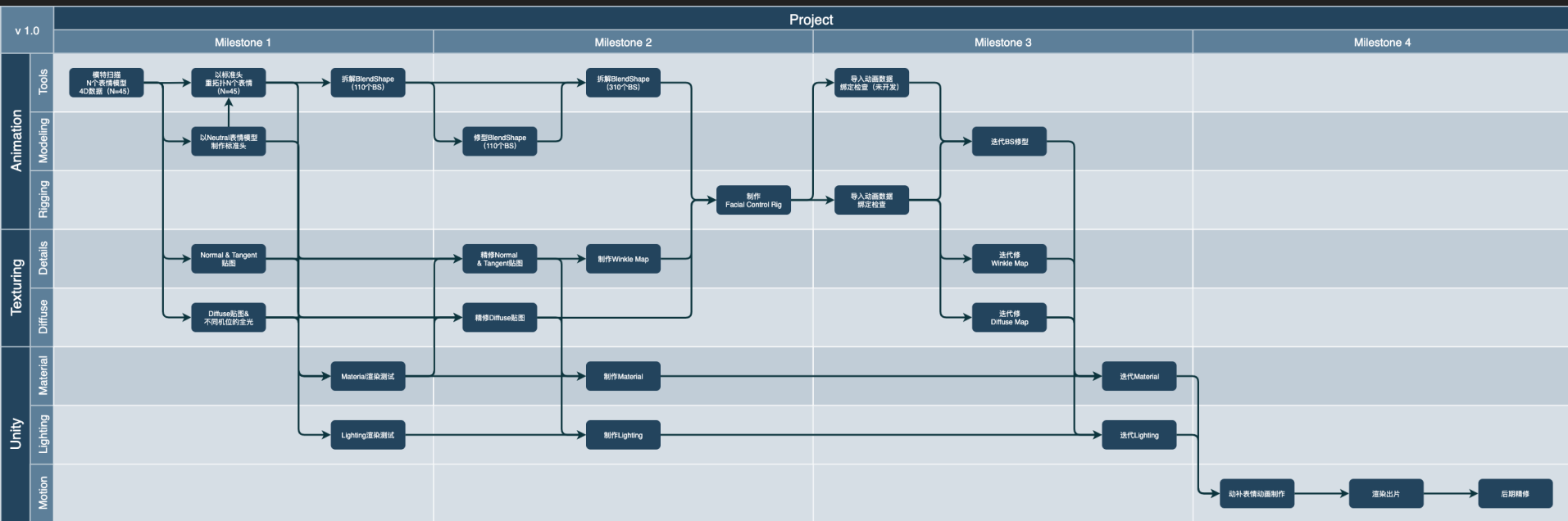


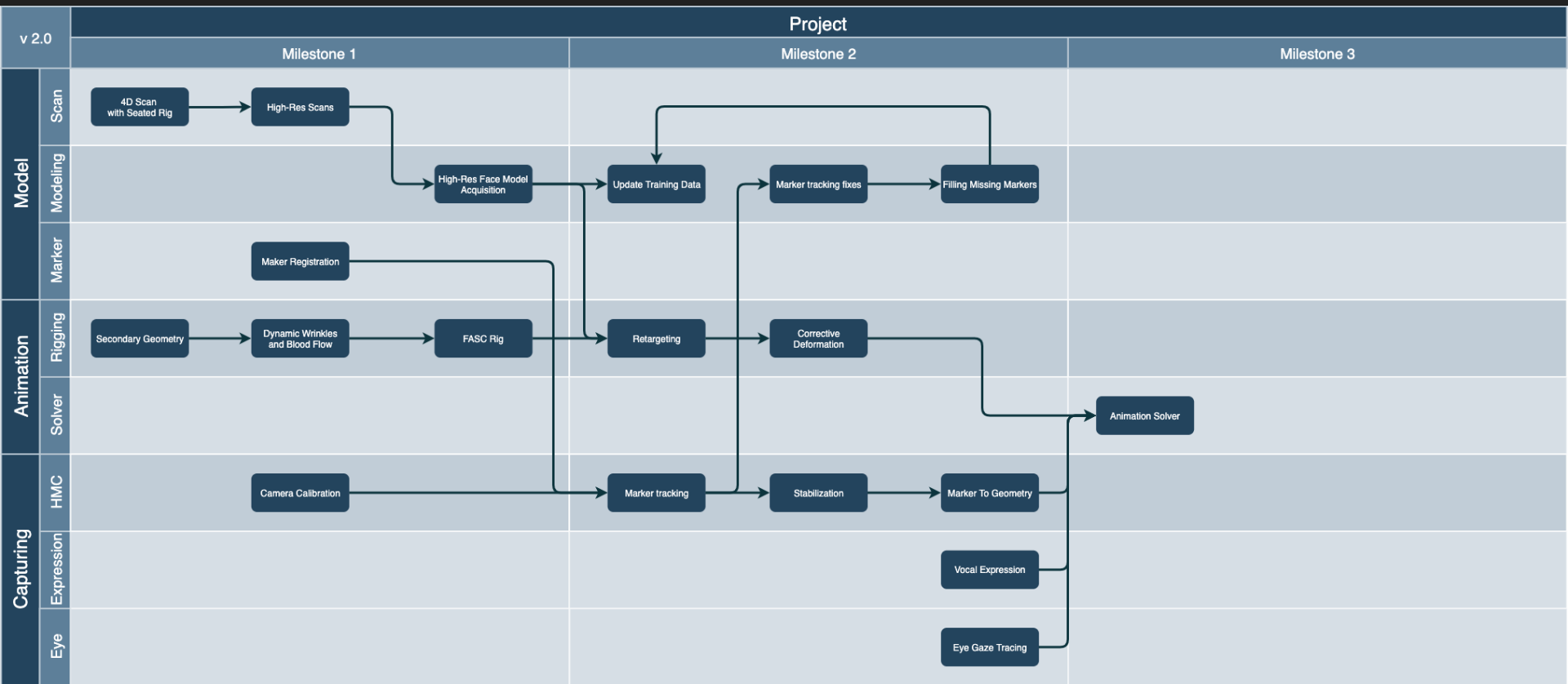
Character Creative Pipeline

Head

生产流程1.0



生产流程2.0



Problems



