



Hybrid Cost Volume Regularization for Memory-efficient Multi-view Stereo Networks

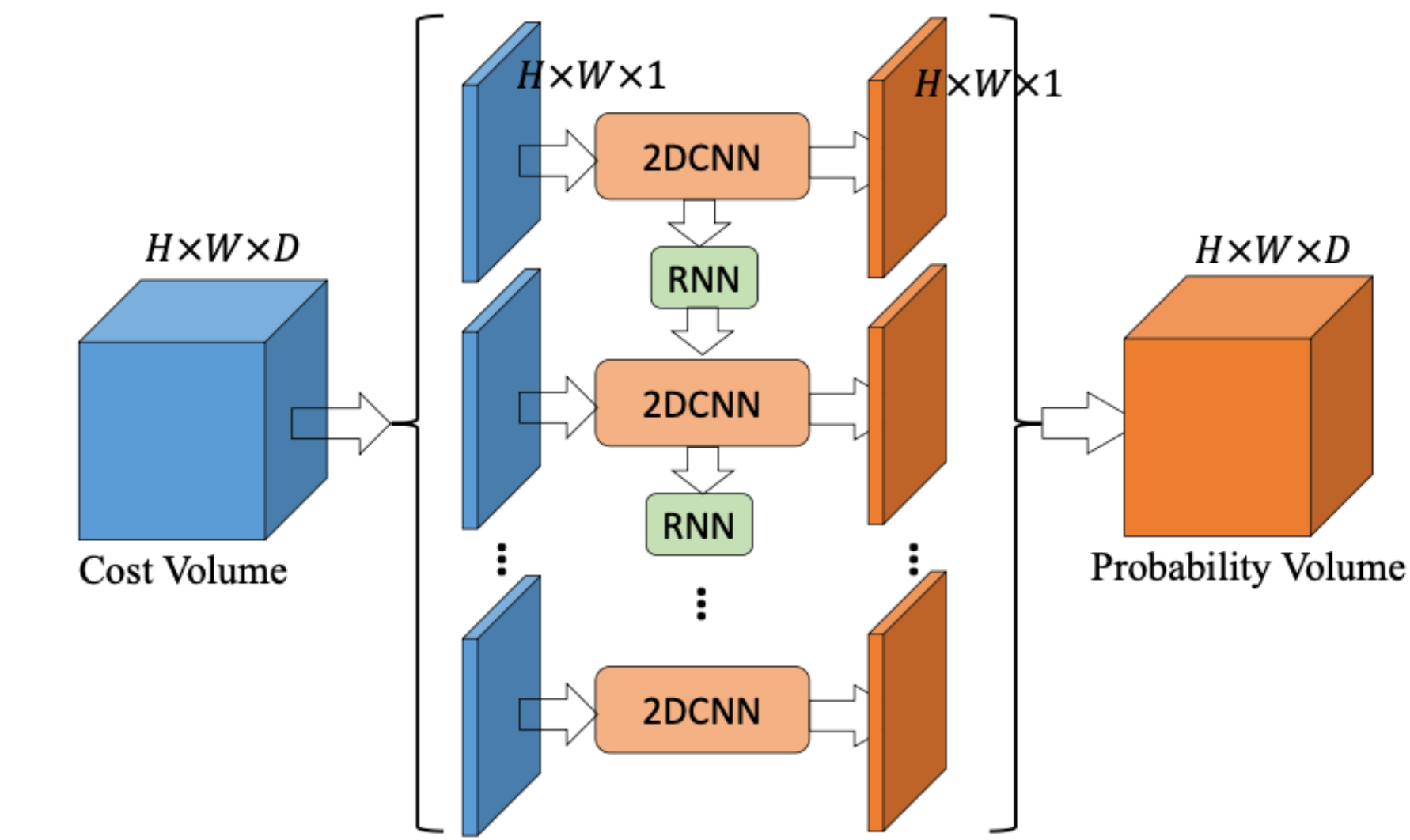
