Computational intelligence in Vaasa

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Automation engineering education and research at University of Vaasa is computationally oriented. Computational intelligence, especially evolutionary algorithms and their applications, are worked on. The applications range from various optimisation problems in engineering to medical and economic applications. Judged by the number of published papers the automation group is the leading one in evolutionary computing in the Nordic countries [1]. Perhaps the most artificial intelligence flavour has work on evolutionary algorithms related to Sudoku puzzles [2, 3]. In evolutionary software testing the group is among the global top ten most active groups [4]. Medical applications are related to visual and near-infrared imaging [5]. In the medical applications evolutionary optimisation is usually used in spectral wavelength selection (optimal minimum set) of model parameter search/optimisation. University of Vaasa has had own education in engineering since 2004. This year saw the graduation of our first doctoral student, when Janne Koljonen defended his doctoral thesis on machine vision. That work also contained some optimisation done by genetic algorithms [6]. Currently there is one doctoral thesis work going on on medical skin imaging applying also GAs in model parameter search [7].

The future activities is planned to include indocyanine green imaging development and optimisation in surgical applications [8] and online video image processing with FPGAs. The more traditional future engineering applications are expected to include optimisation related to energy production and use. [9].

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