表情表达式

BlendShape制作

Wrinkle Map制作

Colour Map制作

Facial Rigging



真人扫描数据

模型重建

贴图重建

拆分BlendShape



表情驱动

语气驱动

语意驱动

面捕驱动



风格化

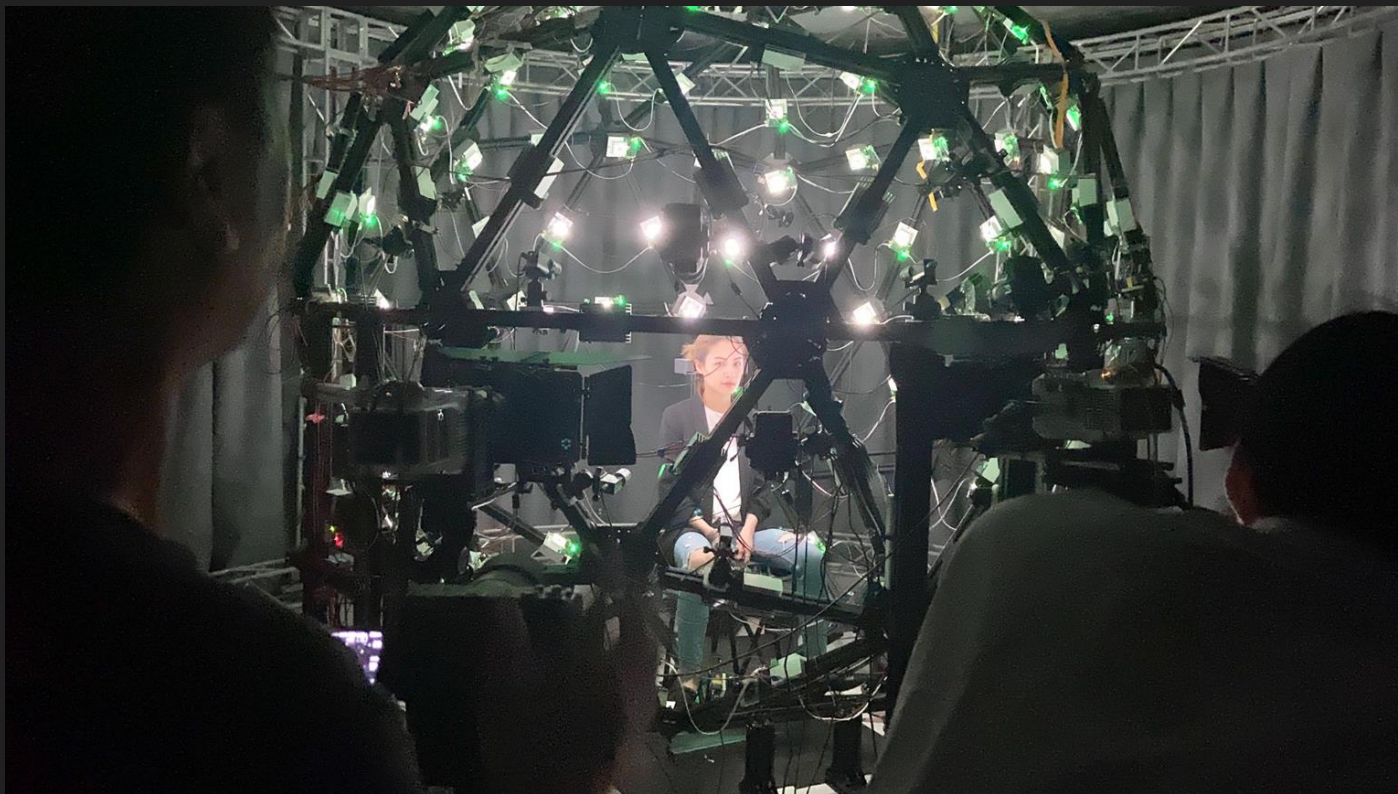
风格化模型

风格化贴图

风格化表情

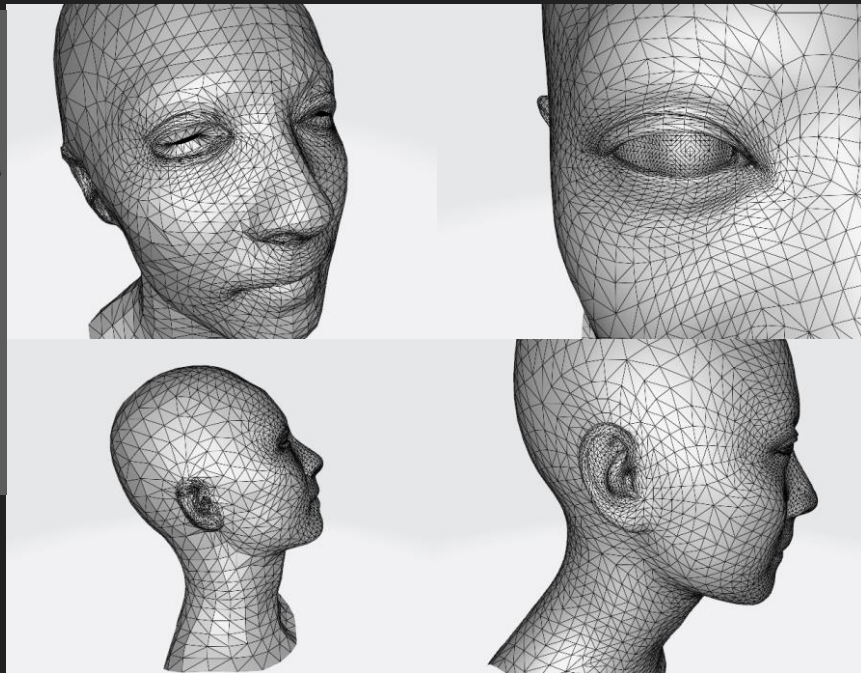
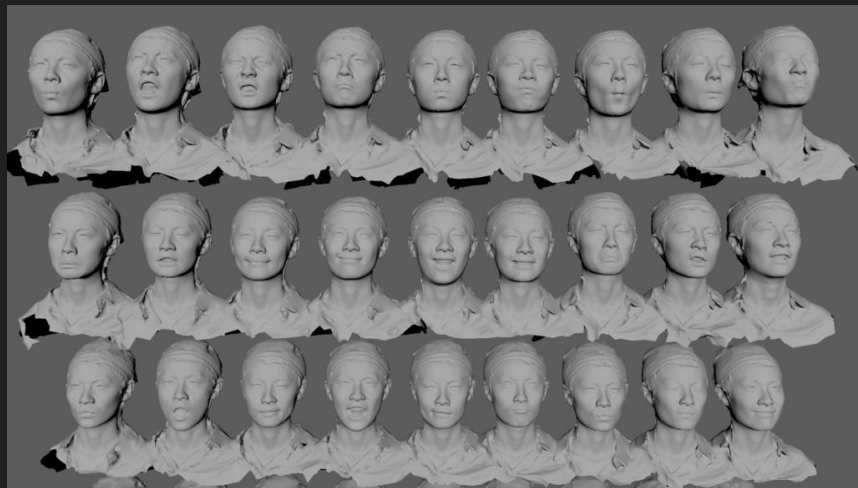
捏脸 (Data Augmentation)

