Accurate Face Rig Approximation with Deep Differential Subspace Reconstruction

By Disney

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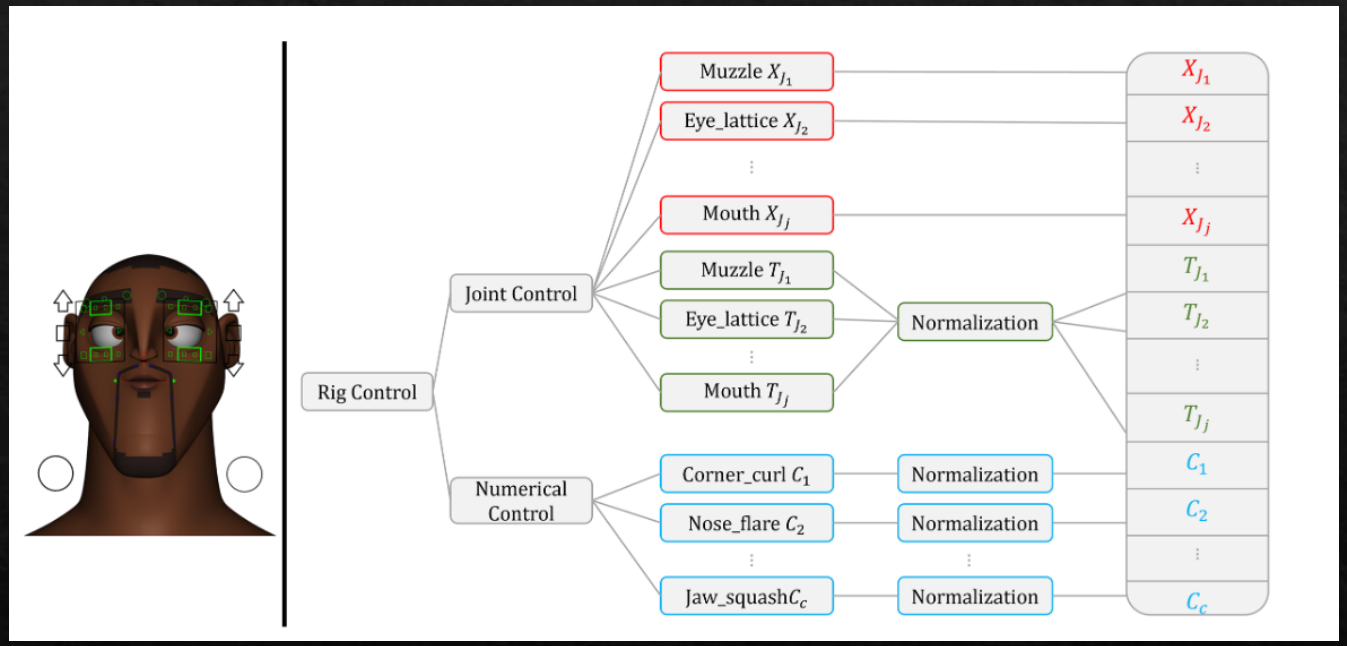
Introduction

- Is a way to approximate face mesh.
- Generalizable face rig
- Non-linear deformation