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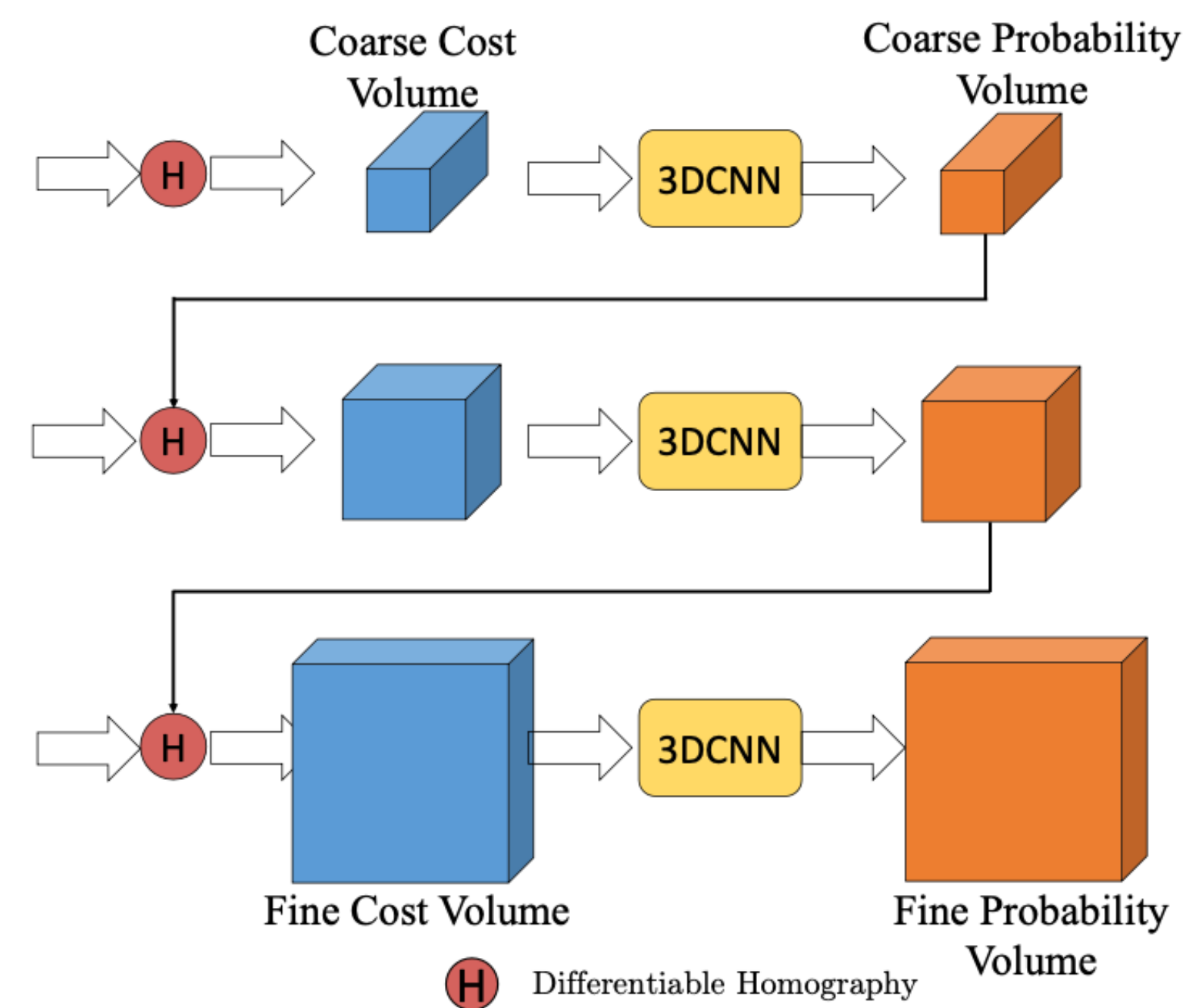


