

Problem:

- Reconstruction of multispectral images from RGB

Solution:

- **FAST:**
 - Training: for each image, compute:
 - Moore-Penrose pseudo-inverse matrix
 - Feature vector
 - Test: for the given image:
 - Select training images based on feature vector similarity
 - Compute element-wise median of the corresponding pseudo-inverse matrices
- **SQUEEZE:**
 - Train a SqueezeNet to predict a single global scaling factor

Dataset:

- NTIRE 2022 Arad 1K Hyperspectral Database
- 1000 RGB-HyperSpectral (HS) pairs
- 900 training, 50 validation and 50 testing samples
- 31 spectral bands
- 400 nm to 700 nm
- 482 × 512 pixels

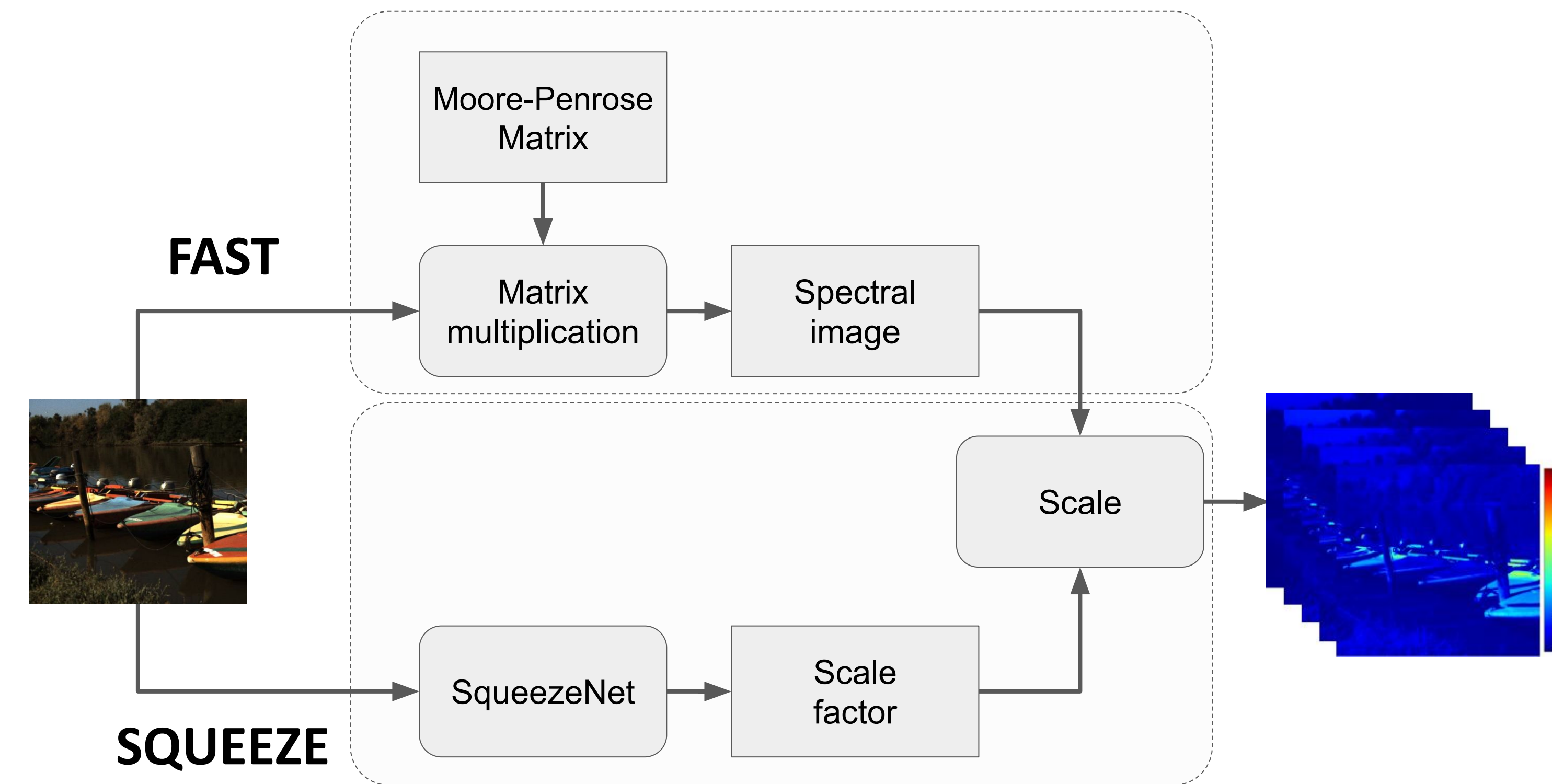
Metrics:

