

Сжатие изображения при помощи автокодировщика

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M4130

Предложенные улучшения

Улучшена архитектура автокодировщика

- Убраны MaxPool слои
- Добавлен ResidualBlock
- GELU активации
- Инициализация весов Xavier

```
class ResAutoEncoder(BaseModel):
    def __init__(self, model_name='residual_ae'):
        super(ResAutoEncoder, self).__init__(model_name)
        self.encoder = nn.Sequential(
            nn.Conv2d(3, 128, kernel_size=7, padding=3, stride=2),
            nn.GELU(),
            ResidualBlock(128),
            nn.Conv2d(128, 32, kernel_size=5, padding=2, stride=2),
            nn.GELU(),
            ResidualBlock(32),
            nn.Conv2d(32, 16, kernel_size=3, padding=1, stride=2),
            nn.GELU(),
        )

        self.decoder = nn.Sequential(
            ResidualBlock(16),
            nn.ConvTranspose2d(
                16, 32, kernel_size=3, stride=2, padding=1, output_padding=1
            ),
            nn.GELU(),
            ResidualBlock(32),
            nn.ConvTranspose2d(
                32, 128, kernel_size=5, stride=2, padding=2, output_padding=1
            ),
            nn.GELU(),
            ResidualBlock(128),
            nn.ConvTranspose2d(
                128, 3, kernel_size=7, stride=2, padding=3, output_padding=1
            ),
            nn.Sigmoid(),
        )

        self._initialize_weights()
```

Результаты

PSNR на тесте:
24.68 vs 23.58

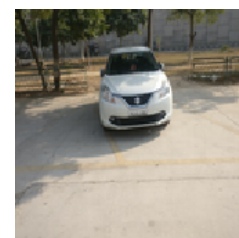
BPP на тесте:
0.48 vs 0.52



PSNR: 25.81



PSNR: 28.89



PSNR: 27.66



PSNR: 28.35



PSNR: 26.63



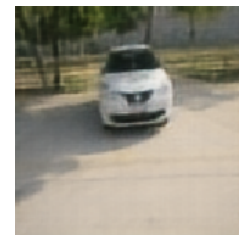
PSNR: 27.63



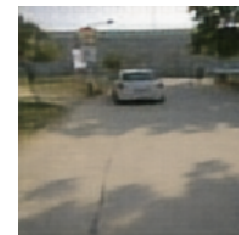
PSNR: 23.35 | BPP: 0.45



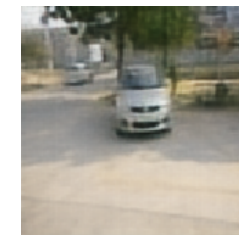
PSNR: 26.18 | BPP: 0.45



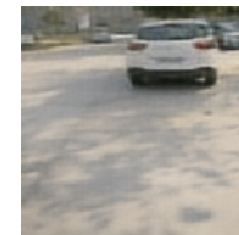
PSNR: 24.96 | BPP: 0.50



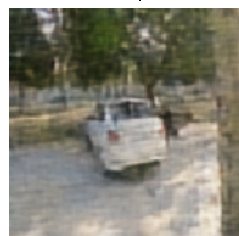
PSNR: 25.49 | BPP: 0.45



PSNR: 24.13 | BPP: 0.49



PSNR: 25.58 | BPP: 0.52



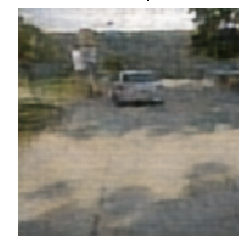
PSNR: 28.68 | BPP: 0.48



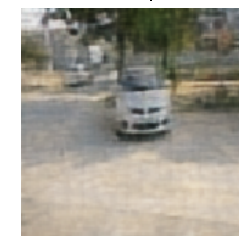
PSNR: 29.03 | BPP: 0.46



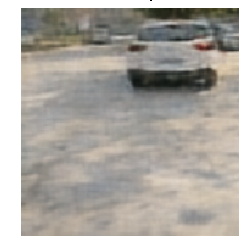
PSNR: 28.97 | BPP: 0.50



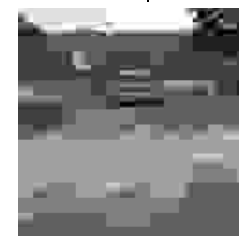
PSNR: 28.87 | BPP: 0.47



PSNR: 28.82 | BPP: 0.49



PSNR: 29.09 | BPP: 0.51



Код и логи

- Wandb https://wandb.ai/agorb/codec_itmo/
- GitHub https://github.com/Myashka/Codec_ITMO_lab/