ID-Patch: Robust ID Association for Group Photo Personalization

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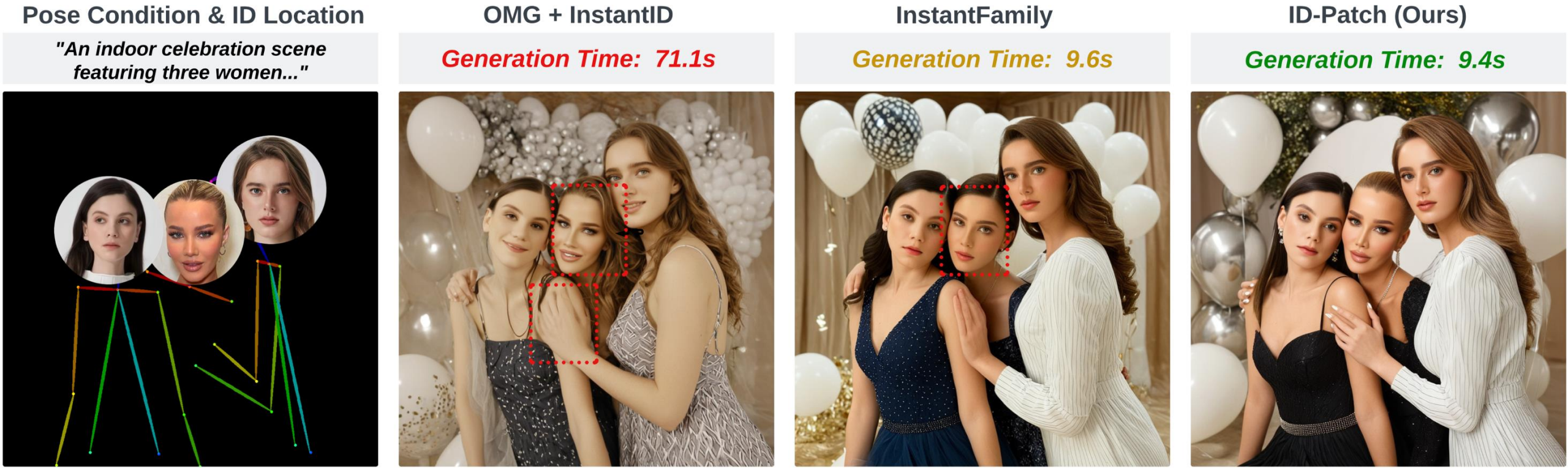
MICHIGAN STATE UNIVERSITY

