Exploring Photobios
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“Face Movie” in Google Picasa
• Select multiple photos in Picasa
• Click Create → Movie → From Faces

© Photos: Ariel McIlrandon
Create a “This is Your Life” Video

Chronological

© Photos: David Simons

1 photo per week for 8 years!

Create a “This is Your Life” Video

+ registered (eyes aligned)

YouTube

a photo a day
dickflashwhirr
for three-and-a-bit years

Manually created version

© http://dickflashwhirr.blogspot.com
Our Method

- Unstructured photo collection
- Completely automatic

Method Overview

Similarities between photos → Photo ordering → Rendering & Analysis of cross dissolve

Method Overview

Pairwise Similarity

Similarity between 2 photos = Head Pose + Facial Expression + Time

© Photos: Amit Kemelmacher
Pose Estimation

Face detection
Bourdev and Brandt '05

Fiducial points detection
Everingham et al. '06

2D registration

Estimate 3D pose
Template 3D model

Pose Estimation

Face detection
Bourdev and Brandt '05

Fiducial points detection
Everingham et al. '06

3D registration and frontal pose

Estimate 3D pose
Template 3D model

Aligned Images after 2D Registration
(with different poses)

Warped Images after 3D Registration
Facial Expression Similarity

We use Local Binary Patterns – LBP (Ahonen et al. ‘06)

Use center pixel’s value as a threshold for comparing with its 8 nearest neighbors.

Facial Expression Similarity

• Each cell is represented by a histogram of LBP values
• Concatenate histograms into feature vector

Compare concatenated histograms between 2 images

Facial Expression Similarity

Chi-squared distance
**Method Overview**

- Similarities between photos → Photo ordering → Rendering & Analysis of Cross-dissolve

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**Face Graph**

Given 2 images, find shortest path using Dijkstra’s algorithm

Edge weight = “distance” between images

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**Automatically Generated Transition**

Least cost path through Face Graph from Source to Target

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**Method Overview**

- Similarities between photos → Photo ordering → Rendering
Render the Sequence

• **Goal:** Give impression of natural motion

• **Morphing = warping + cross-dissolve**
  – needs accurate correspondence

• **Cross-Dissolve only:**
  – Because images are in approximate local alignment, gives the appearance of synthesized motion

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Linear Cross-Dissolve

\[(1-t) + t\]

\[t = 0, \ldots, 1\]

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Edge Approximation

Edge = Sin

\[\sin\]
Cross-Dissolve of Sine Waves

\[ \sin(mx) \quad \sin(mx + d) \]

\( d = \text{phase shift} \)

Cross-dissolve = \( c_1 \sin(mx) \sin(mx + k_1) \)

Contrast

Low contrast in mid-transition

Large phase shift

Speed

Ease-in ease-out dynamics

Large phase shift

Contrast boosted
Lighting

Cross dissolve = light motion

Results

“Face Movie” in Google Picasa

• Select multiple photos in Picasa
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Example Result
Growing up

500 Years of Female Portraits

- A similar idea applied to female portraits in Western Art

Philip Scott Johnson, 2007