Advances in FR Biometric Systems
BCC September 21, 2005
Animetics Core Technologies

3D Model Generation: Diffeomorphic Mapping Via Computational Anatomy

Photometric Tracking via Luminance Representation

Human in the Machine

Rigid Head Tracking through the Projective Geometry

Expression Tracking through the Projective Geometry
Computer Vision
(Finite Dimensional Matrix Groups)
Computational Anatomy:
Constructing the Metric Spaces of Human Shape
The Metric on Anatomies

Metric distance is the length of the flow connecting anatomies.
Animetrics Core Technologies

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Expression Tracking through the Projective Geometry
Single View Geometry Generation
More Advanced Texturing
3View Geometry Generation
TwoView Geometry Generation
Feret FR Degradation with Pose
Feret FR Degradation with Pose

FRR

12 degrees

22 degrees

40 degrees

FAR
3DModel FR Boosting

Feret 12 Degree

FAR vs FRR graph with a bar chart.
3D Model FR Boosting

FRR

FAR

Feret 22 Degree
3D Model FR Boosting

Feret 40 Degree

FRR

FAR
Human in the Machine

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Photometric Tracking via Luminance Representation

Rigid Head Tracking through the Projective Geometry
Expression Tracking through the Projective Geometry
Animetrics 3D Models Carry Luminance

- Mesh carries rigid motion \((\text{SO}(3) \times \mathbb{R}^3)\) for dynamic tracking
- Mesh carries luminance field
Active Luminance Model
Luminance on FRGC Uncontrol
Luminance Tracking
Animetrics Core Technologies

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Rigid Head Tracking through the Projective Geometry

Expression Tracking through the Projective Geometry
• Mesh carries rigid motion (SO(3)xR3) for dynamic tracking

• Mesh carries luminance field

• Meshes all articulate

• Meshes carry expression vector fields for articulatory motion
Models Articulate and are Expression Ready
Models Articulate and are Expression Ready
Animetics geometric and photometric technologies integrated with Video Applications.

Face Capture

3D Camera

3D Avatar Generation

2D Camera

3D Representation

Rigid Motion Tracking
Expression Tracking
Photometric Tracking

Video Input
Rigid Tracking
Rigid + Photometric Tracking

Output

Optimized data for registration and ID including pose, expression and photometric normalization.
Thank-you