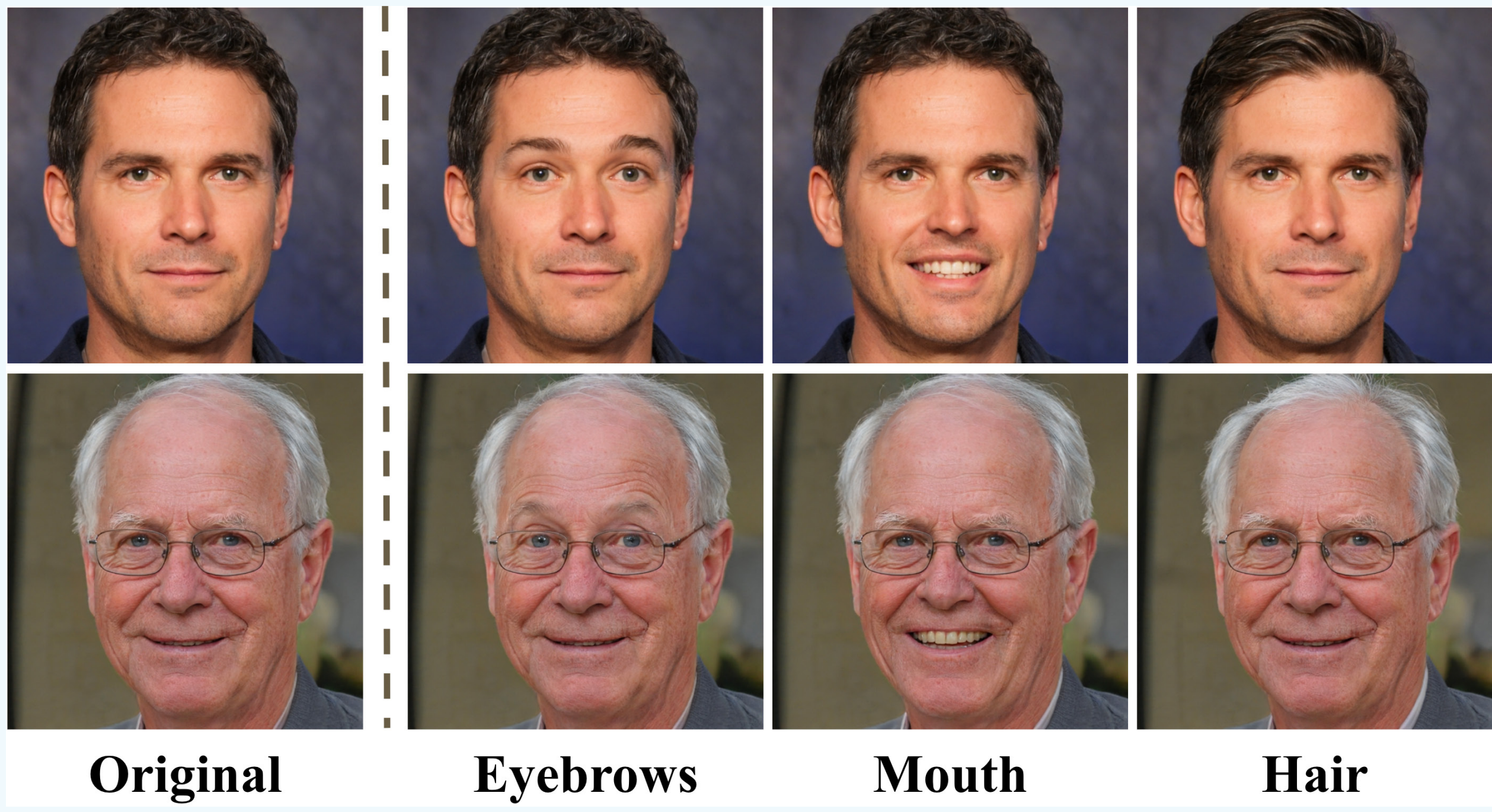


Introduction



Semantic Image Editing requires prior knowledge of high-level concepts.

Generative Adversarial Networks (GANs) learn a mapping from a low-dimensional latent space to the image domain (prior knowledge).

Previous works find meaningful directions in GAN's latent space to perform high-level image editing, but they fail to perform localized semantic editing.

