AN INTELLIGENT SYSTEM FOR THE CONTROL OF DEPTH OF ANAESTHESIA

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Abstract

The monitoring and control of unconsciousness under surgical conditions in operating theatre is a major challenge to both anaesthetists and machines. An intelligent system has been developed for the assessment of depth of anaesthesia which utilises auditory evoked brain potentials, heart rate and blood pressure measurements. Using wavelets analysis the features within the auditory evoked signals are extracted and then fed to a learning neuro-fuzzy system which in turn classifies the depth of anaesthesia. In addition, the heart rate and blood pressure signals are used as a second measure based on a rule-based fuzzy logic system. The two measures are then fused to give a final indication of anaesthetic depth. This is then fed back to a Target Controlled Infusion (TCI) system for regulating the infusion of the drug propofol for the maintenance of anaesthetic state. The architecture has been validated via extensive simulation and in clinical trials. The system has also been developed as a computer-based training device.