4D Scan with Seated Rig



High-Res Face Model Acquisition

Facial modeling team



制作FACS表情

1

Remove unwanted geometry or stray parts from the scan (prepare for wrapping)

4

Subdivide base mesh and project scanned details; starting with a low subdivision level and gradually working up

2

Wrap base topology in Wrap3

5

Clean any noise from projected scan and remove hair, skull cap, etc

3

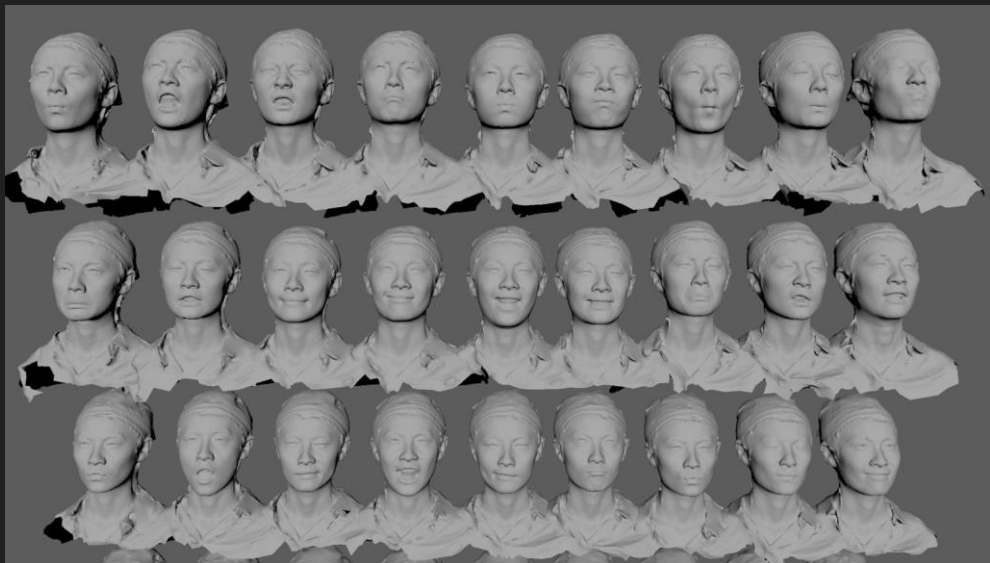
Import into ZBrush and cleanup topology flow

6

Apply surface details using a range of techniques; alphas, hand sculpting, high pass from diffuse map, etc

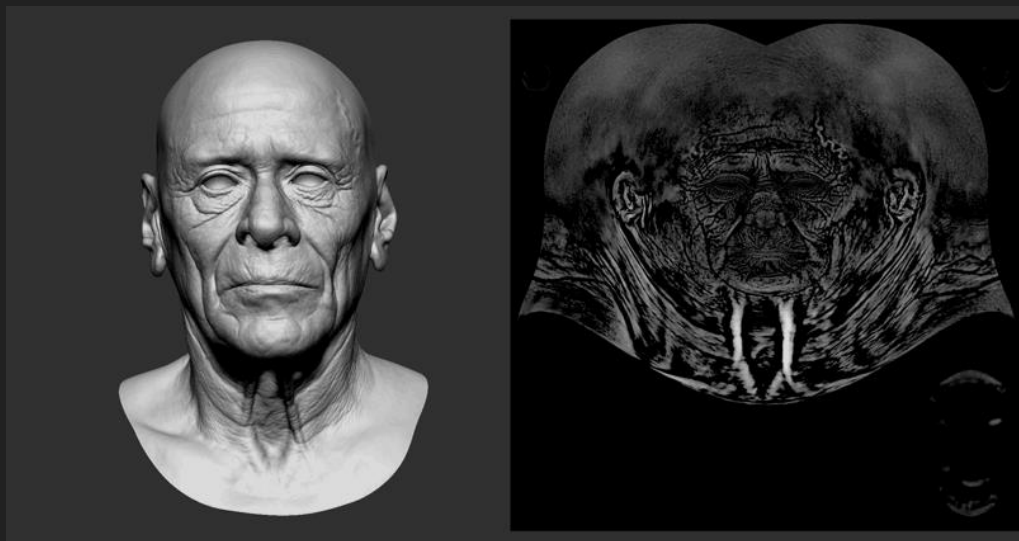
FACS Rig -- BS 拆分

- Well-defined Blend Shape 组合
 - Neutral表情作为Baseline
 - 线性组合出任意自然表情
 - 尽量精简的集合
 - 可精修的结果
 - 分界的规则清晰可理解