ByteDance

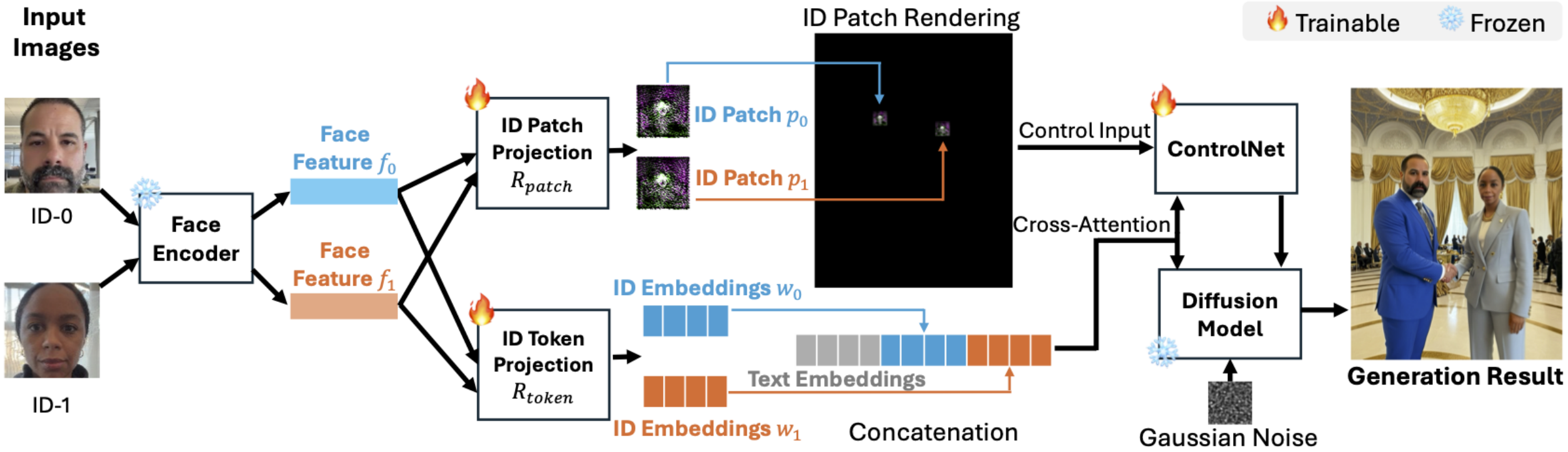
TikTok

Limitations of Existing Works



- Group photo generation process is **time consuming** → Linear to the number of identities
- Dependent on **additional model** to provide mask. → Fail in challenging
- ID leakage:
  a) **imprecise masks** (close interaction of faces)
  b) **unintended information propagation** through self-attention and convolutional layers

Method: ID-Patch



- **Time-efficient** → Only additional process is to add ID patch on the condition image
- **Independent** on additional model to provide mask.
- **Avoid ID leakage** → model learns to associate IDs with their spatially designated locations.
- **Seamlessly integrates** with various types of spatial conditions (such as poses, canny edges or depth map). → enhancing the robustness and flexibility of our method.

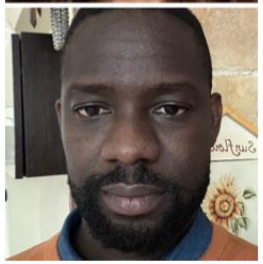
Pose-Free Generation

ID + ID Location	 "fashion photoshoot of two women in a studio"	 "three adults enjoying a relaxed evening at a rustic restaurant"	 "five friends in black shirts taking a selfie"	 "a group of eight adults at an outdoor party, background of forest"
Generation Result				

