Goldsmiths
UNIVERSITY OF LONDON

Computational Creativity Group

Computational Creativity Autumn School II

Building an Automated Painter

(Practical and Cultural Aspects)

Simon Colton

Computational Creativity Group
Department of Computing
Goldsmiths College, University of London

ccg.doc.gold.ac.uk

Check us out...

ccg.gold.ac.uk

- Computational Creativity Group at Goldsmiths
  - Two PhD students, six RAs, three academics, one administrator
- We perform AI research, where we study fundamental notions of creativity in software via applications to:
  - Graphic design, mathematical discovery, the visual arts, video game design, creative language and fictional ideation

Please visit:
ccg.doc.gold.ac.uk

Twitter:
@GoldsmithsCCG
#goldccg

About us

Who we are, what we do, contact details

News | Events | Images | Tweets

Members of the Group

Robin Baumgarten
PhD Student (Imperial)

Cameron Browne
Research Fellow

John Charnley
Research Associate

Simon Colton
Professor

Joe Corneli
Research Associate

Michael Cook
Research Associate

Jeremy Gow
Lecturer

Rose Hepworth
Research Associate

Maria Teresa Llano
Research Associate

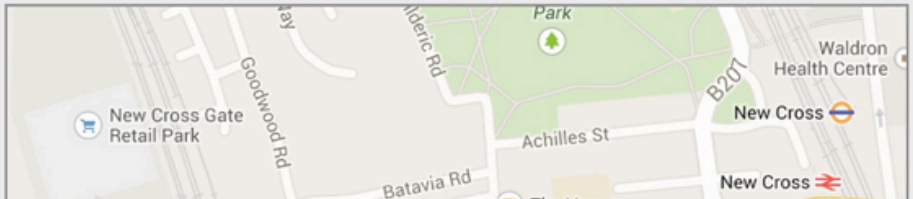
Alison Pease
Lecturer (Dundee)

Ramin Ramezani
PhD student (Imperial)

Contact Us

Simon Colton is the head of the group, and can be contacted at: s.colton@gold.ac.uk

We are based in the Department of Computing on the Goldsmiths campus in New Cross, London:



Aims Today

- To give you an introduction to The Painting Fool project and to automated painting in general
- To provide some technical details about how to get software to creatively produce images
- To show you some of the artworks produced by the software some of and the interesting sub-projects
- To make you aware of some cultural issues which are raised when you talk about creative software in artistic circles

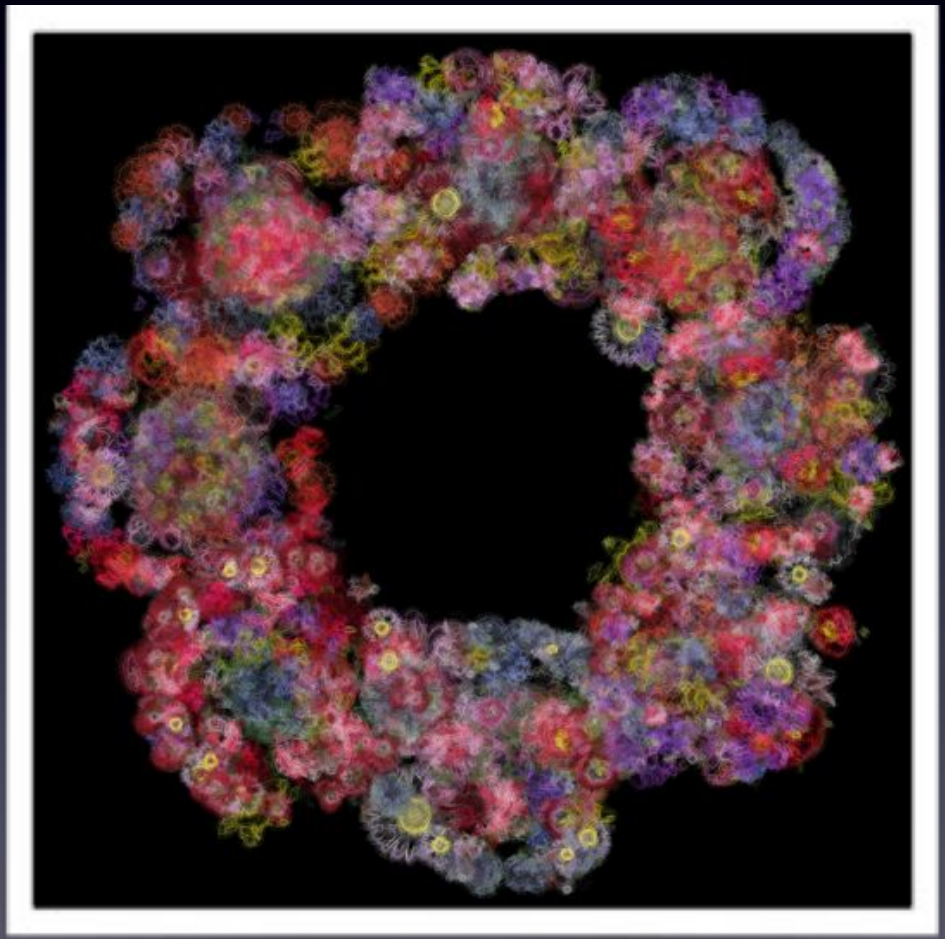
These will be my conclusions...

- Never forget that painting is a cognitive process and should be automated from an AI perspective
- You will have to combine dozens of approaches in order to get something similar to a painter
- You can't build an automated painter without addressing many of the philosophical issues of the field
    - You will have to manage the public perception of creativity in software as much as you will have to advance technically... work with journalists if you can
- It's a good idea to exhibit the artwork produce, in order to get feedback and change opinions

The Painting Fool

Project Overview

- Aim: to build a system which is - *one day* - taken seriously as a creative artist in its own right.
- Involves graphics, NLP, AI and vision: painting is very much a cognitive process
- Around 10 years of work (a dozen years of software)



www.the*painting*fool.com

The Painting Fool

Project Overview

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- Around 10 years of work (a dozen years of software)

"Simulating artistic techniques means also simulating human thinking and reasoning, especially creative thinking. This is impossible to do using algorithms or information processing systems"

Strothotte and Schlechtweg
Non-Photorealistic Computer Graphics
Morgan Kaufmann, 2002

