



Talking-Head Generation in Practice

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What Is Talking-Head Generation?

Goal: create a speaking face video

Input: image / audio / text / motion

Output: talking-head video

Uses: digital humans, education, meetings, entertainment



Motivation and Research Questions

The field is growing fast

- Many new models
- Many datasets
- Many evaluation metrics
- Hard to understand the full picture

Our goal: provide a clear and practical overview

We ask three questions:

How have talking-head models changed?

What datasets are used?

How do researchers evaluate models?



Our Study Framework

117 papers from 2021–2025

We analyze:

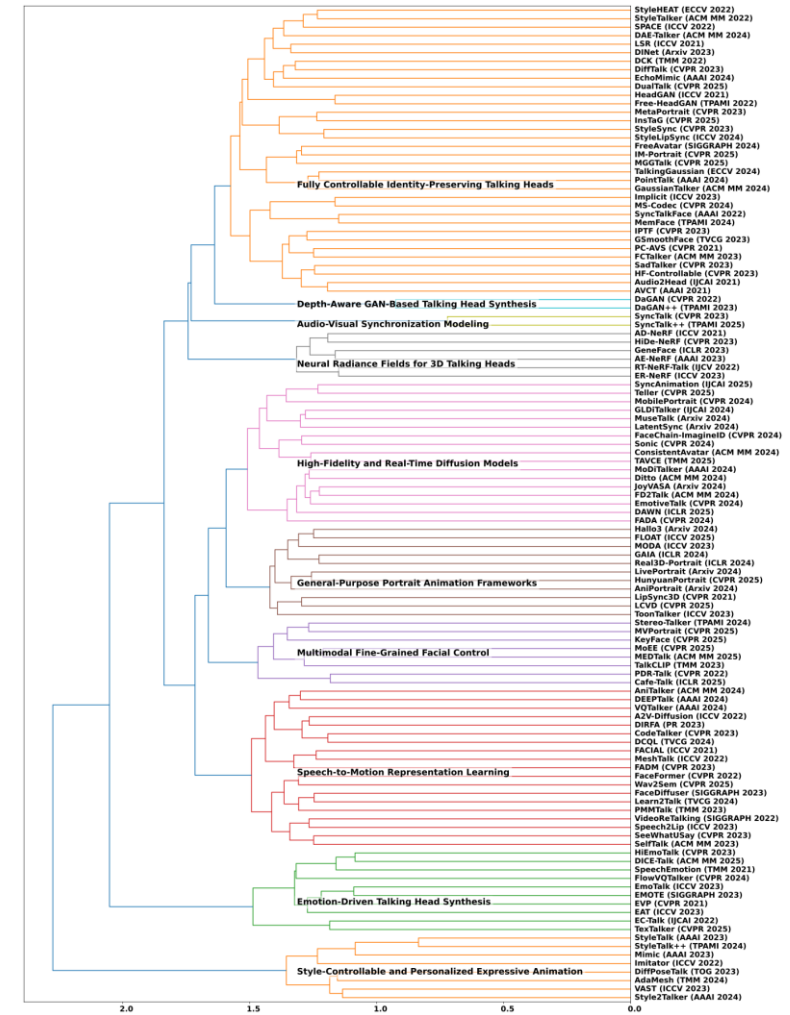
Model directions

Input signals

Datasets

Evaluation metrics

Methods: taxonomy + trend analysis



10 major research directions

Main Model Trend

From lip sync to rich communication

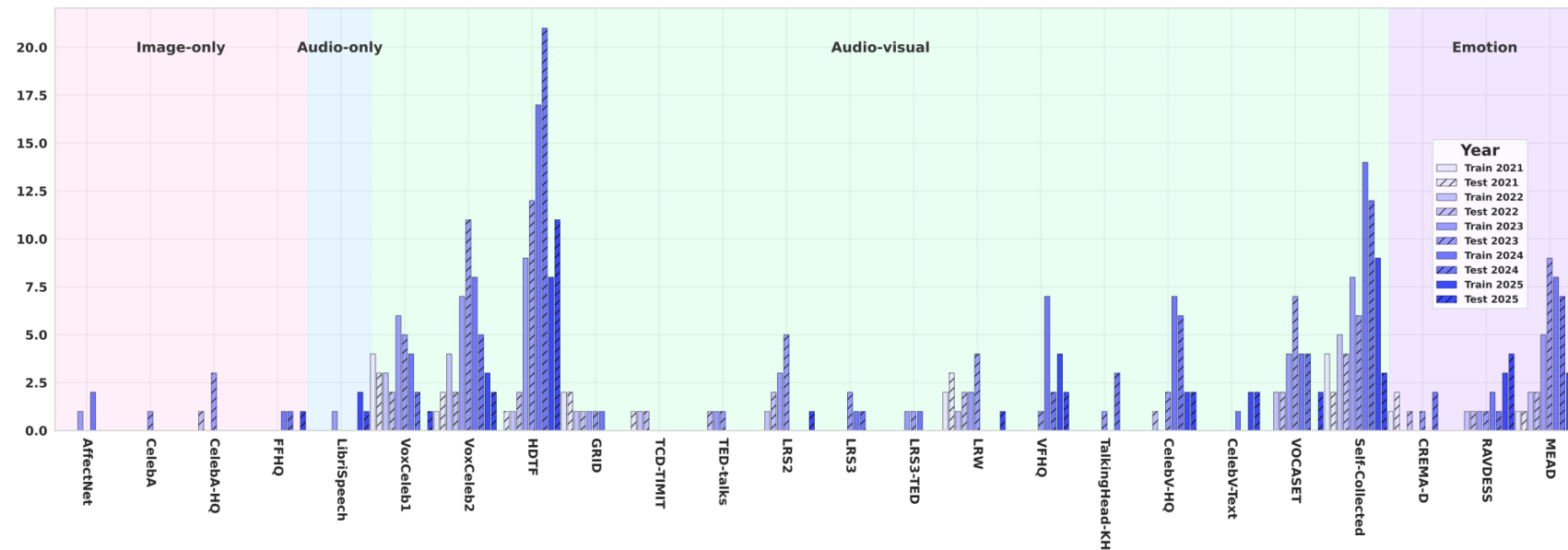
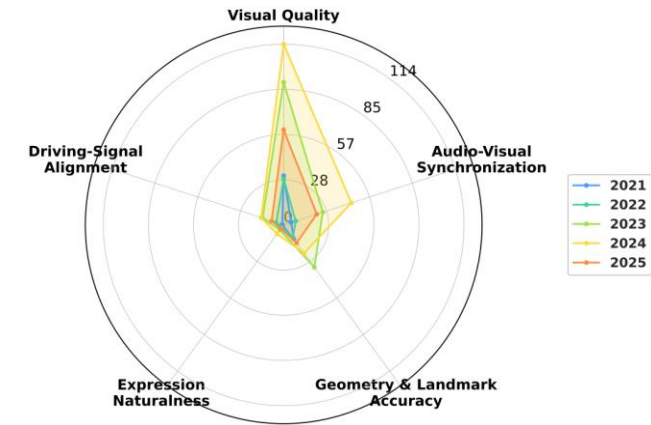
- Better facial motion
- More emotion and style
- Stronger identity preservation
- More user control
- More unified systems



