centre ALGORITMI is part of the University of Minho, with research facilities in Guimaraes and Braga. The Centre is partitioned into four groups, each corresponding to a university department: Industrial electronics, Intormation systems, Informatics, and Systems engineering. The unit consists of 140 professionals, including 40 PhDs. It is managed by a Director, Deputy Director, management committee, scientific committee, and advisory committee.

This report is organized as follows: First some general comments about the entire unit, followed by specific commentary on each of the four groups.

General

The panel was generally impressed by the management capabilities of the Director. We found him knowledgeable about the work going on in the Centre and willing to honestly answer questions about the Centre activity. We saw evidence of strong leadership. For example. he insisted that all research should operate across group boundaries. His focus is on research that addresses the problems of local industry, uses existing or viable increased resources, and uses the existing talent of his staff. He has a goal of increasing the PhD complement of his unit from 40 to 80. He is looking at creative outfitting of research laboratories by renting required furnishings and then returning them at the duration of a project. That is, a sub-group does not own space ad infinitum, but rather occupies space for the duration of a project. This could have positive stimulating effect on the initiative of the research groups.

Thc objective of increasing the number of PhDs from 40 to 80 is a worthy objective. We strongly suggest that the first step is for the Centre to systematically identify the most important strategic areas to hire in, and then to recruit from beyond their current MSc staff. We discourage inbreeding. Furthermore, it is important that hiring be done in strategic areas, independent of the areas of existing ALGORITMI staff.

Many of the impressive researchers were trained outside of Portugal. The Centre is to be congratulated for taking advantage of universities outside of Portugal to train potential young faculty. However, the Centre must insure that when these researchers return to the unit, the expertise they acquired comes back to ALGORITMI with them. That means equipment support and proper mentoring for junior faculty, in order to ensure that the work is sustainable in ALGORITMI.

Too many papers are published in tenth rate international conferences. The panel is not impressed with such publications. In fact, these publications are weighted negatively for two reasons. (I) writing papers for such conferences wastes time in writing and in going to the conference, and (2) attending the conference costs money that could be better spent in the execution of research.

The Centre professorial staff has exorbitant teaching loads. As we understand it, this is a result of an agreement that was made in order to acquire a new building for the Centre. While the panel does not feel comfortable undoing prior agreement; we recognize that the heavy teaching load does get in the way of reasonable attention to research. Thus we encourage the Ministry to undo the increased teaching burden that has resulted from the agreement to construct a new building

Individual research groups.

Industrial Electronics (rating: 3)

The group is to be commended on working on problems relevant to traditional manufacturing areas beneficial to the national economy, for example, the work in leather defects and fabrics.

The group is also pursuing excellent work in forward-looking areas, for example the MCM work.

Much of the work is not at an exciting level and could stand to be upgraded.

Information Systems (rating: 2)

This group seems to lack substantive research component. Many papers are survey papers, others are opinion papers, many are descriptive without substantive experimental component and subsequent analysis.

Two papers that did have technical depth were written with researchers outside Portugal (i.e., from the UK and Australia). Another reasonable piece of work dealt with IEEE 802.11, but the lead group was from Aveiro.

Informatics (rating: 2)

Resources needed for the work described seemed adequate.

Research areas covered seemed far too dispersed.

The reconfigurable embedded systems work seemed to be reasonable.

The PAR C++ language is based on directives for automatic detection of parallelism and generation of parallel code. No experimentation with this language appears to have been published.

SGHL is a language for generating web sites. The description seems very straightforward. No evaluation of the language was provided in the paper we saw.

A paper describing the detection of movement in image sequences using neural networks was published. However, no experimental component of the work was described.

A paper on concept learning contained substantial mathematical formalism, but not experimental component.

Work on geographic information processing seemed to be a straightforward application. We could not identify a fundamental contribution to knowledge.

Summary statement: Many of these projects were on problems that require substantial experimentation, but no experimentation was present in the work reported. This causes one to question the basic research capabilities of the researchers involved.

Systems Engineering (rating: 5)

This group is doing research on several problems in the general area of operations research. The research appears to be, in general, solid.

The panel wishes to single out one researcher in particular, Carvalho, for particularly outstanding work on several projects, including his exact solution to bin packing (a branch and bound solution on a problem where the genetic algorithm approach - which we found to be a preoccupation of too many researchers in Portugal -- does not work).

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