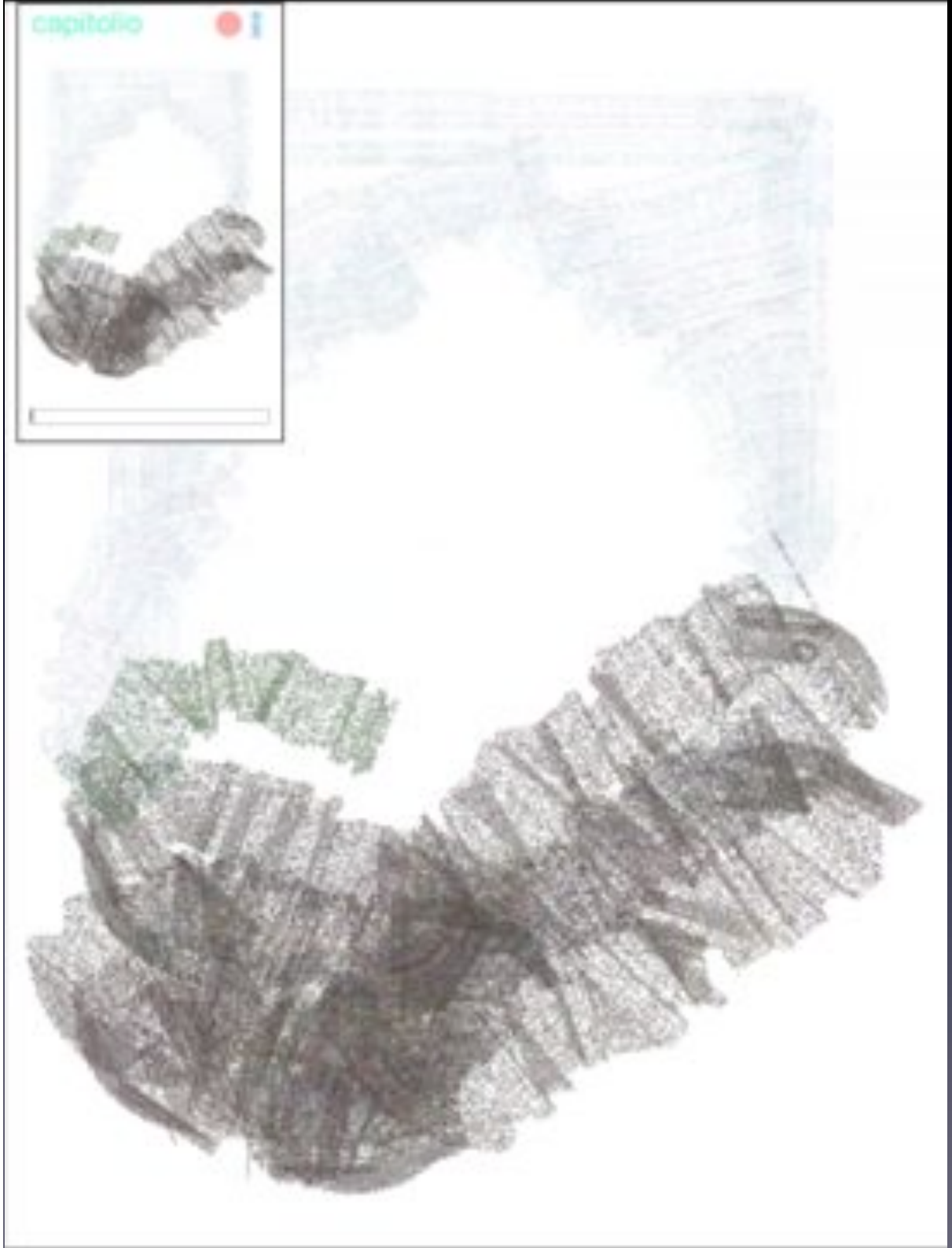
www.the*painting*fool.com

The Painting Fool

Stages of Development

- Non-photorealistic rendering (skill)
- Emotional modelling (appreciation)
- Generative art (imagination)
- Multimedia art (skill and imagination)
- Live portraiture (skill, appreciation, imagination, intentionality, learning and reflection)

Stage 1:
Non-photorealistic Rendering
(Skills)

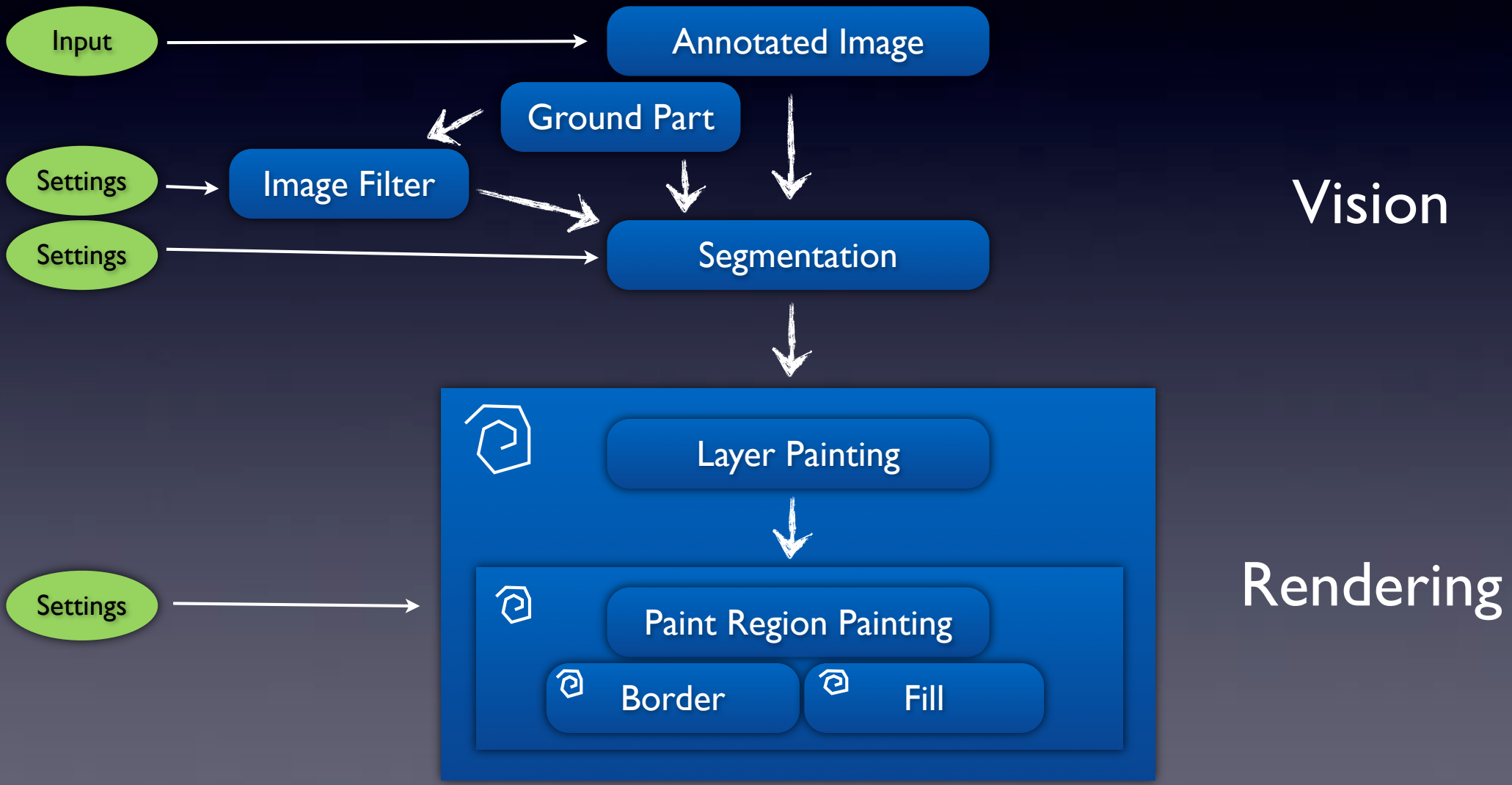


Stage 1

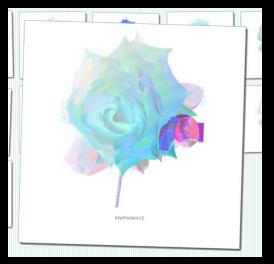
Build a non-photorealistic rendering system for photos. Uses image filtering, image segmentation, curve fitting, natural media simulation, filling routines, transformations, etc.

