The Library of Components

Each algorithm has two implementations: hardware and software. Each implementation has known runtimes for a set of images. Interpolation used for rest of image sizes. Each hardware implementation has a known area size. All components are image in/image out. Reprogramming and Communication costs incurred at sw/hw.

Problems sizes of 20 or fewer stages. 500 ms to make a decision.

Solving Pipeline Assignment

Exhaustive Search

Find: Optimal solutions

How: Search entire problem space

Algorithm Runtime: \(O(2^{\text{number of pipeline stages}})\).

ILP

Find: Optimal solutions

Need pipeline implementations that minimize reprogramming and communication costs.

Blue boxes are hw/sw boundaries

Red boxes are fixing image edges

Green Boxes are reprogramming

Possible Implementations

Blue boxes are hw/sw boundaries

Red boxes are fixing image edges

Green Boxes are reprogramming

Median Filter and Edge Detection Profiles

Median Filter and Edge Detection Profiles (with Init Times)

![Diagram](chart.png)

- Pad Image
- Edge Detect
- Remove Padding
- Median Filter
- Remove Padding
- Edge Detect
- Median Filter
- Fix Padding
- Edge Detect
- Remove Padding

Possible Implementations:

- Edge Detect
- Pad Image
- Edge Detect
- Remove Padding
- Median Filter
- Remove Padding
- Edge Detect
- Median Filter
- Fix Padding
- Edge Detect
- Remove Padding

Exhaustive Search

Find: Optimal solutions

How:

- Interpolation
- Each implementation has known runtimes
- Each hardware implementation has a known area size
- All components are image in/image out
- Reprogramming and Communication costs incurred at sw/hw
- Problems sizes of 20 or fewer stages
- 500 ms to make a decision

ILP

Find: Optimal solutions