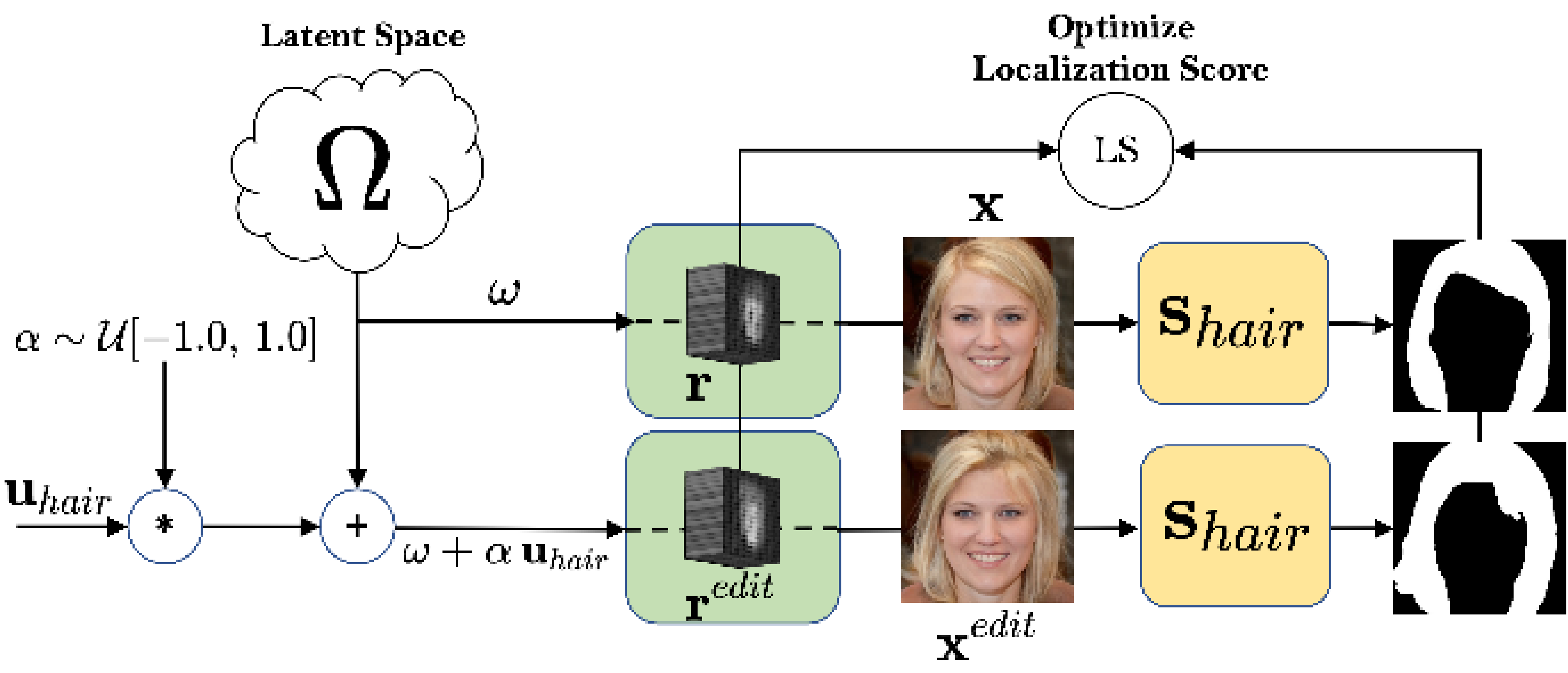
Contributions

- A novel objective function for finding **Locally Effective Latent Space Direction (LELSD)**
- GAN architecture and dataset-agnostic
- Fast training and convergence
- Editing any object/part
- Layer-wise editing for StyleGAN generators
- Multiple semantic edits for each object/part