Dataset Trends

Datasets are becoming more diverse

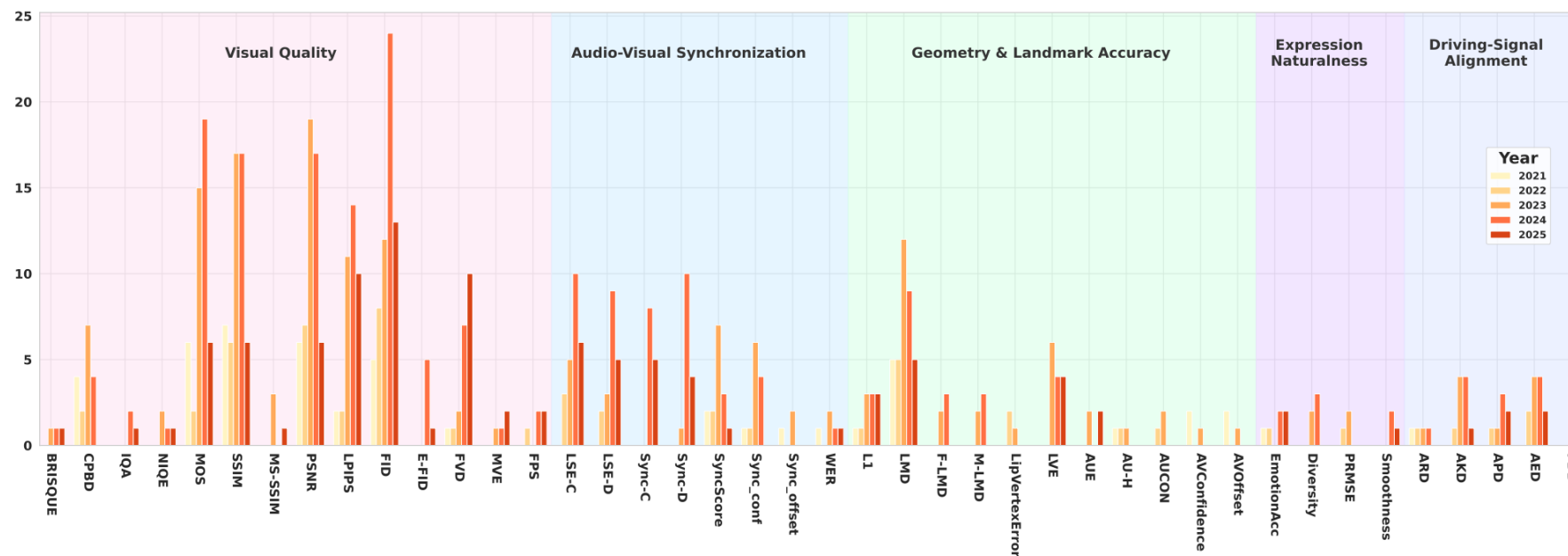
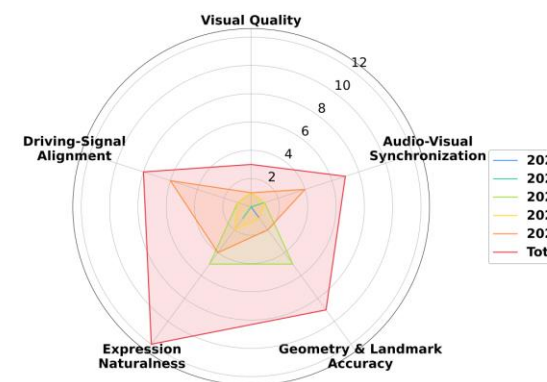
- Early: VoxCeleb, LRS, GRID
- Later: HDTF, CelebV-HQ
- More emotion datasets: MEAD, CREMA-D, RAVDESS



Evaluation Metric Trends

Evaluation is changing

- From visual quality
- To synchronization
- To geometry and motion
- To emotion and controllability



Practical Guidelines & Future

Better evaluation should include:

- Visual quality
- Audio-visual sync
- Identity preservation
- Motion stability
- Human evaluation

Future directions:

semantic understanding, low-shot personalization, long-term stability, ethics.

Related work: Zhang, Z., Wang, L., Zhang, Y., and Gao, Y.
“Temporally-Aligned Evaluation for Audio-Driven Talking Head Generation.”
arXiv:2606.01031, 2026.



Conclusion

Main message:

Talking-head generation is moving from visual realism to meaningful communication.

Our contributions:

- 117-paper survey
- Method taxonomy
- Dataset trend analysis
- Metric trend analysis
- Practical guidance





Thank you!

Questions & answers