## Abstract

Mobile devices such as smart-phones and tablets are becoming the most important channel for delivering end-user Internet traffic especially multimedia content. One of the most popular multimedia application is video streaming. The video decoding process of this application is compute-intensive and is responsible of the consumption of a considerable part of the energy budget. Those mobile devices contain heterogeneous processing elements among-which we find Digital Signal Processors (DSP) and General Purpose Processors (GPP). In this context, the performance and energy estimation of those complex platforms is a difficult and time consuming task especially when considering both hardware and applicative parameters. In this paper, we propose a methodology for developing a unified high level video decoding performance and energy consumption analytical model for embedded heterogeneous platforms. This methodology is based on experimental measurements conducted on an embedded low-power platform. The developed model describes the performance and the energy consumption of H.264/AVC video decoding on both GPP and DSP in terms of video bit-rate, clock frequency and a set of comprehensive hardware and video related coefficients. It achieves a balance between a too abstract high level model and a detailed lower level one while guaranteeing a very good prediction properties (R-squared = 97%) for the tested videos. As a use case, we show that our model allows to accurately determine the bit-rate values for which video decoding on GPP is more energy-efficient than on DSP for a given platform