- Rig parameters + anchor point

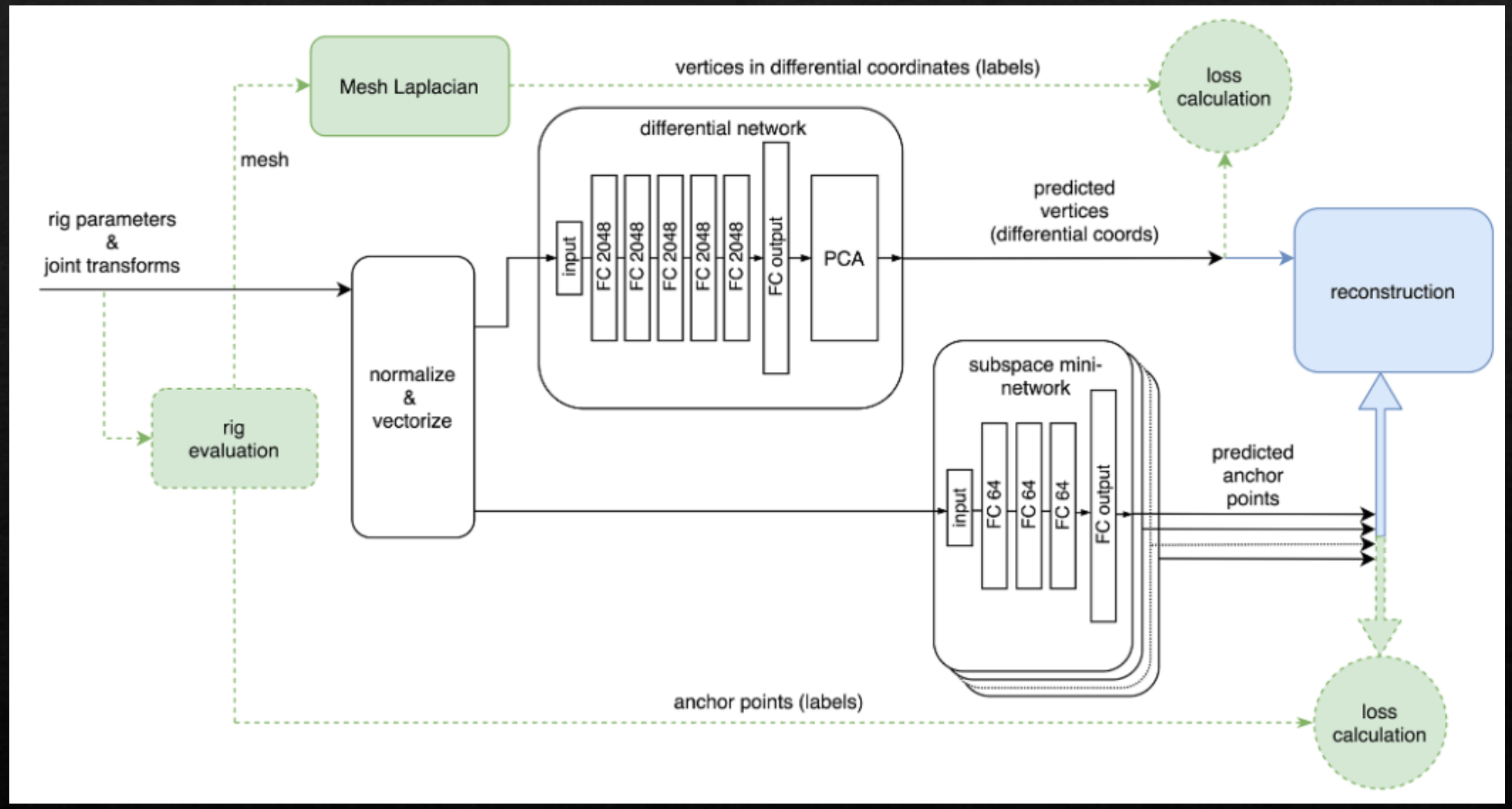
Input

- Multi-dimensional animator value



Estimation Method

- Estimation of deformations
- Estimation of anchor points
- Reconstruction


Mesh Laplacian
vertices in differential coordinates (labels)
loss calculation
mesh
differential network
input
FC 2048
FC 2048
FC 2048
FC 2048
FC 2048
FC output
PCA
predicted vertices (differential coords)
rig parameters & joint transforms
normalize & vectorize
reconstruction
rig evaluation
subspace mini-network
input
FC 64
FC 64
FC 64
FC output
predicted anchor points
anchor points (labels)
loss calculation

Training Environemt

Table 1. Statistics for the three test models.

	Agent	Bull	Matador
Vertices	4403	3669	3211
Face Height (cm)	25.12	84.28	26.03
Face Width (cm)	21.27	67.00	20.45
Numerical Controls	67	131	121
Joint Controls	20	20	20
Anchor	87	73	64
Differential PC	220	183	160