Background & Motivation:

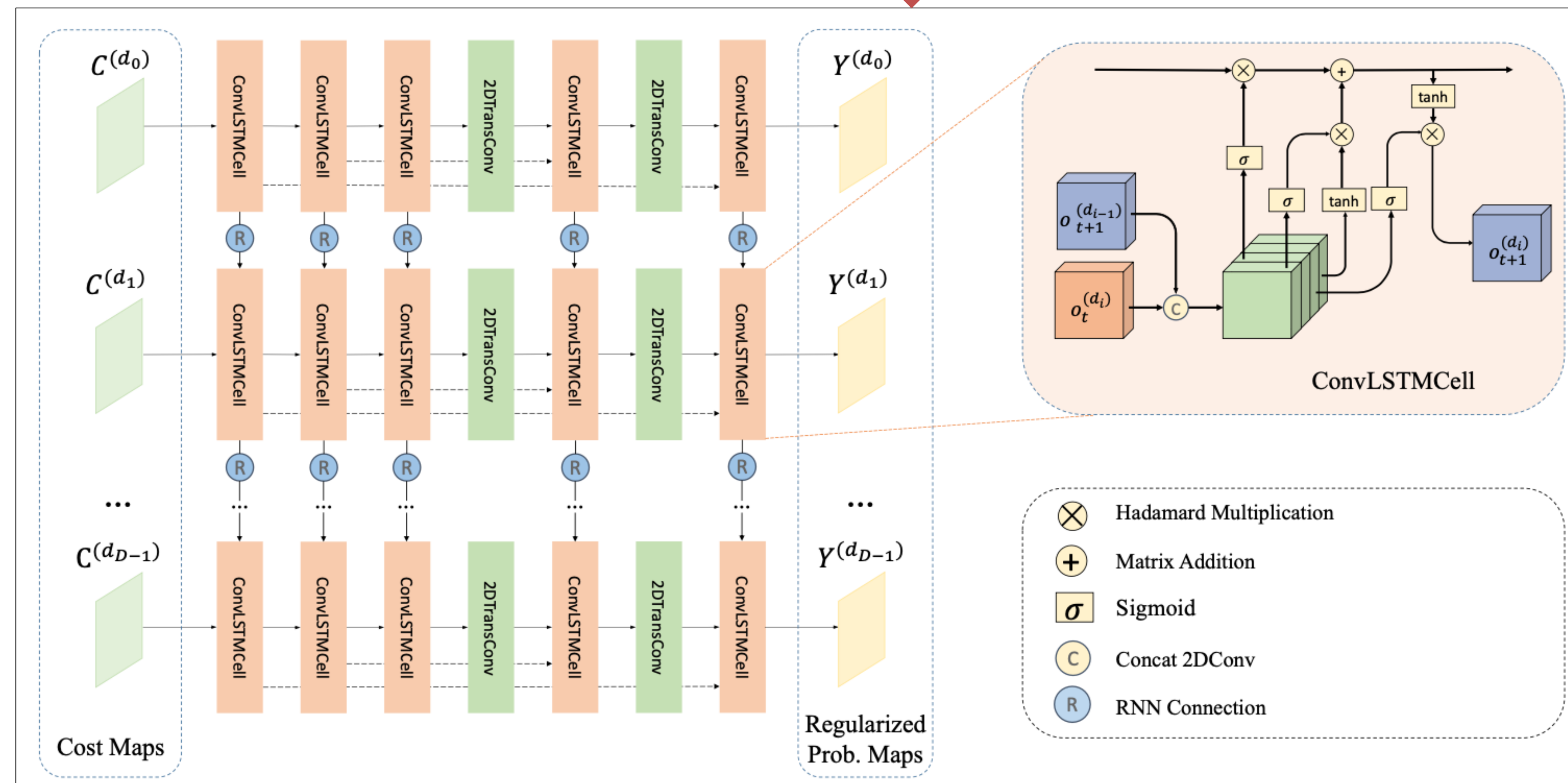
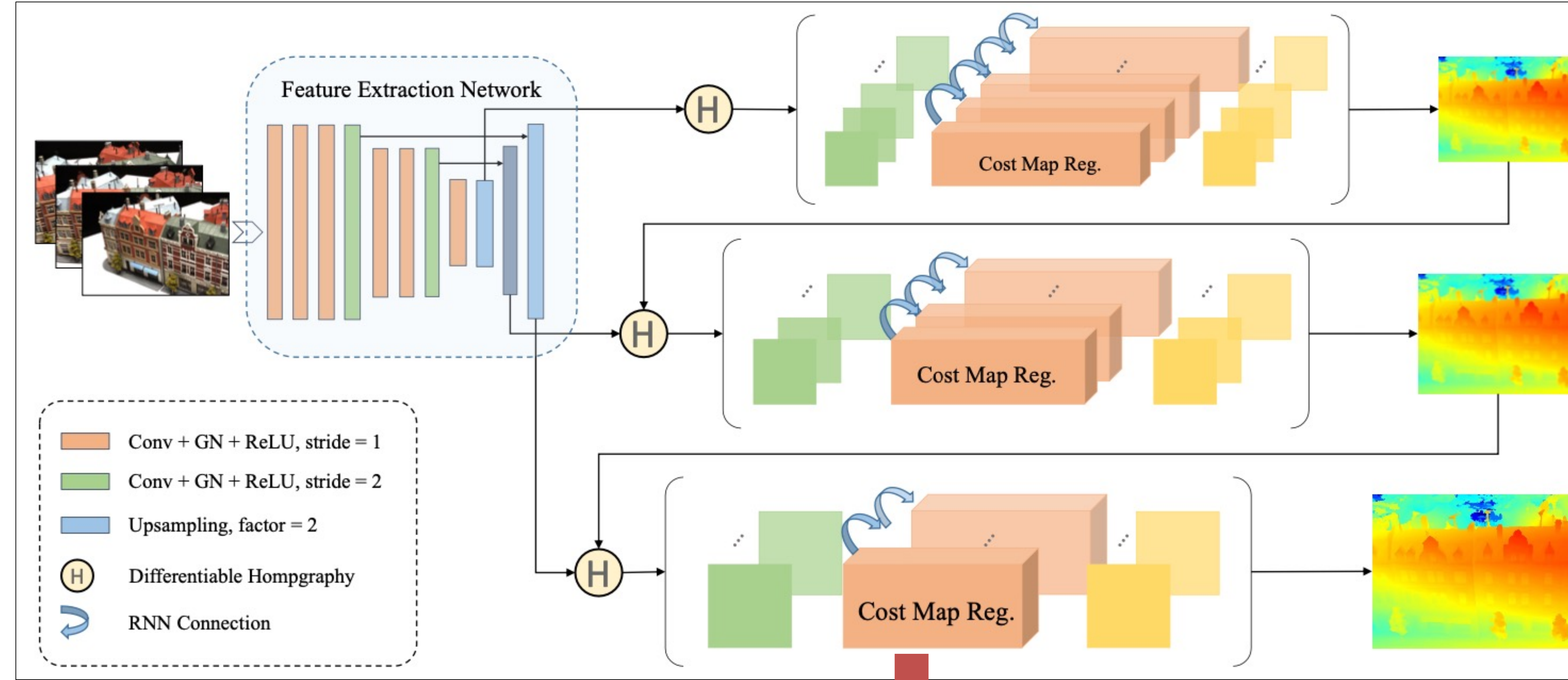
- MVS (Multi-view Stereo):
 - A key stage of image-based 3D reconstruction.
 - To recover the dense representation with a series of calibrated images.
- Real applications:
 - Runtime efficiency: time & memory.
 - Flexibility: configurable hyperparameters.
 - Recurrent regularization: lightweight, configurable but slow.
 - Cascade regularization: fast, unconfigurable but heavyweight.