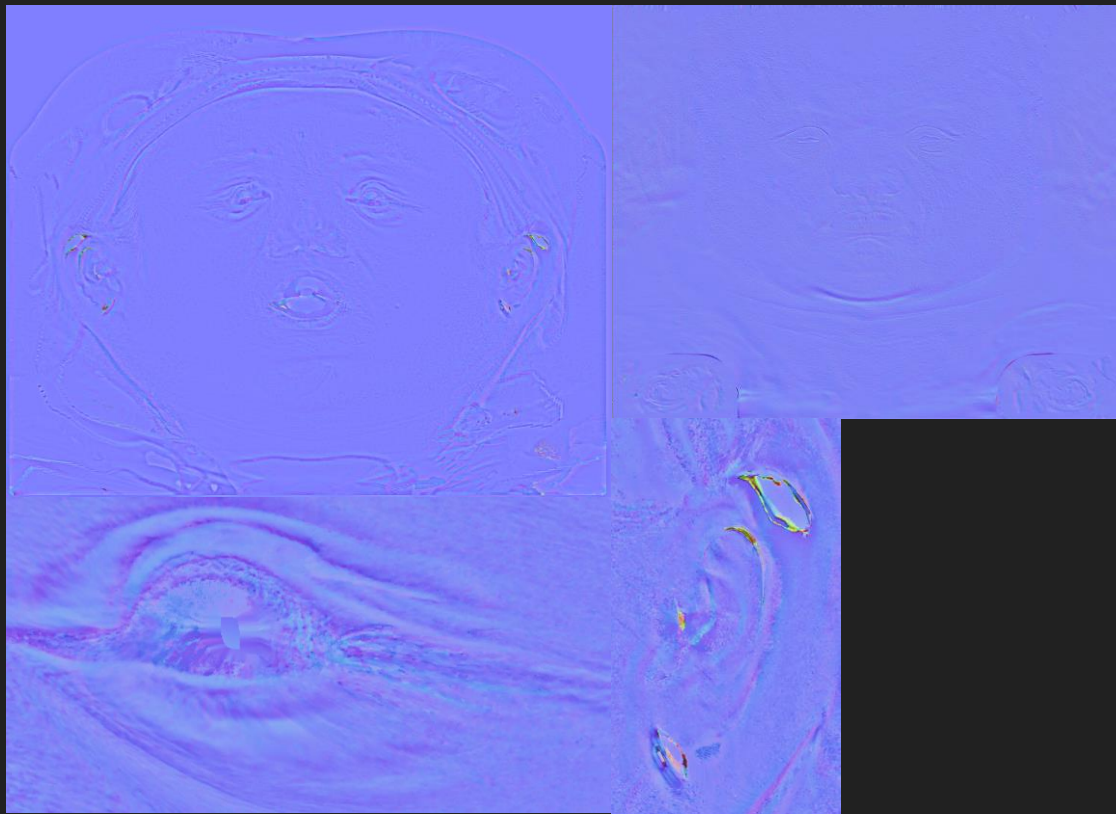
FACS Rig -- Wrinkle Map

- Well-defined Wrinkle Map
 - Neutral表情作为基本UV空间
 - 于UV空间线性组合出任意自然表情
 - 尽量精简的集合
 - 精确分块Masks



