Dual-Stage Hyperspectral Image Super-Resolution (DualSR) algorithm

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Catalogue


01
Coarse Stage

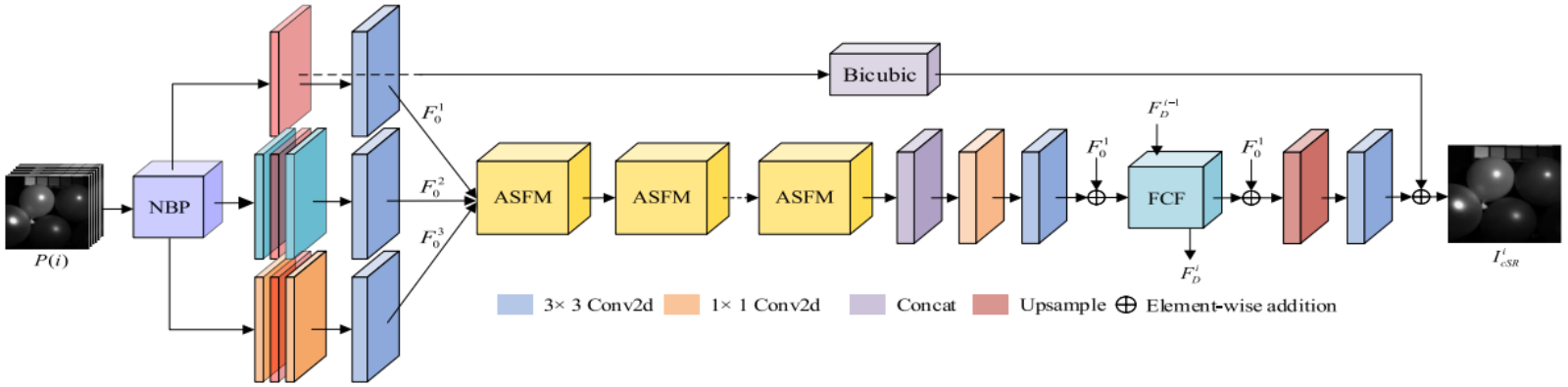

Fig. 4. Overview of the proposed CoarSR for hyperspectral image SR in coarse stage.

Coarse Stage (Supervised Manner):

1. **Selection of the current band and four adjacent bands based on high similarity within a certain spectral range.**
2. **Division of these bands into three groups to facilitate the learning of potential knowledge from each band.**
3. **Implementation of an adjacent spectral fusion mechanism to generate complementary content from intra/inter-groups, enhancing representation learning.**
4. **Recovery of each initial super-resolved band in the hyperspectral image through a recurrent manner.**


02
Fine Stage

Fine Stage (Unsupervised Manner):

1. Employment of an enhanced back-projection method under spectral angle constraints to learn the content of spatial-spectral consistency.

2. Further refinement of the coarse results to improve performance gain globally.

3. Application of the strategy as a plug-and-play method, allowing integration into any hyperspectral image super-resolution algorithm for optimization.

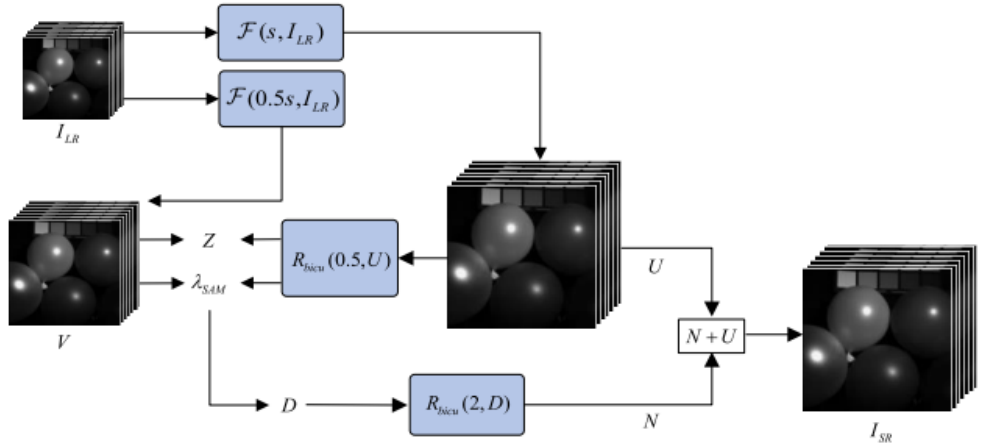

Fig. 6. Enhanced back-projection method via spectral angle constraint.

03

Summary of DualSR

The DualSR involves two stages – coarse stage, fine stage. The coarse stage focuses on enhancing the spatial details using supervised learning by leveraging the similarity between adjacent spectral bands. The fine stage then refines these details through unsupervised learning, considering global information to preserve spectral fidelity. Therefore, the DualSR is able to maintain high spectral fidelity while significantly improving spatial resolution.


Thank you
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