(a) Recurrent Regularization

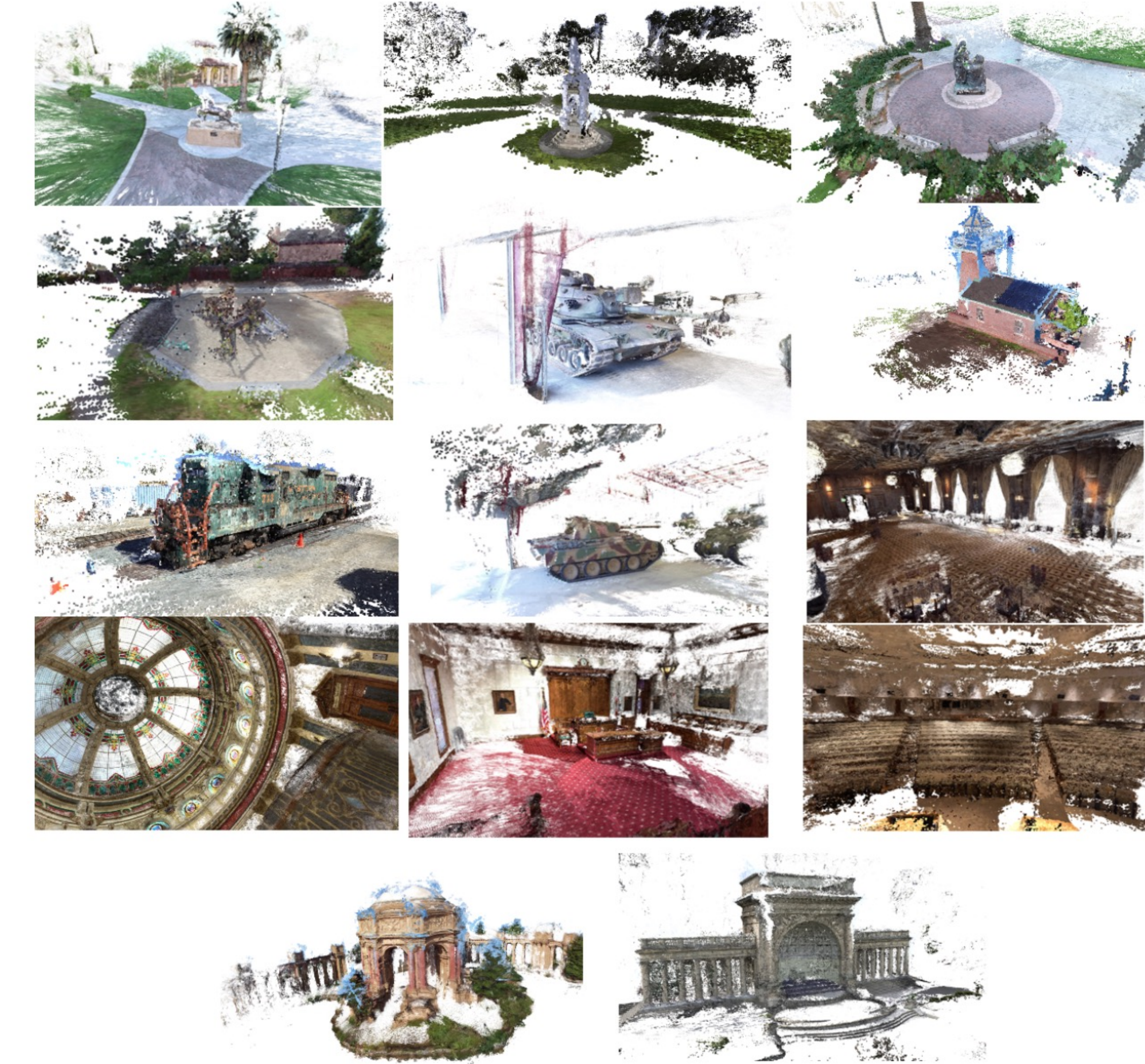


(b) Cascade Regularization



Hybrid Regularization:

- Overall architecture:
 - Multi-stage coarse-to-fine depth sampling & regularization.
 - Recurrent regularization for stage-wise regularization.
 - A good & flexible trade-off between time & memory.
- Stage-wise recurrent regularization:
 - 2D encoder-decoder CNN for each cost slice.
 - LSTM RNN for context across cost slices.



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