Skill-based

Graphics Workflow



Demonstration



- Filter Feast software

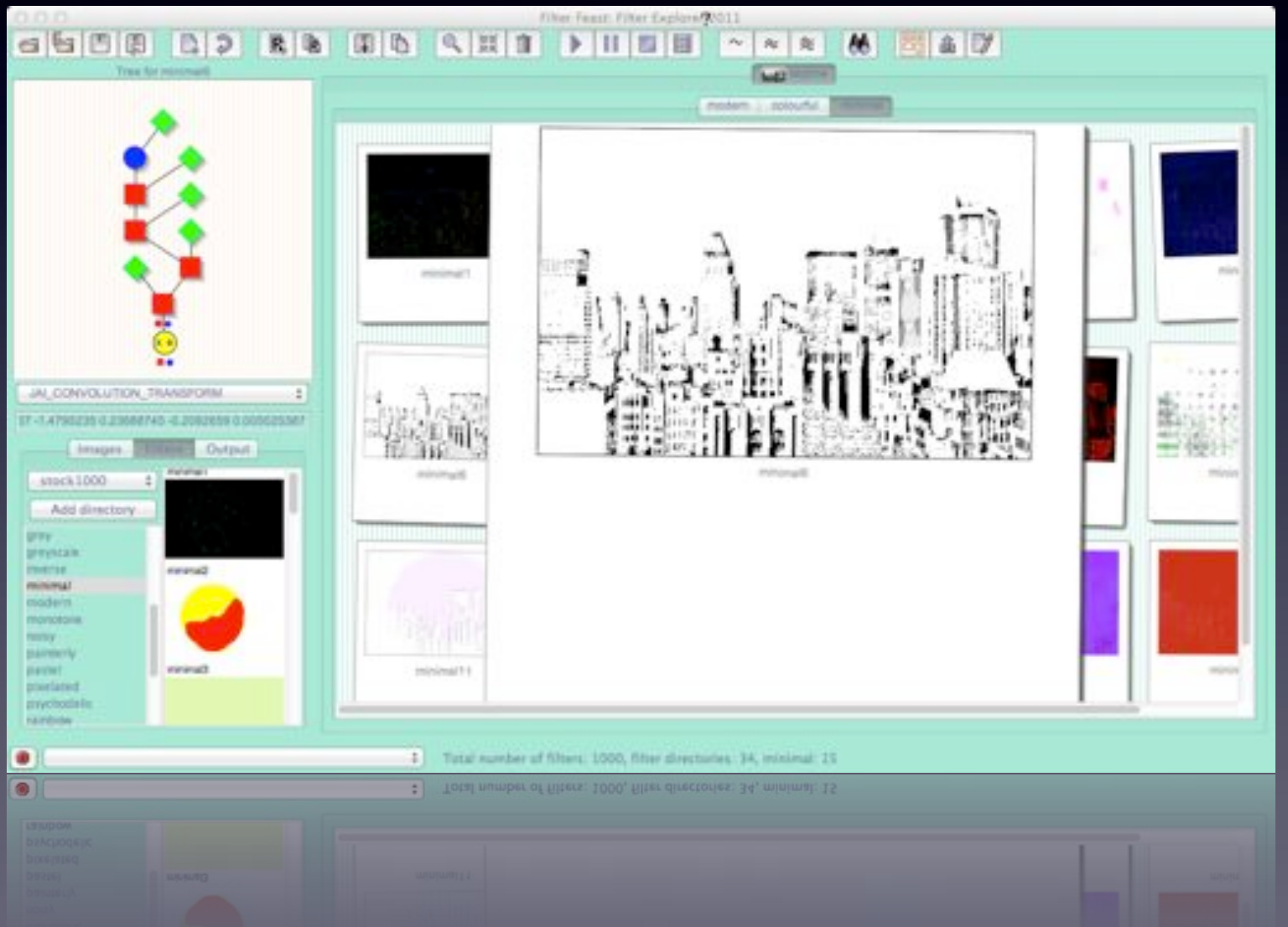
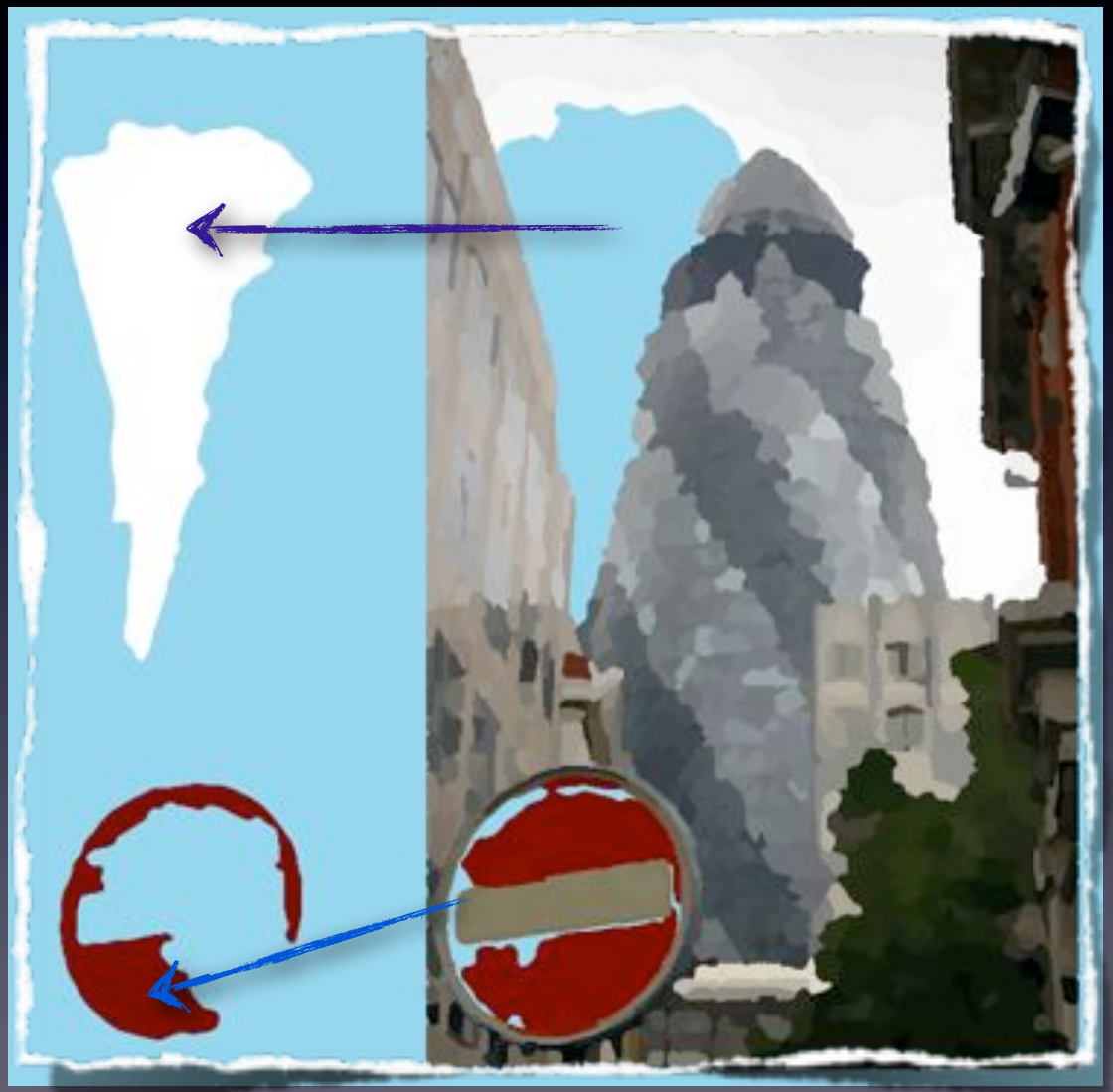