Examples of Edits



Scheme of Our Method



Localization Score measures the ratio of change inside the mask

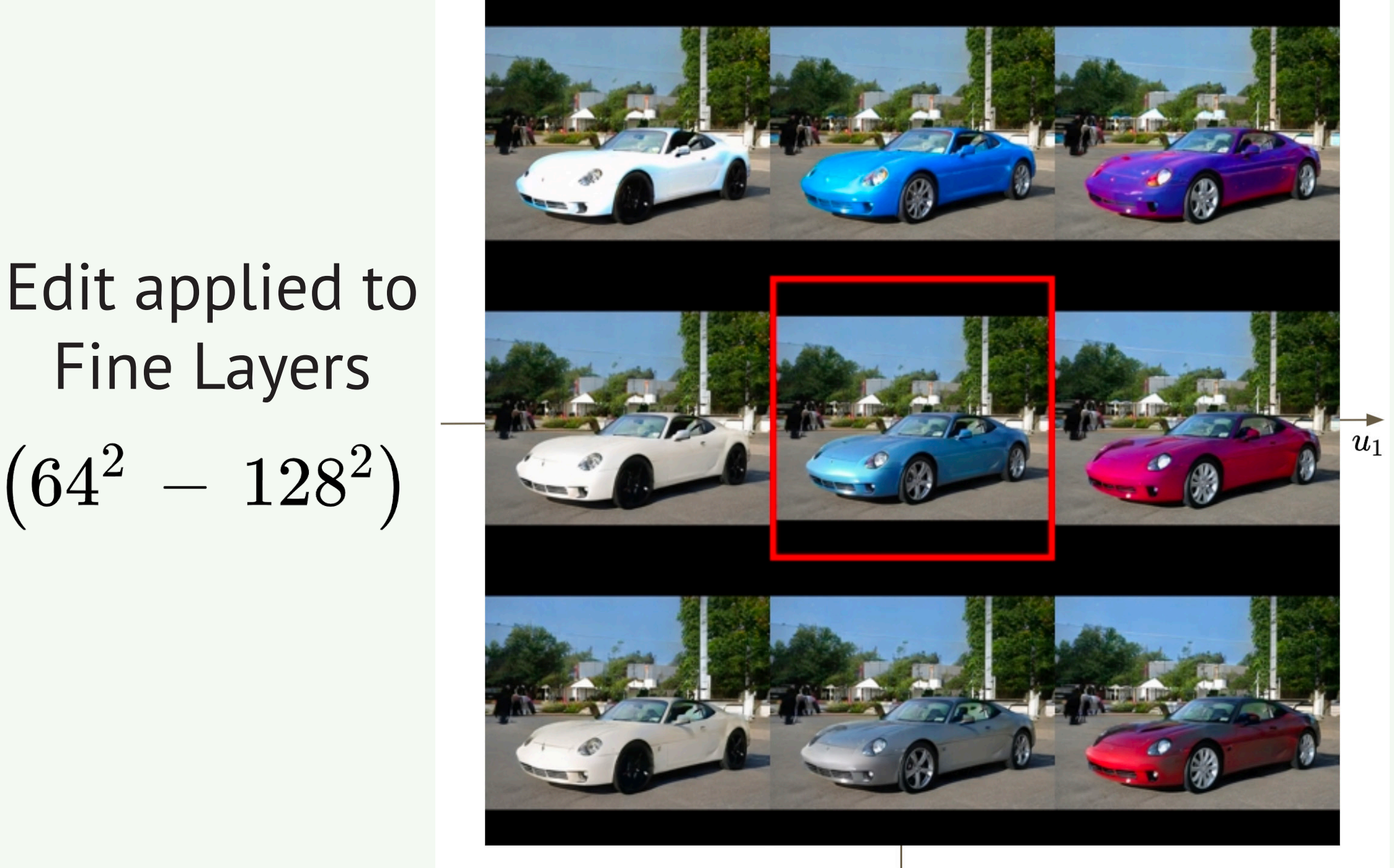
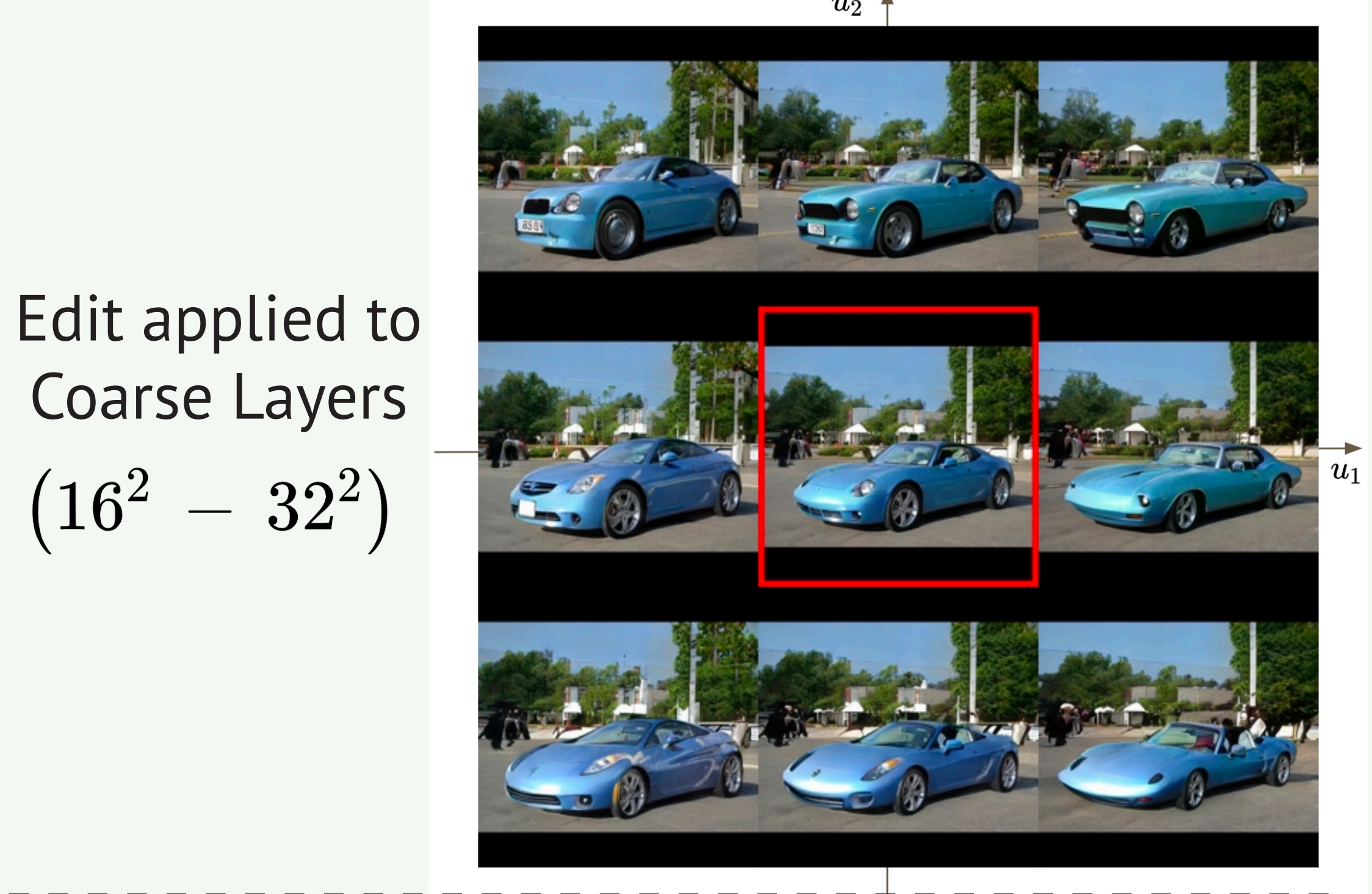
$$LS(\mathbf{u}) = \frac{\sum_{i,j} \downarrow \tilde{s}_c(\mathbf{x}, \mathbf{x}^{edit}) \odot |\mathbf{r} - \mathbf{r}^{edit}(\mathbf{u})|^2}{\sum_{i,j} |\mathbf{r} - \mathbf{r}^{edit}(\mathbf{u})|^2}$$

To find multiple directions for editing the same semantic we add a regularization term to the objective to encourage diversity

$$R(\mathbf{u}_1, \dots, \mathbf{u}_k) = \frac{-1}{2} \|\text{Corr}(\mathbf{u}_1, \dots, \mathbf{u}_k) - \mathbf{I}_K\|_F$$

$$J(\mathbf{u}_1, \dots, \mathbf{u}_k) = \sum_k LS(\mathbf{u}_k) + cR(\mathbf{u}_1, \dots, \mathbf{u}_k)$$

Layer-wise Editing



Sequential Editing

