

Abstract

Manal Helal

Dimension and Shape Invariant Programming – The Implementation and the Application

The thesis implemented in C++ (as an imperative programming languages) the Mathematics of Arrays (MOA) Constructs, which is a programming paradigm that is invariant of dimension and shape. Arrays dimension and shape are entered at run time, and performance linearly scale with the array contents invariant of the data dimensionality and shape. The theory was tested through image and video processing as 2-dimension and 3-dimension applications, and it was proven feasible. Parallel processing factors are examined in this new paradigm, and hardware implementation was conducted also (using the Renoir tool). The new paradigm is promising, but still requires lots of experimentation and applications.