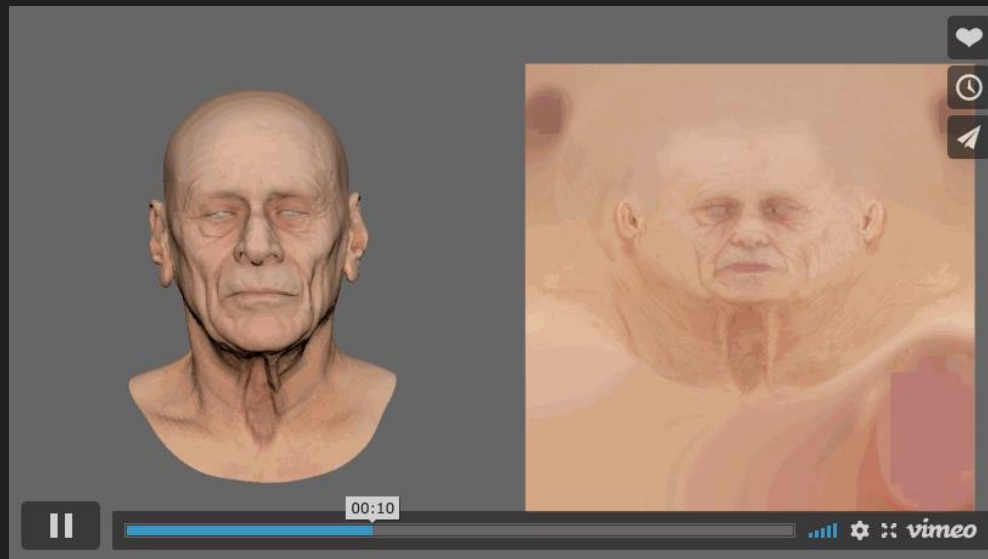
真人扫描数据 -- 贴图重建

- Well-defined 贴图
 - UV空间要平整
 - 没有坏掉的地方
 - 保留细节
 - 同理应对Colour相关
 - 减少噪点
 - 充分利用贴图
 - 按照展示重要性占比
 - 主要器官不能扭曲



FACS Rig -- Colour Map

- Well-defined Colour Map
 - 同Wrinkle Map处理



FACS Rig -- Secondary Geometry

- Well-defined Secondary Geometry
 - Jaw
 - Eyelashes
 - Eyebrows



风格化 -- 模型

- Well-defined 风格化模型
 - 根据用户输入改变模型风格
 - 风格化过程中保持模型基本特征不变
 - 模型风格化程度可控
 - 模型的风格化过程连续，可获取风格化过程的中间状态

风格化 -- 贴图

- Well-defined 风格化贴图
 - 根据用户输入改变贴图风格
 - 风格化过程中保持贴图基本特征不变
 - 模型风格化程度可控

风格化 -- 表情表达式

- Well-defined 风格化模型
 - 表情符合选定的风格
 - 风格化表情与真人表情间存在某种映射关系
 - 风格化产生的表情过渡自然
 - 风格化表情可以多角度查看