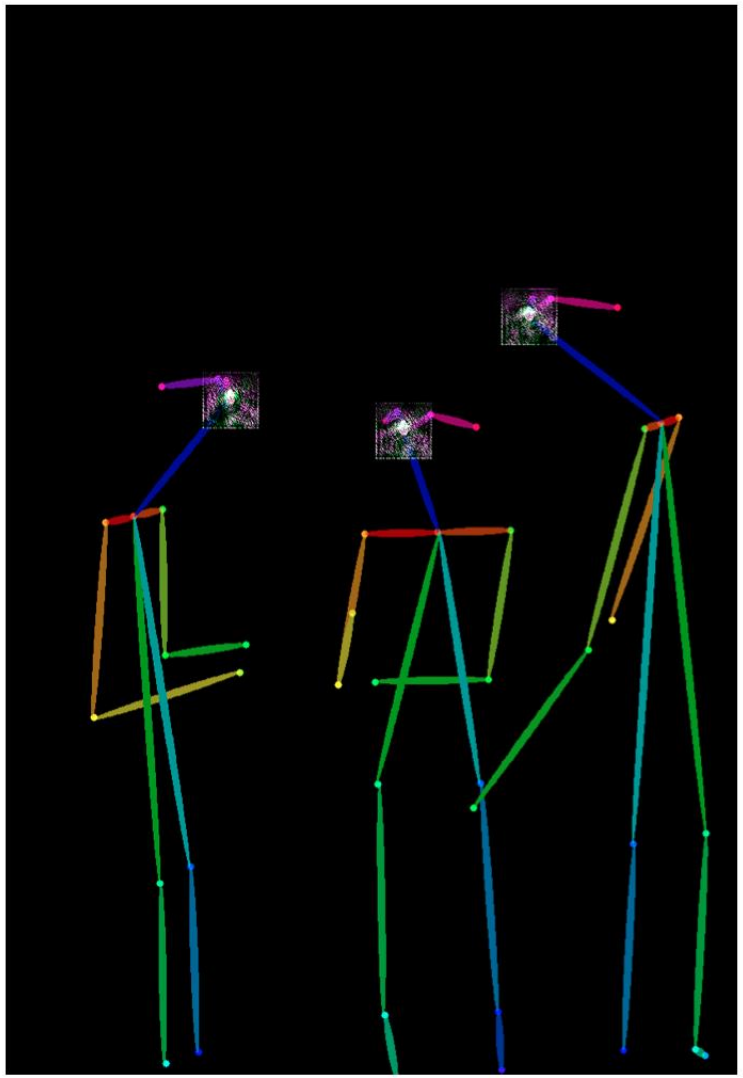
Plug-and-Play

ID-Patch ControlNet + Canny Edge ControlNet

Pose-Conditioned Generation



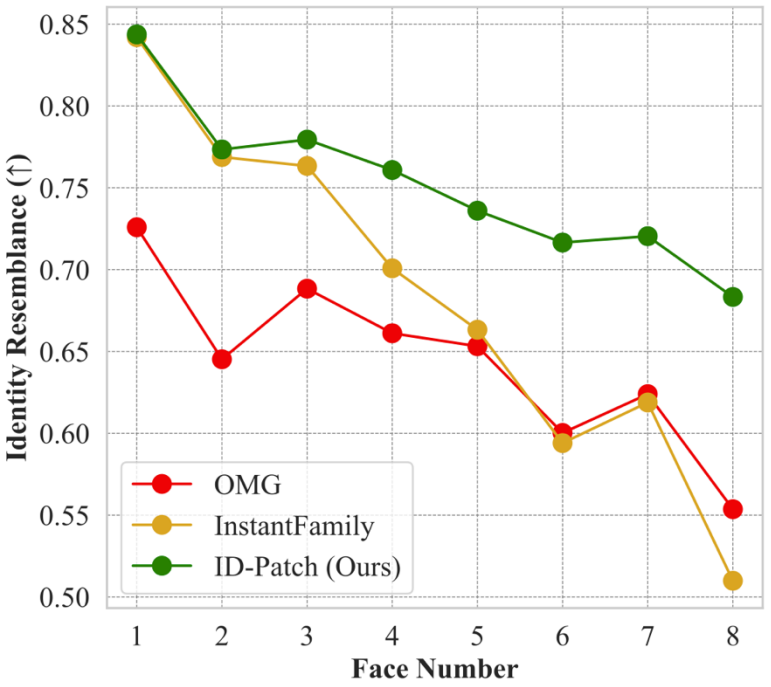
Pose-Free Generation



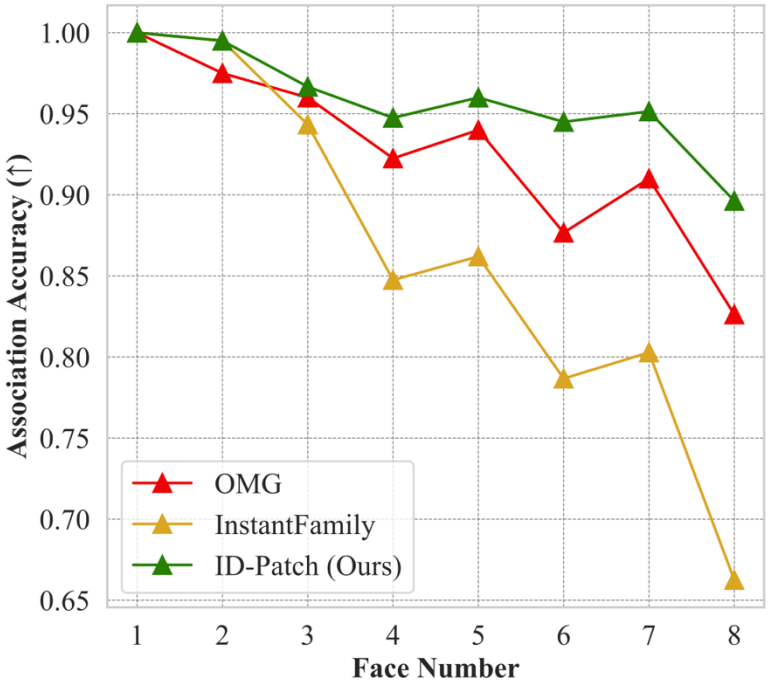
ID-Patch on OpenPose

Pose-Conditioned Generation

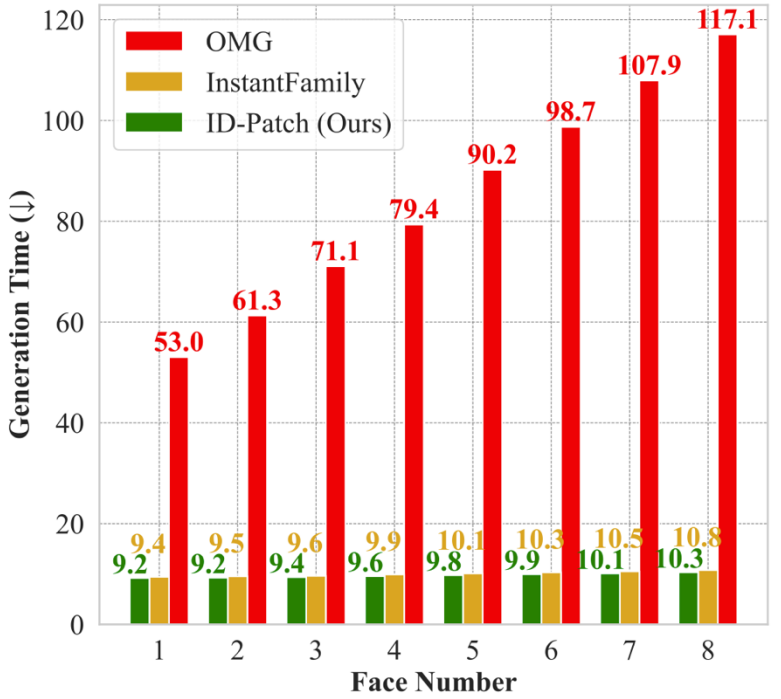
Performance Comparison



(a) Identity Resemblance



(b) Association Accuracy



(c) Generation Time

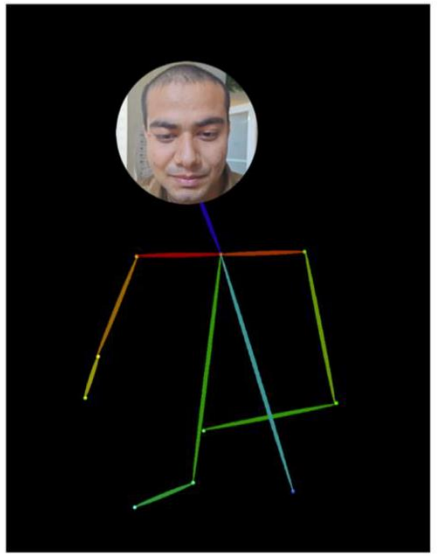
Cosine Similarity between face features