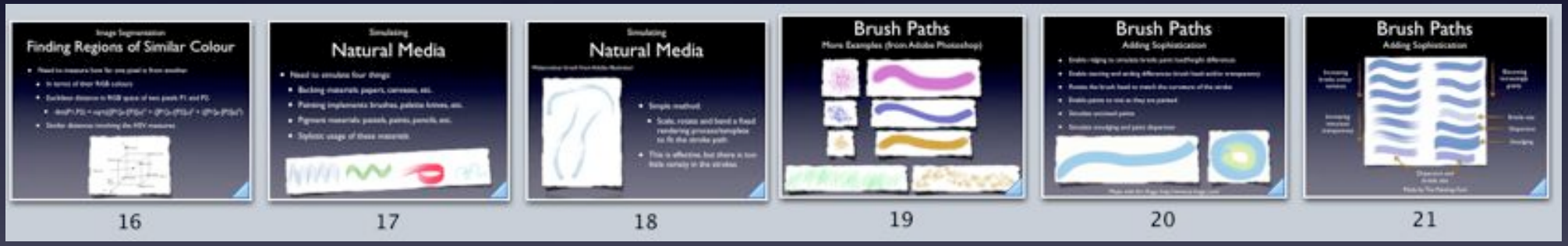
Image Segmentation

Example - 1000 regions



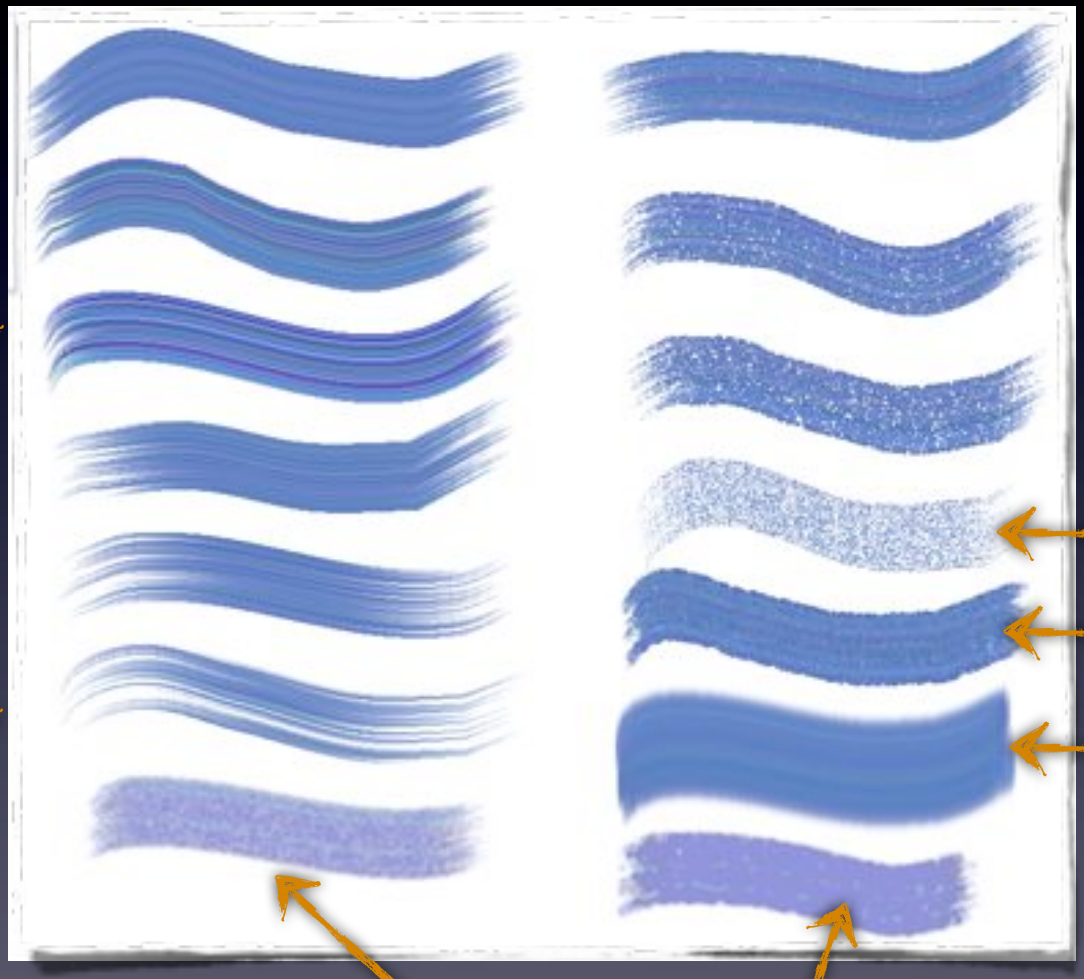
Skipping Some Slides

Non-Photorealistic Rendering



Brush Paths

Adding Sophistication



Increasing bristle colour variance

Increasing intro/exit transparency

Becoming increasingly grainy

Bristle size

Dispersion

Smudging

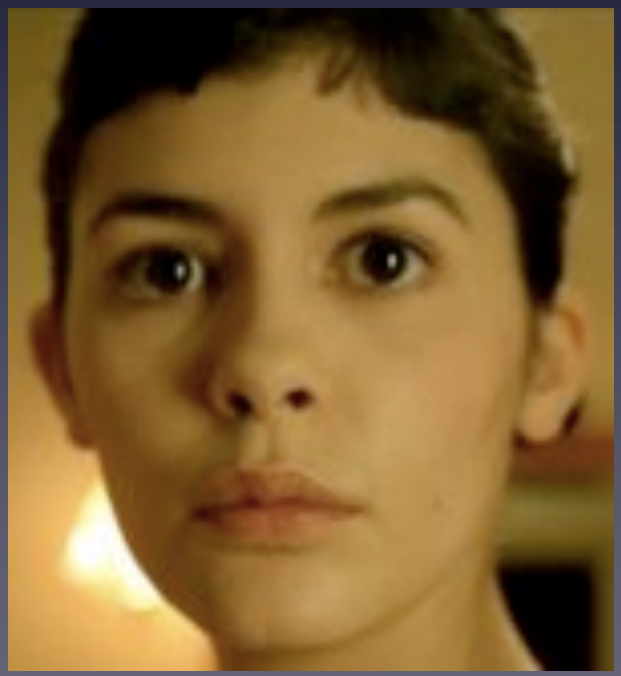
Dispersion and bristle size

Made by The Painting Fool

Stage 2
Emotional Modelling
(Appreciation)

Stage 2.1

- Externalise the parameters which define styles: colour palettes, abstraction levels, fill styles, natural media, etc; enable search over sets of parameters; match emotion enhancement to styles; build KB; enable control via emotion keywords;



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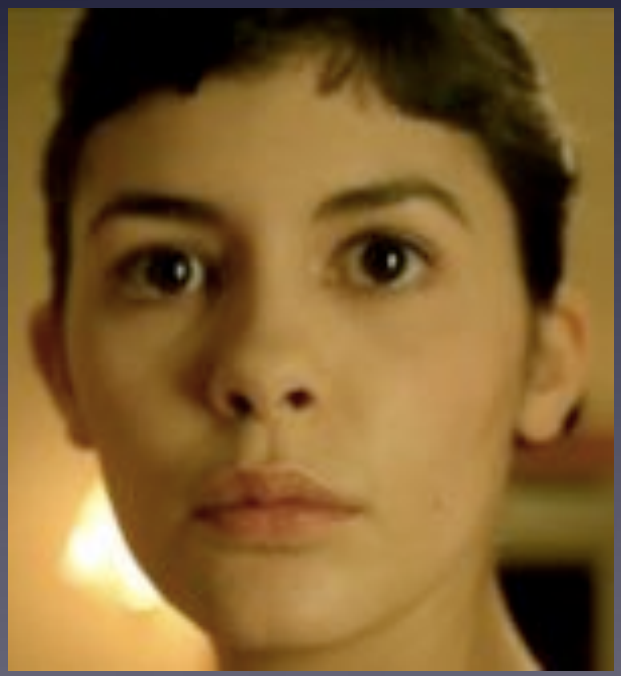

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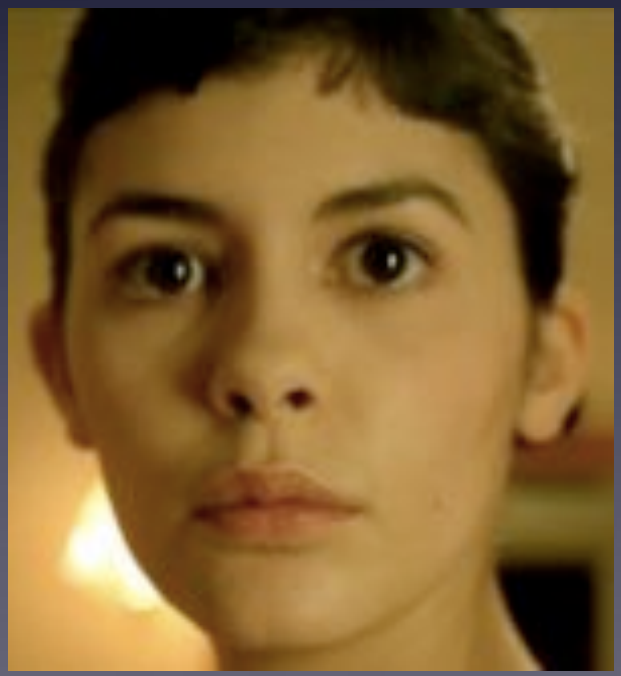
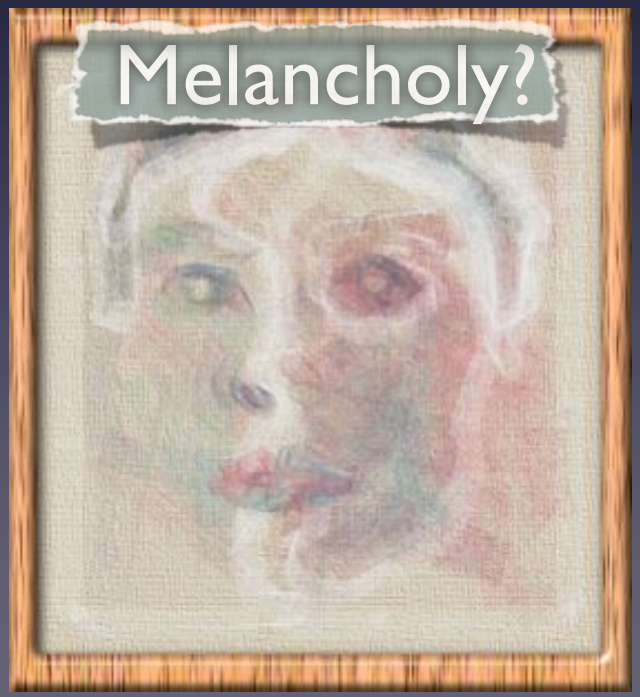




