Continuous learning of face attribute synthesis

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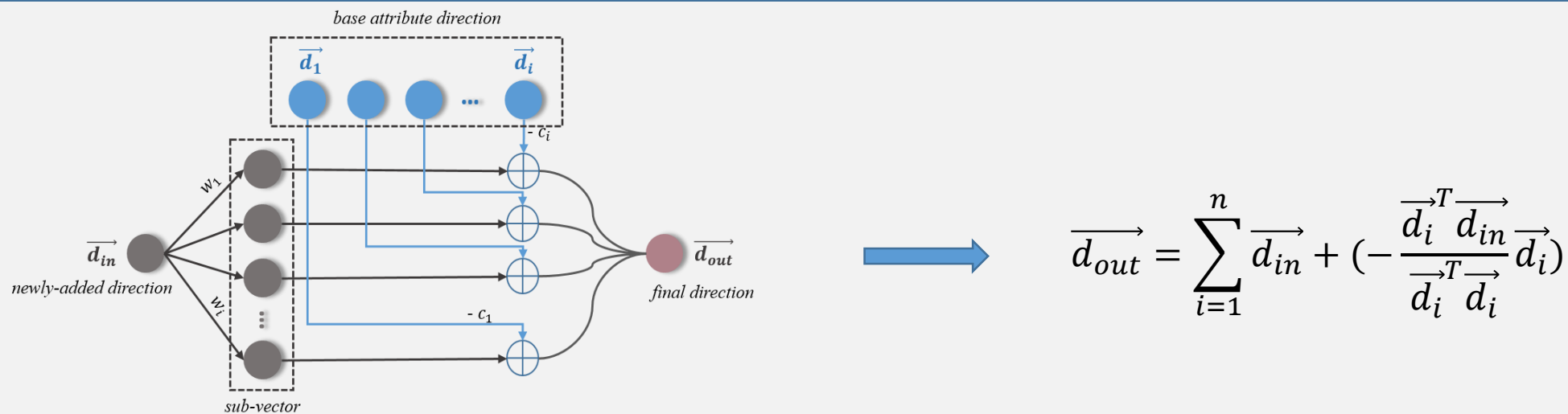[3]College of Information Engineering, Sichuan Agricultural University

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- ➤ The generative adversarial network (GAN) shows great superiority in face attribute synthesis task. However, the current method provides very limited extensibility for newly added attributes.

- ➤ The most common way to implement a new attribute composition task is to retrain the model and tailor the network parameters to fit the new data.

- ➤ How to make the model have the ability to continuously learn different attributes without retraining the model has become a hotspot of current research.
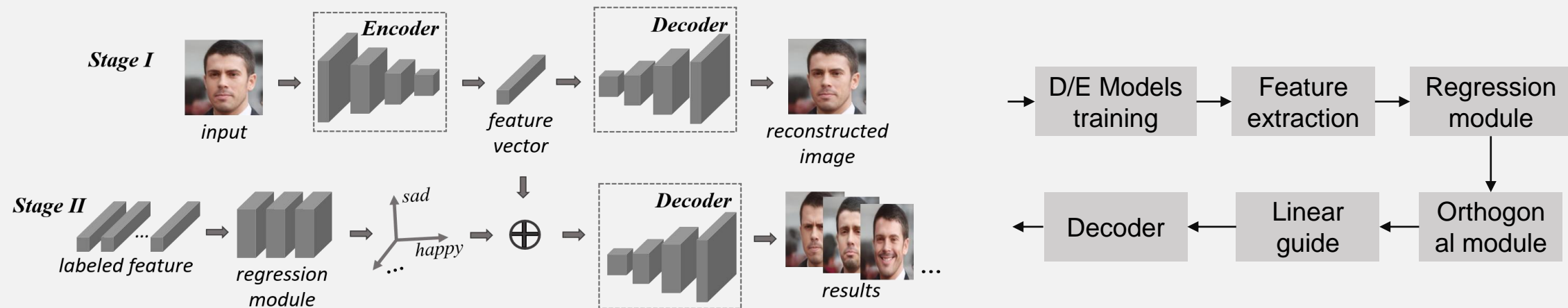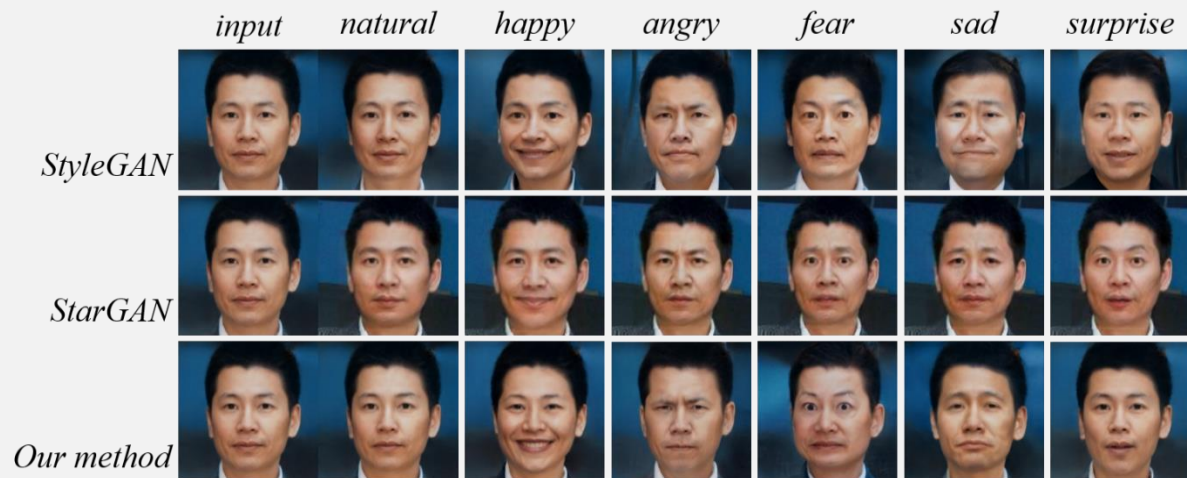
Network structure of attribute composition