风格化 -- 捏脸

- Well-defined 捏脸
 - 捏脸模型特征与真实人相似
 - 捏脸模型在真实人脸基础上适当美化
 - 真实人脸照片个性化影响最终效果

Marker Tracing



Maker Registration

WorkFlow represent by toolset

On demand complexity

Plentiful middleware ecosystem



Camera Calibration

Every platform supported

Global accessibility

Cross device Co-creativity



Marker Tracking

Keeping creators engaged

Delivering new features

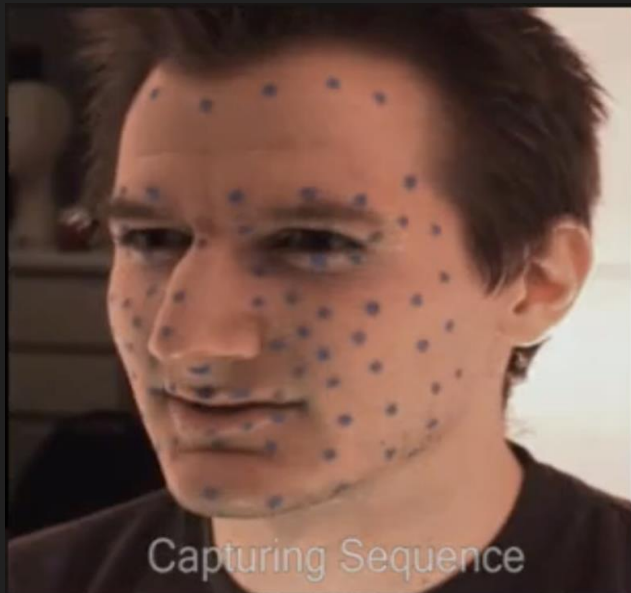
Modularity configurable

Marker Tracing



Shape Prediction

Marker To Geometry



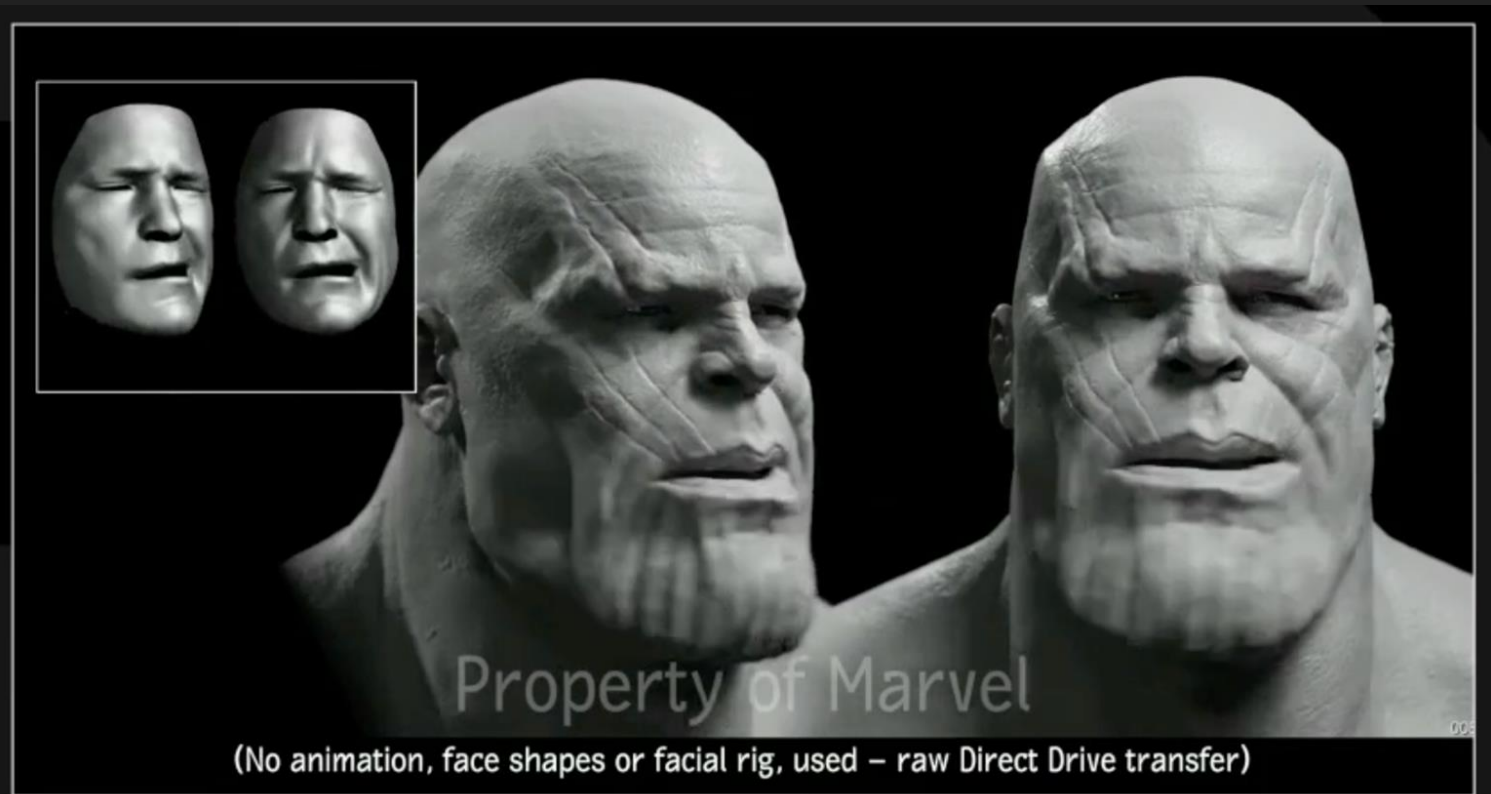
Capturing Sequence



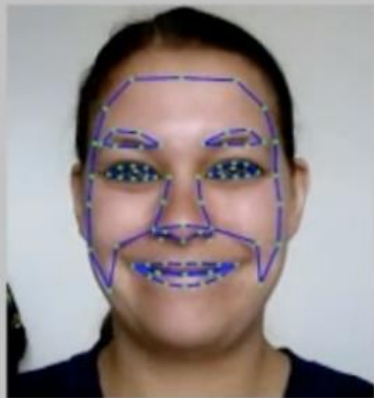
Real-Time Animation

Pose-Space Animation and Transfer of Facial Details
Bickel et al. 2008

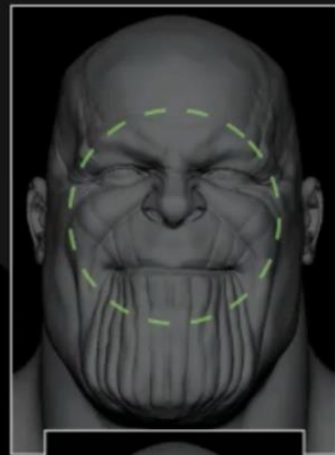
Shape Prediction



Shape Prediction