Amelie's Progress Gallery

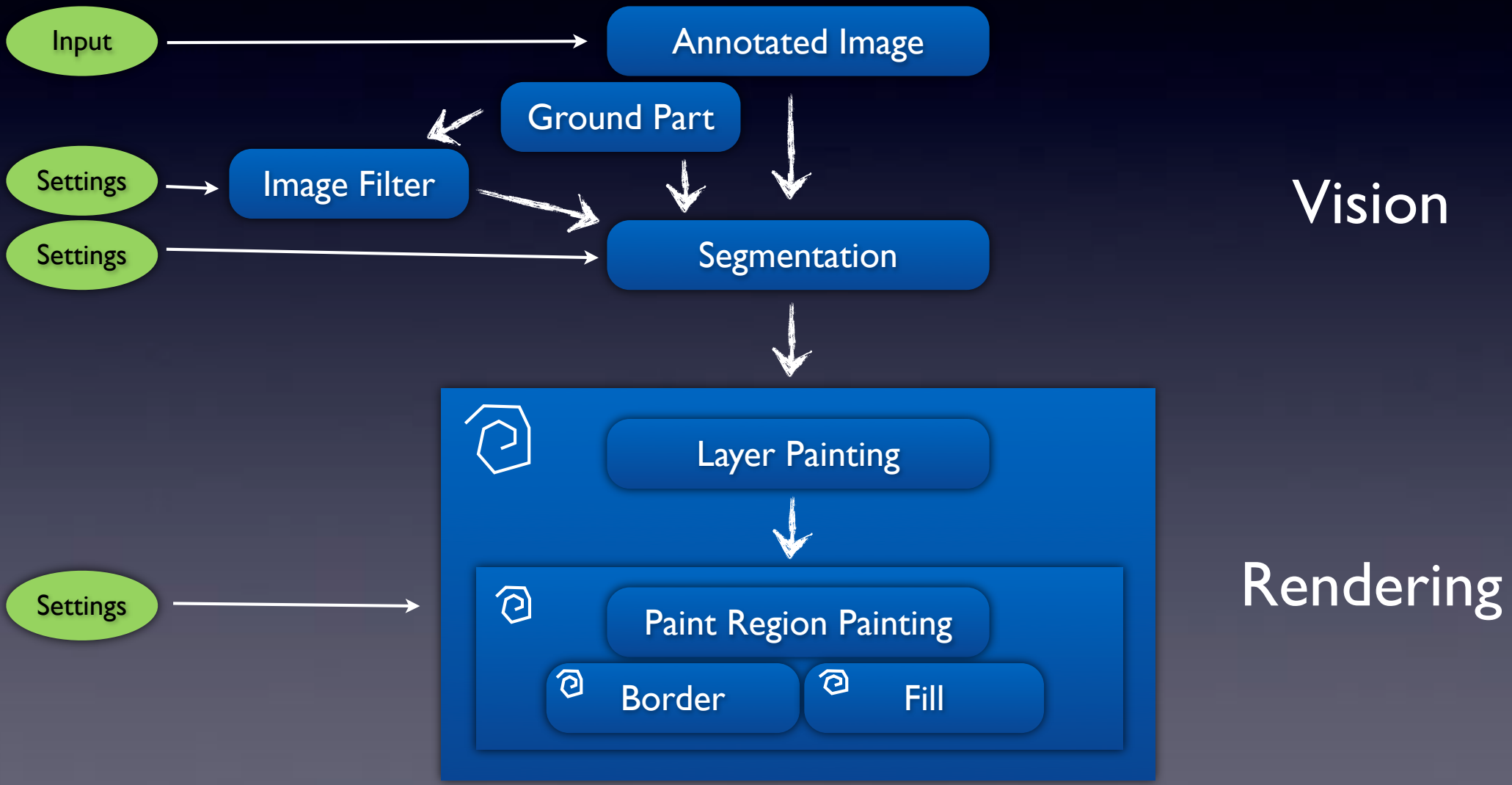
222 pictures from 22 images; emotional direction

Stage 2.2
Emotional Enhancements

- For the BCS machine intelligence competition (Dec. 2007)
- Combined The Painting Fool with the emotion detection system of Maja Pantic and Michel Valstar
  - Uses a machine-learned boosted classifier based which uses the movements of facial anchor points
- Uses video clips of someone expressing an emotion and detects (i) apex image (ii) feature locations and (iii) one of six emotions - which is passed to The Painting Fool
- The Painting Fool chooses its painting style according to the knowledge base of emotion-enhancing styles