accuracy of identity-position association in generated images

$$\frac{1}{N}\sum_{i=0}^{N-1}\mathbf{1}\{i = s(i)\}$$

the time (in seconds) required to generate an image on an NVIDIA A100 GPU (excluding the time taken for model loading and image I/O)

Visualization Comparison

ID + Pose	OMG	InstantFamily	ID-Patch (Ours)
			
			

Visualization Comparison

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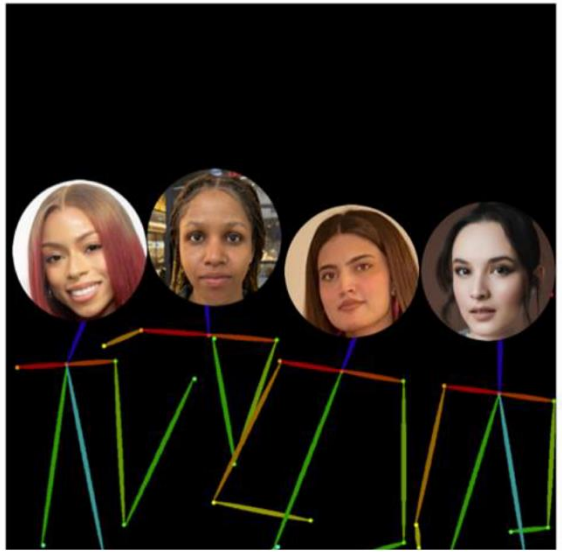			
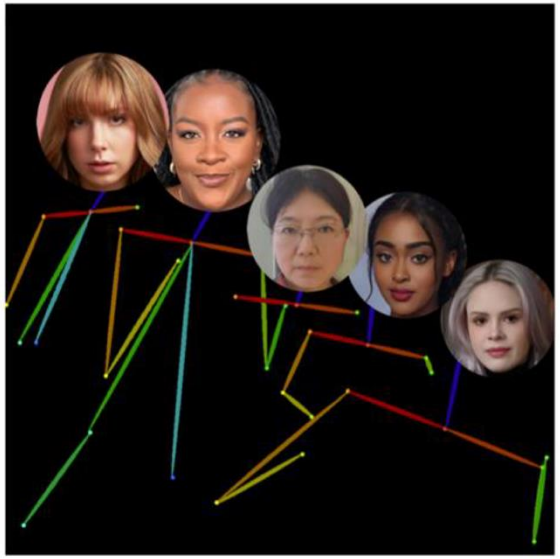			

Visualization Comparison

ID + Pose	OMG	InstantFamily	ID-Patch (Ours)