Tests

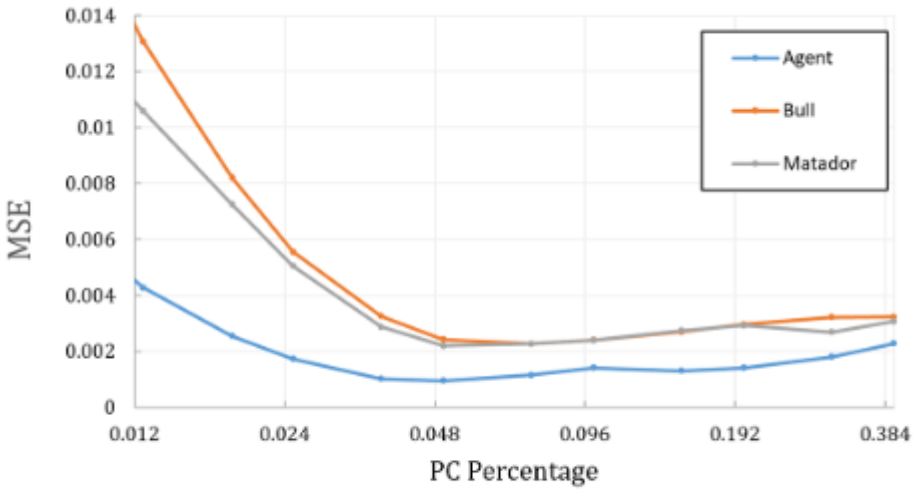
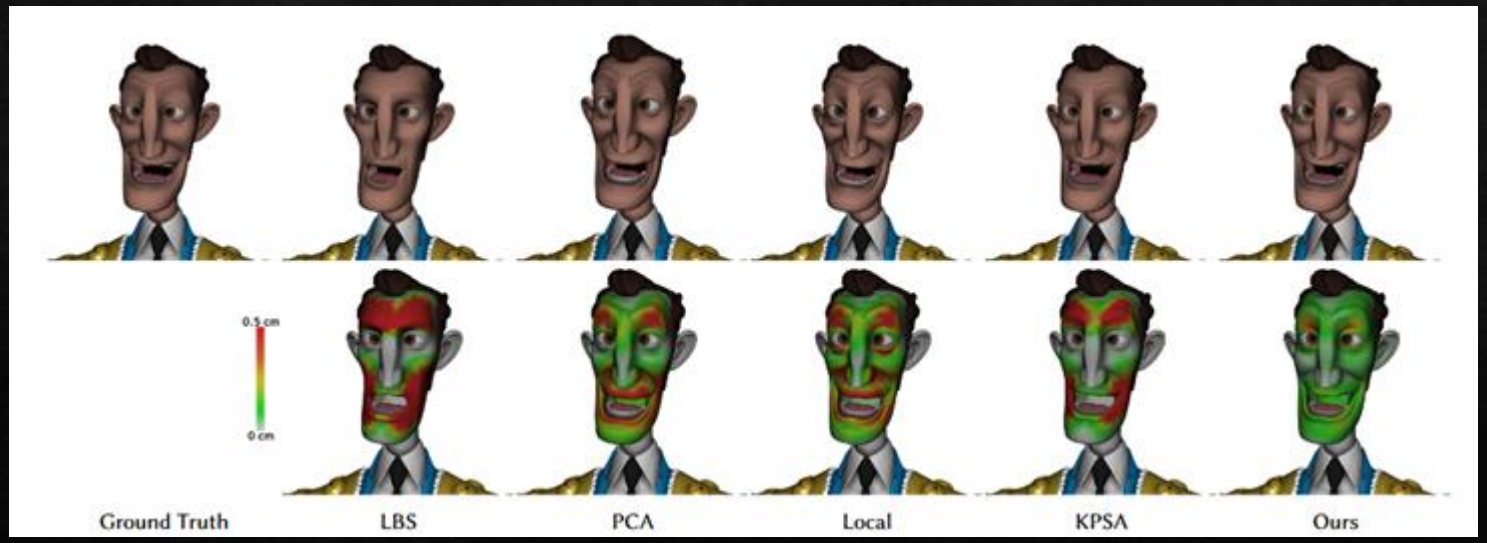


Fig. 5. Prediction error of differential network with varying PC percentage

Table 4. Prediction errors (Differential and Subspace) and reconstruction errors (Mean and Max) for the tests with different training data size.

	25%	50%	75%	100%
Differential	2.66×10^{-3}	1.57×10^{-3}	1.03×10^{-3}	1.53×10^{-3}
Subspace	3.91×10^{-3}	2.81×10^{-3}	2.07×10^{-3}	1.71×10^{-3}
Mean error	0.0301	0.0246	0.0195	0.0186
Max error	0.891	0.819	0.740	0.517

	Agent		Bull		Matador	
	Mean	Max	Mean	Max	Mean	Max
LBS	0.174	3.228	1.672	23.56	0.228	4.261
PCA	0.073	1.980	0.848	8.367	0.158	1.533
Local	0.072	0.689	0.521	5.779	0.155	1.106
KPSA	0.061	1.623	2.115	34.25	0.089	1.664
Ours	0.032	0.630	0.512	4.682	0.087	0.782



Thank you

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