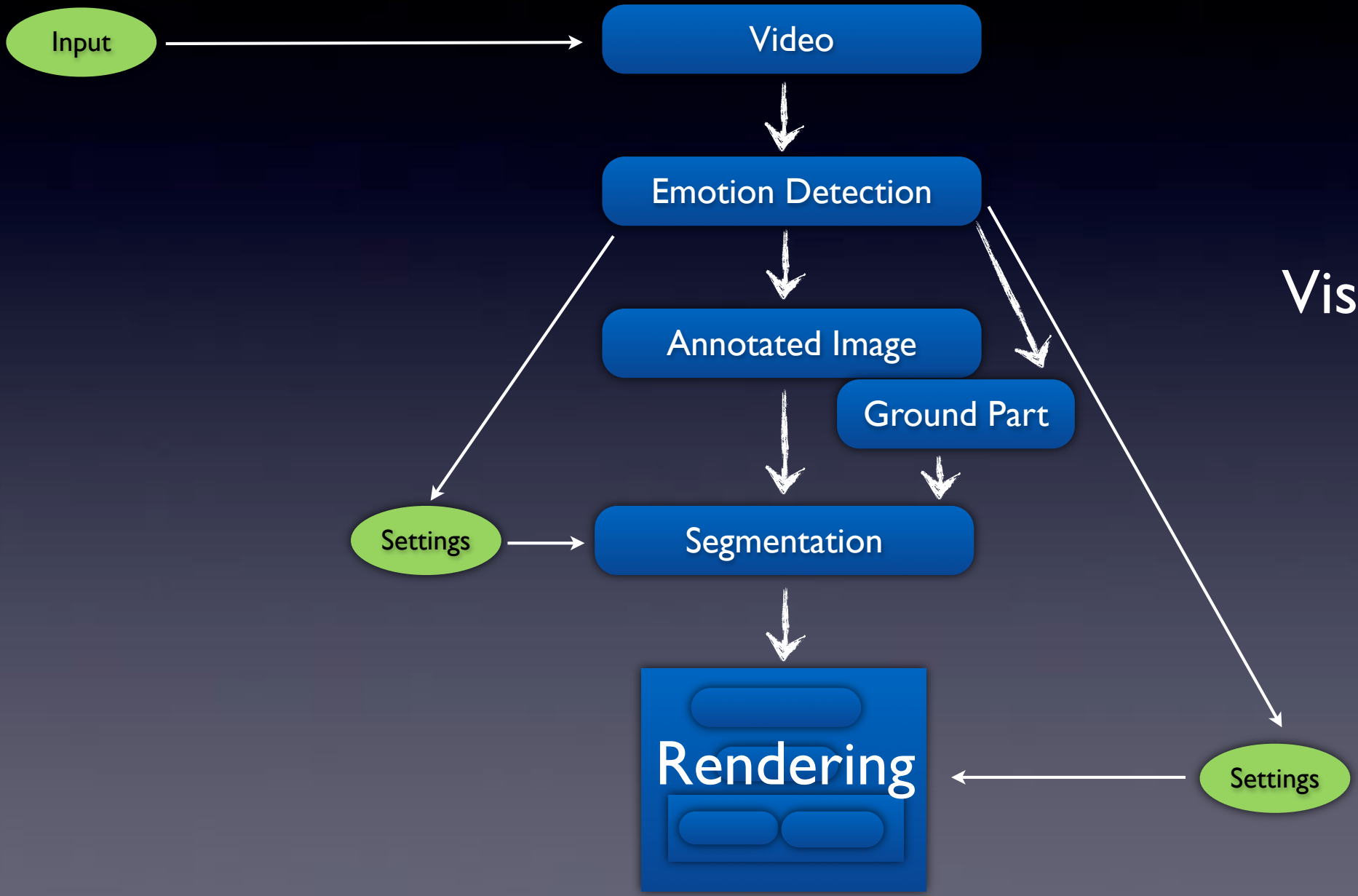
Skill-based

Graphics Workflow



Appreciation-based

Graphics Workflow



Example: Mike Swain

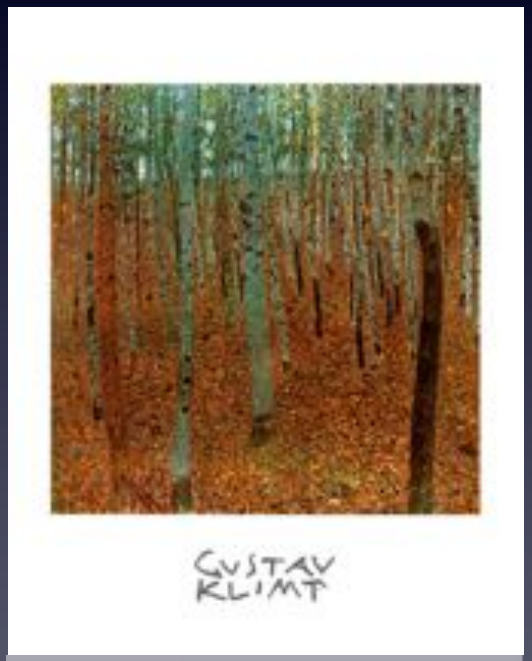
More Portraits

Stage 3
Generative Art
(Imagination)

Stage 3.1

Automatic Scene Construction

Scenes with repetitive elements

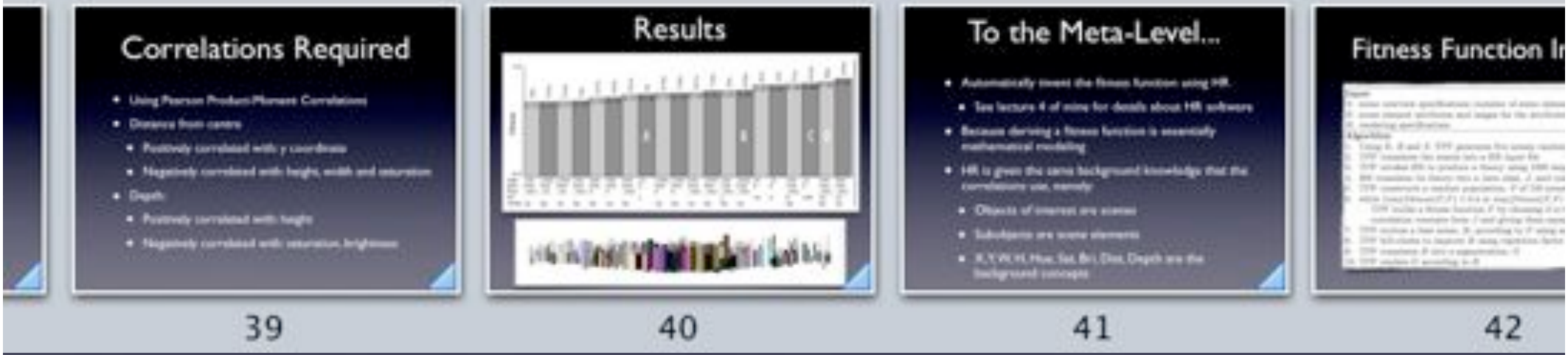


Skipping Some Slides...

Approach 1: Evolutionary

Skipping Some Slides...

Approach 1: Evolutionary



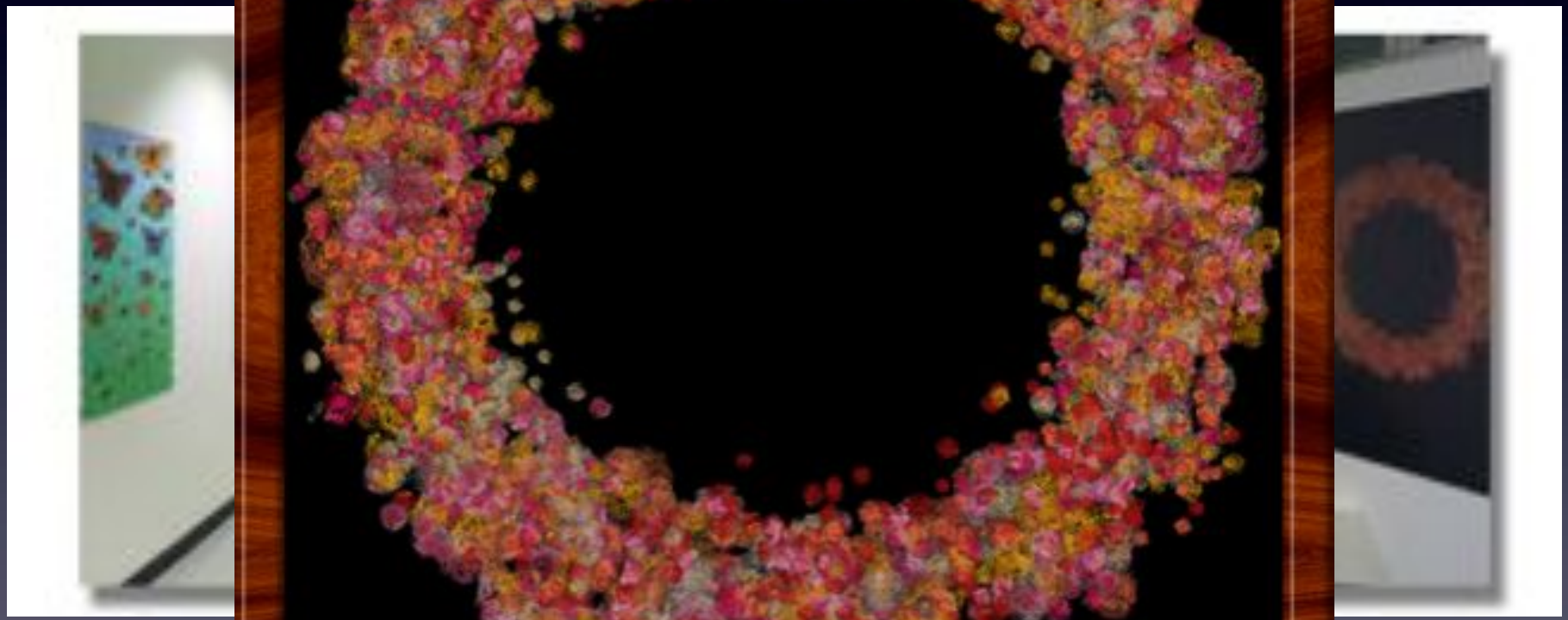
Skipping Some Slides...

