COMPUTING AND MATHEMATICAL SCIENCES

Presentation time: 11.25am

Mark Nikora

Tūhoe, Te Aitanga a Hauiti

Post Graduate Diploma in Computer Science

Off the shelf Non-Intrusive Load Monitoring Devices Utilised in a Low Activity Detection Service

There is a growing awareness for the need to provide low cost solutions for the care of the elderly and in particular to allow them to keep living indepdent lives. In parallel to this there has also been significant advances in a number of technical areas including 1) monitoring electricity consumption for the purposes of reducing power costs, 2) non-intrusive load monitoring (NILM), 3) using sensors to determine activities of daily living and 4) cloud computing. This paper describes a low intrusive monitoring system that utilizes a single sensor to determine the use of appliances in a domestic home. The system is built around a readily available off-the-shelf power meter that automatically learns from the total electricity current load profile of the home. The authors have built a cloud based system that analyses the appliance use and determines through basic logic if the occupant of the home may be in need of assistance. The system can be configured to either call the appointed Carer or first call the home to determine if assistance is required. The system incorporates lessons learned in user trials of the previous less sophisticated system and has resulted in a system that becomes invisible to the user

Paul Brown

Waikato

PhD Candidate

Thomas Bayes and the Big Bang

Statistical inference under the Bayesian paradigm has existed since the 18th century through Bayes' Theorem, formulated by the Reverend Thomas Bayes. Bayesian inference has since been developed further through the works of prominent mathematicians, statisticians and scientists from varying fields. Bayesian inference is a way to build upon earlier understanding of some phenomena, by formally combing prior (often subjective) beliefs with currently measured data of the phenomena, which results in an update of the statistician's degree of belief (posterior belief). Whilst Bayesian inference has many advantages over other forms of statistical inference, it has only come into prominence since the dawning of the computer age.

This talk will focus briefly on some fundamentals of Bayesian inference, and potential solutions to its computational drawbacks. The problem of parameter estimation in regards to light source separation of Cosmic Microwave Background (CMB) Radiation (ancient light left over from the "Big Bang") from other forms of light in the observable universe will also be discussed.

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