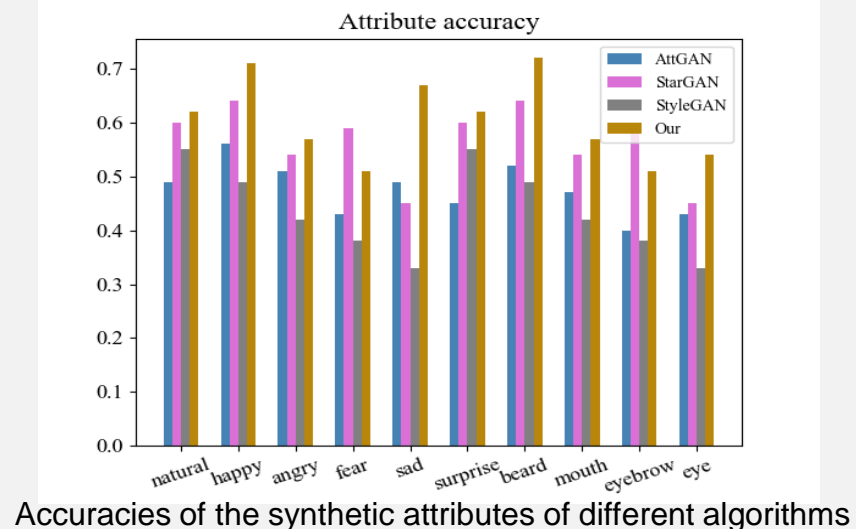$$\overrightarrow{d_{out}} = \sum_{i=1}^{n} \overrightarrow{d_{in}} + \left(-\frac{\overrightarrow{d_i}^T \overrightarrow{d_{in}}}{\overrightarrow{d_i}^T \overrightarrow{d_i}} \overrightarrow{d_i} \right)$$
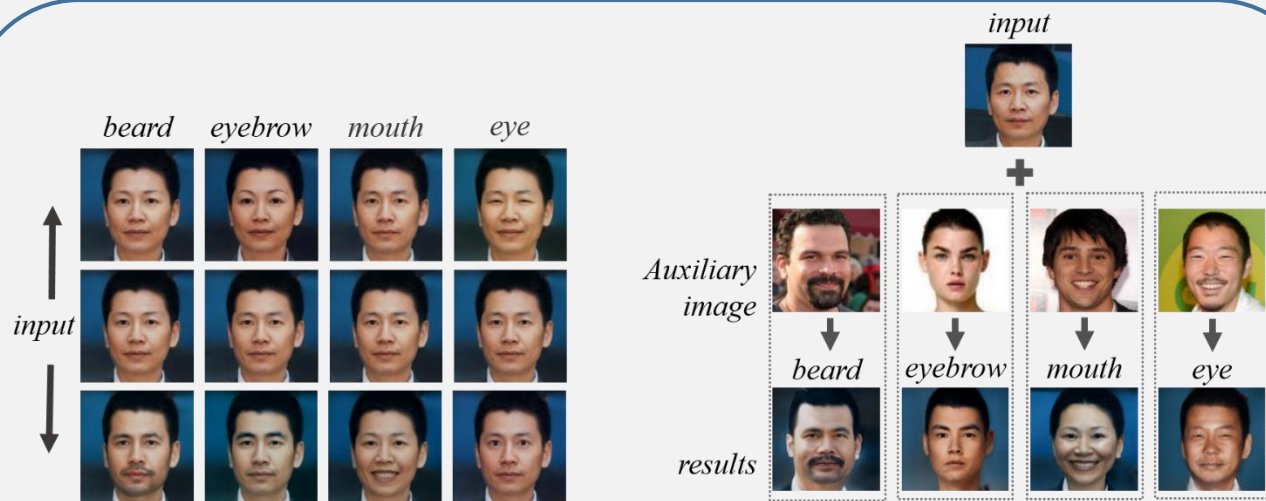
New attribute orientation extension

The results of different methods on facial expressions

Accuracies of the synthetic attributes of different algorithms

(a): Attribute expansion results of our algorithm

(b): Attribute expansion results of StyleGAN

The results of the attribute extension

Vehicle attribute manipulation results

4. CONCLUSION

- The change directions of different attributes in feature space are explored by extracting the feature vector of input images , and then using orthogonal operations to modify the direction of the attributes to decouple different attributes.

- The continuous synthesis of the target attributes is realized by the linear guidance of input features, and the manipulation process is more controllable.

- A new attribute extension module was proposed, which can separate the interference of basic attributes by decomposing new attributes and obtain independent changes of new attributes without retraining the generated network.

- Via experiments, it was found that the proposed algorithm generate high quality of the synthesized images, the manipulation of attributes is more in line with human sensory logic, and the manipulation of new attributes is more flexible.

Thank You

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