Approach 1: Evolutionary

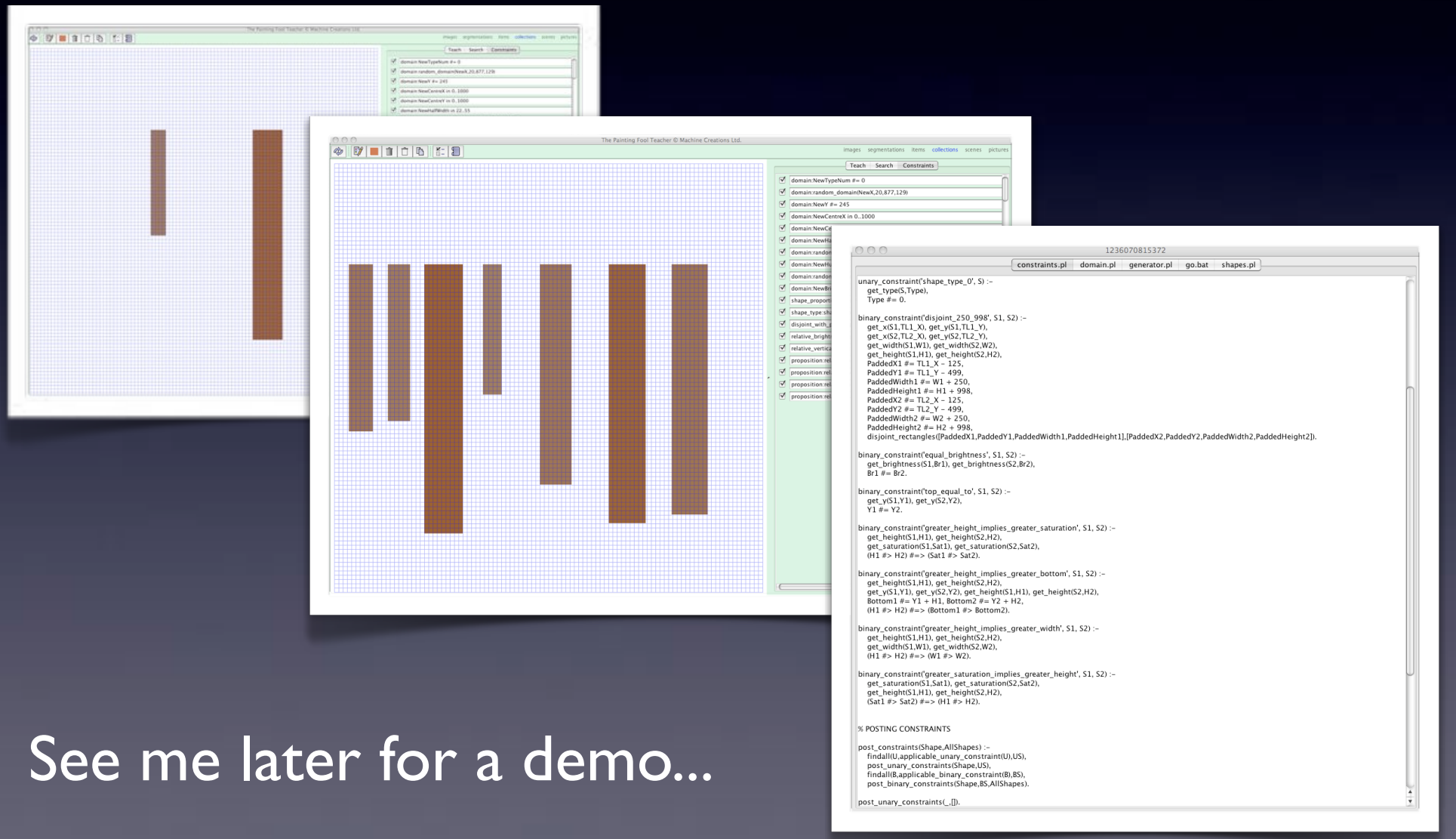
A
B
C
D
E
R_1

Permanent Exhibition at Imperial

Per aint



Approach 2: CSP based



See me later for a demo...

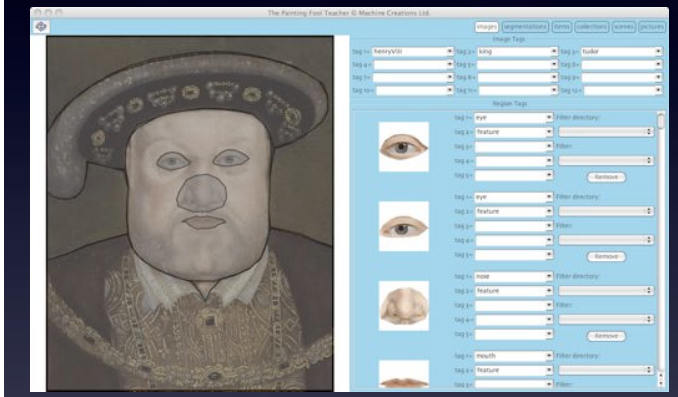
Stage 3.2

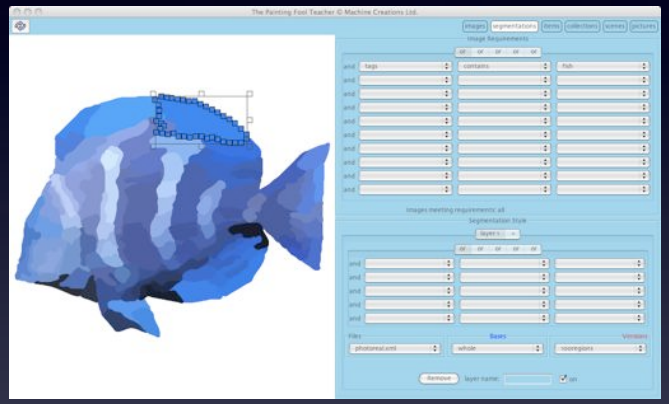
Automatic Scene Construction

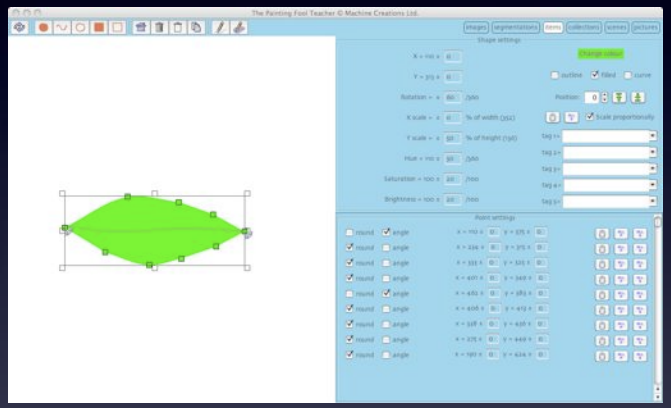
Scenes with discernible objects

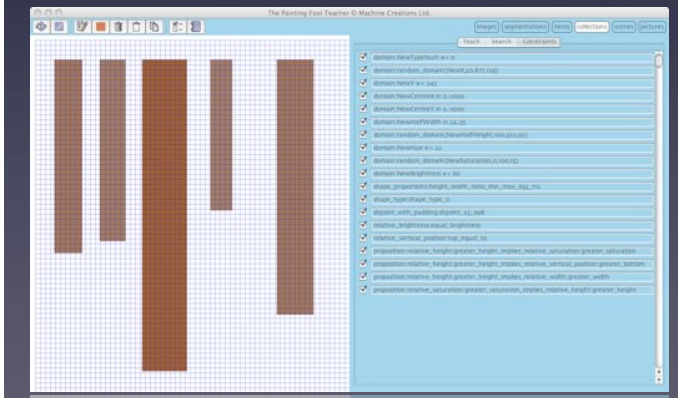
- Evolutionary method absorbed into a *teaching interface* for The Painting Fool
  - Artists are influenced, inspired and taught by many diverse teachers, not just one programmer!
- Modules include:
  - Evolutionary approach; image filtering; constraint generator and solver; evolutionary art; context free design grammars; animation generation;

