**INTRODUCTION**

- **Task**
  - Alleviating blocking and ringing artifacts derived from coding procedure by deep neural network.

- **Motivation**
  - Progressive Representative Feature Review
    - Progressive refinement by Residual Dense Network \(^\text{[1]}\)
  - Channel dimension compressed at the bottleneck
  - Hierarchical Side Information
    - The coding process is performed block by block with the coding tree unfolding which contains hierarchical side information.

**MULTI-SCALE MEAN VALUE OF CU**

- Calculating the mean value of a CU (M-CU) each time it has been partitioned
- Coarse-to-fine way recurrent processing for generating the multi-scale mean value of CU.

**FUSION OF MM-CU**

- Extracting the feature map by a shallow CNN (SIFE Unit)
- Element-wisely adding the feature map to the main branch
- Feature map of coarser M-CU added to deeper layer

**QUANTITATIVE RESULT**

<table>
<thead>
<tr>
<th>CLASS</th>
<th>VRCNN (^\text{[2]})</th>
<th>DCAD (^\text{[3]})</th>
<th>DRN (^\text{[4]})</th>
<th>PRN+M</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>-4.3%</td>
<td>-3.4%</td>
<td>-3.8%</td>
<td>-6.6%</td>
</tr>
<tr>
<td>C</td>
<td>-5.0%</td>
<td>-4.6%</td>
<td>-7.5%</td>
<td>-10.7%</td>
</tr>
<tr>
<td>D</td>
<td>-5.4%</td>
<td>-5.2%</td>
<td>-7.3%</td>
<td>-9.6%</td>
</tr>
<tr>
<td>E</td>
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<td>-7.8%</td>
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<tr>
<td>Average</td>
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<td>-5.0%</td>
<td>-6.9%</td>
<td>-9.6%</td>
</tr>
</tbody>
</table>

\(^1\) Y. Zhang et al., "Residual dense network for image super-resolution," CVPR 2018.
\(^4\) Y. Wang et al., "Dense Residual Convolutional Neural Network based In-Loop Filter for HEVC," ICIP 2018

**LINKS**

- For more details & codes, scan QR code or navigate to https://github.com/Dezhao-Wang/PRN
- Interested in our team STRUCT? Navigate to http://www.wict.pku.edu.cn/struct/struct.html