- Root Mean Squared Error (RMSE)
- Mean Relative Absolute Error (MRAE)
- Back Projection MRAE (BPMRAE)
- Weighted accuracy

Spectral reconstruction from RGB data

FAST: Efficient linear transformation

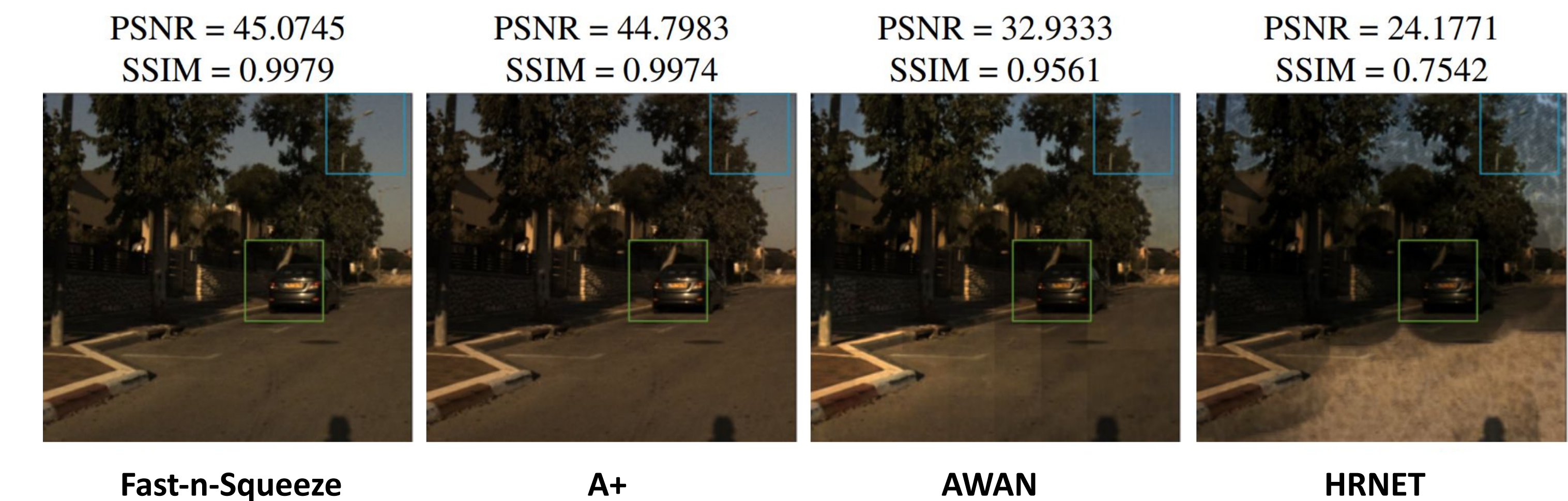
SQUEEZE: Global scaling with lightweight NN



Results:

Method	MRAE	RMSE	BPMRAE	Weighted accuracy	PSNR	SSIM	Infer. speed FPS
A+	0.3906	0.0785	0.3570	0.4004	29.1255	0.8420	0.31 (CPU)
AWAN	0.3551	0.0704	0.3312	0.3660	29.7714	0.8619	0.14 (GPU)
HRNet	0.5810	0.0848	0.5436	0.5565	27.5177	0.8037	40.26 (GPU)
Fast-n-Squeeze	0.2753	0.0452	0.2107	0.2986	33.4023	0.9303	198.45 (GPU)

Quantitative comparison on the NTIRE 2022 validation set



Inference time:

