

FPGA Implementation of a Marginalized Particle Filter for Delineation of P and T Waves of ECG Signal

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Abstract : The ECG signal provides important clinical information which could be used to pretend the diseases related to heart. Accordingly, delineation of ECG signal is an important task. Whereas delineation of P and T waves is a complex task. This paper deals with the Study of ECG signal and analysis of signal by means of Verilog Design of efficient filters and MATLAB tool effectively. It includes generation and simulation of ECG signal, by means of real time ECG data, ECG signal filtering and processing by analysis of different algorithms and techniques. In this paper, we design a basic particle filter which generates a dynamic model depending on the present and past input samples and then produces the desired output. Afterwards, the output will be processed by MATLAB to get the actual shape and accurate values of the ranges of P-wave and T-wave of ECG signal. In this paper, Questasim is a tool of mentor graphics which is being used for simulation and functional verification. The same design is again verified using Xilinx ISE which will be also used for synthesis, mapping and bit file generation. Xilinx FPGA board will be used for implementation of system. The final results of FPGA shall be verified with ChipScope Pro where the output data can be observed.

Keywords : ECG, MATLAB, Bayesian filtering, particle filter, Verilog hardware descriptive language

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