Corrective Deformations



Dynamic Texture Details

Wrinkle

Blood

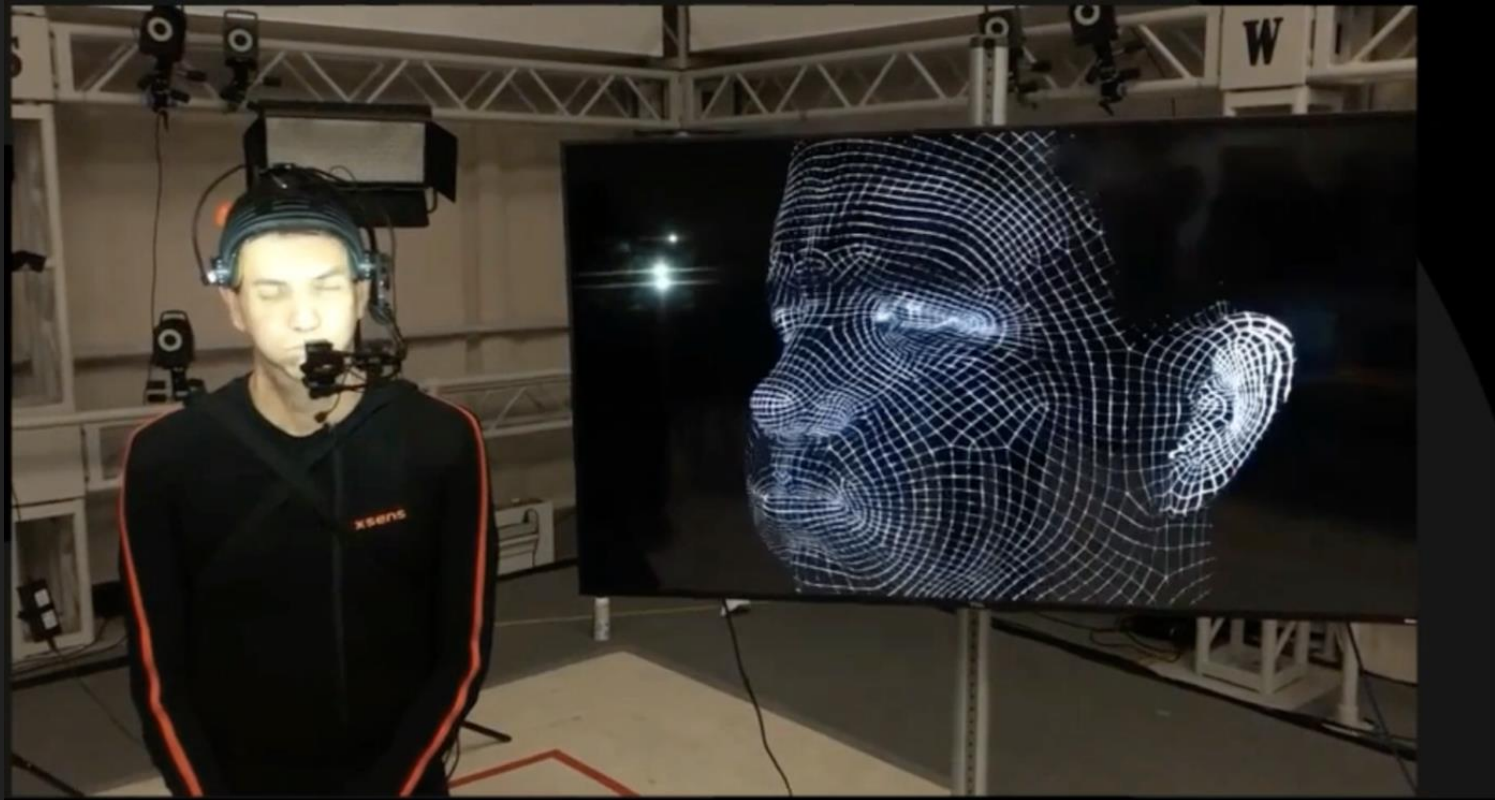


Secondary Geometry

Jaw

Eyelashes

Eyebrows



Animation Solver



Define Function

Facial Rigging



Define Loss



Training Data

Animation Solver Output
Video/Image
VS.

Disney Studio's Research
Medusa

DI4D training data session
USC-ICT Light stage scans
Other very accurate
photogrammetry session

Problems

Motion Capture

Rigging

Marker Layout

Camera Calibration

Retargeting

Marker Registration

High-Resolution
Acquisition

Secondary
Geometry

Marker Tracking

Stabilization

Corrective
Deformation

Marker Tracking
Fixes

Marker To
Geometry

Dynamic Wrinkles
and Blood Flow

Filling Missing
Markers

Eye Gaze Tracking

FACS Rig

 **Manual**

 **Custom**

 **ML**