PRiME

Power-efficient, Reliable, Many-core Embedded systems

EPSRC

Engineering and Physical Sciences Research Council

Runtime-adaptive, cross-layer video processing demonstrator

Contributors:
Imperial, Southampton & Newcastle

Purpose:
- Optimise performance given constraints and requirements
- Use offline characterisation and online monitoring

Key Features:
- Cross-layer, closed-loop runtime control
- Online error measurement
- DVFS
  - Adapt frequency to meet frame rate
  - Minimise voltage to save power
- Runtime management choices:
  - Use hardware acceleration?
  - Select base voltage/frequency
- System modelling
  - Characterise hardware
  - Derive model for runtime management

Collaboration:
- Product of hackathon weeks
- Imperial – hardware, knobs and monitors
- Southampton – runtime management
- Newcastle – modelling

Model

Characterisation

Modelling

User

Runtime Management

Frame rate

Coarse voltage

Voltage

Voltage Control

Frequency, HW/SW?

Input frame

Output frame

Image Filter

Test rows

Error rate (HW only)

Filtered test rows