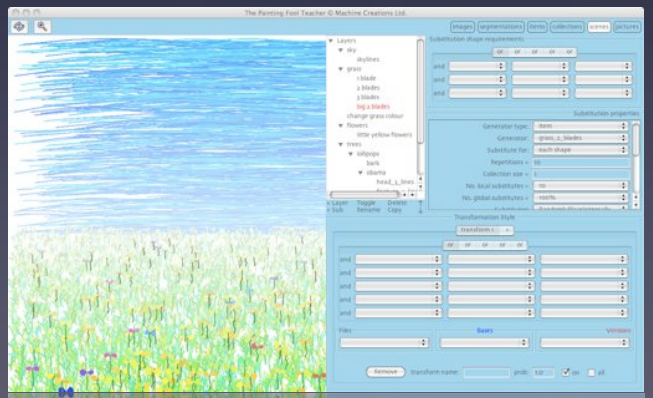
A Teaching Interface

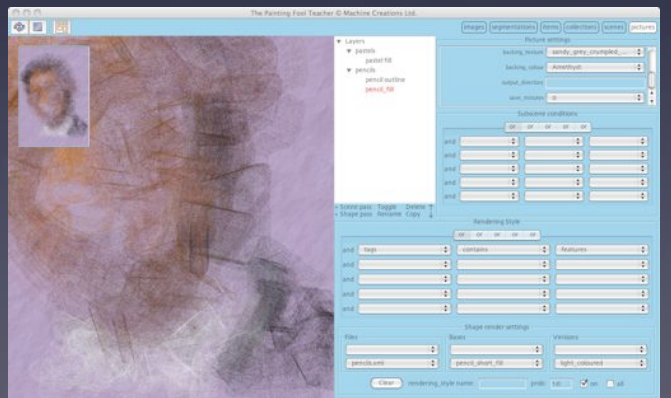




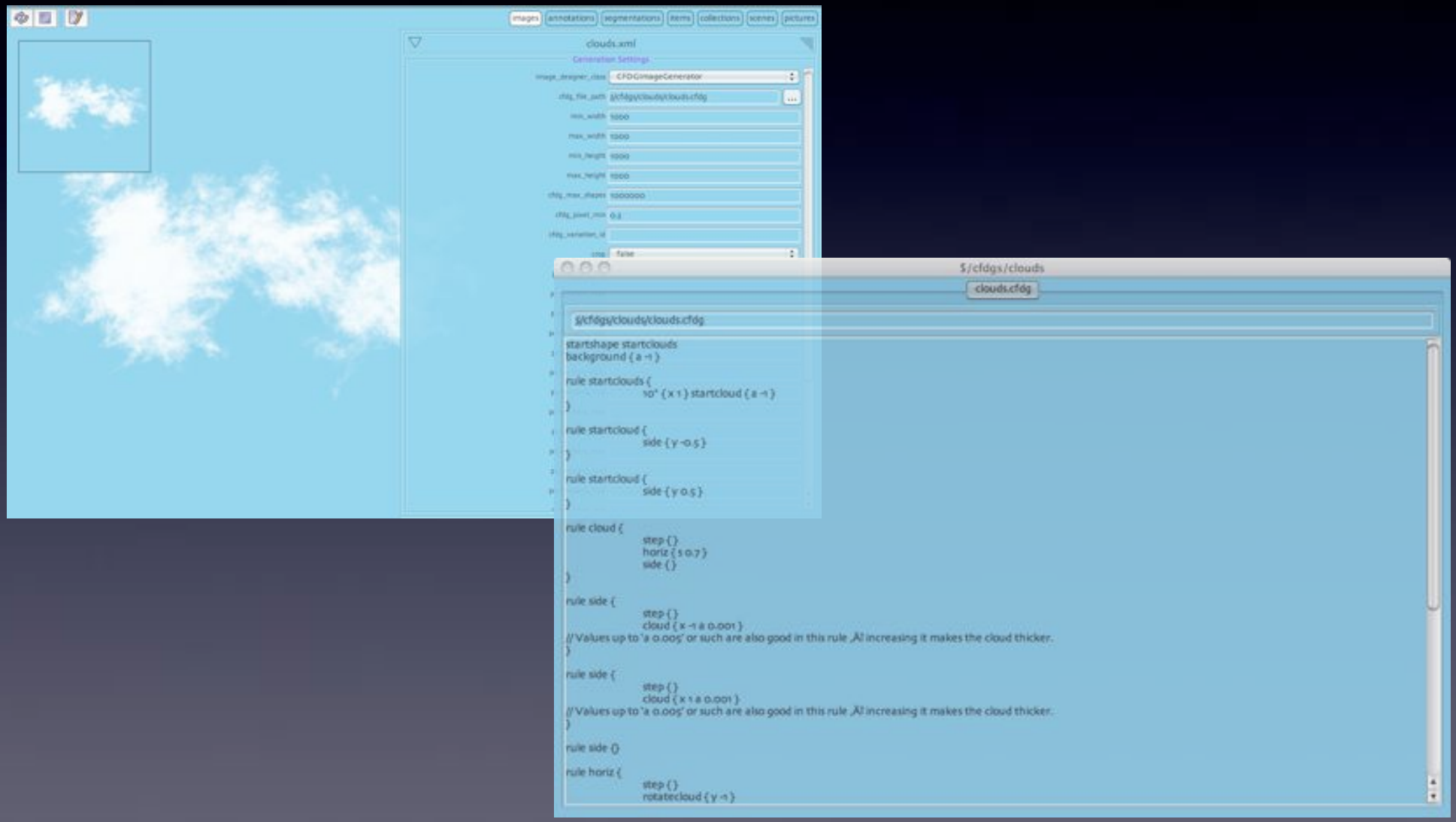




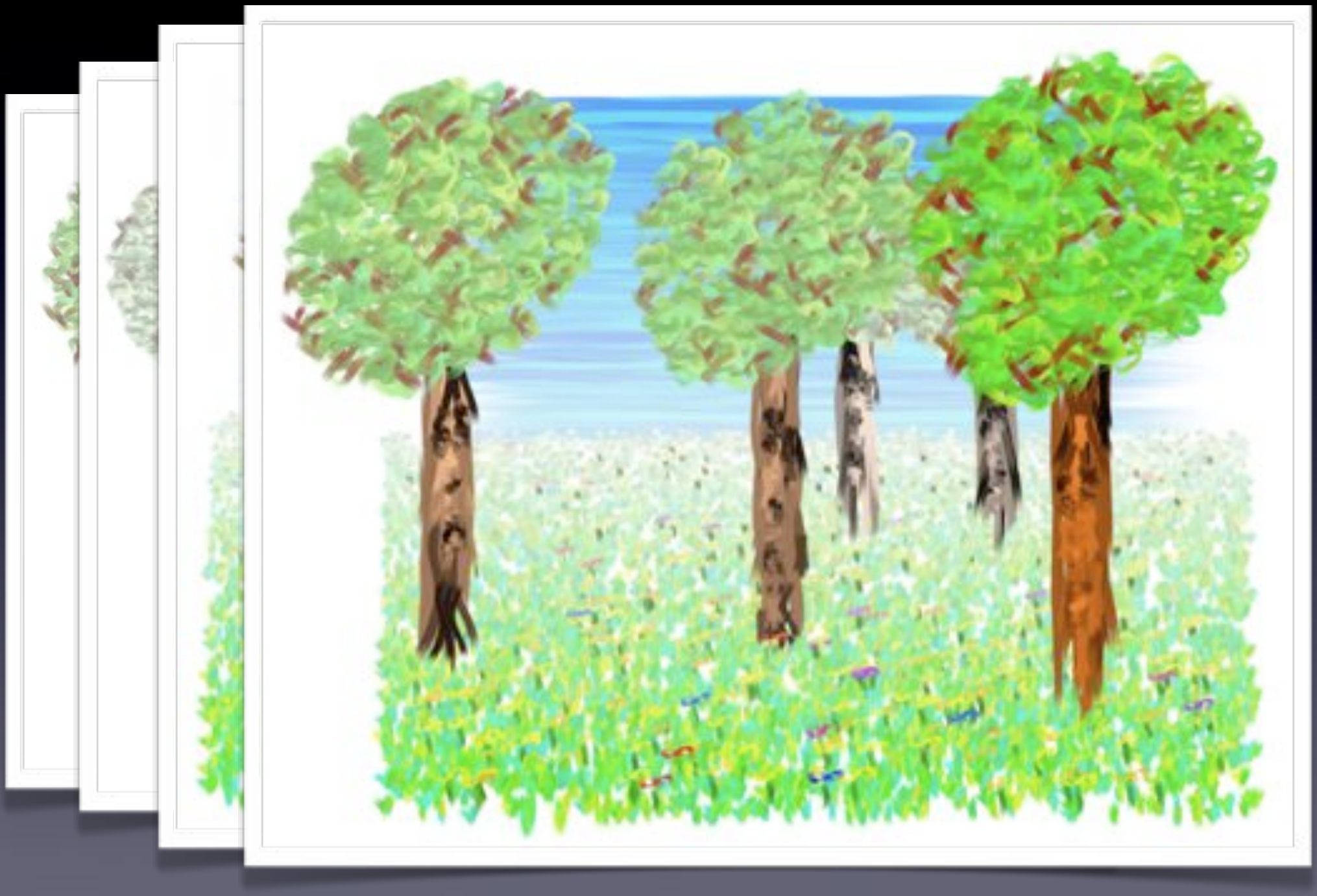


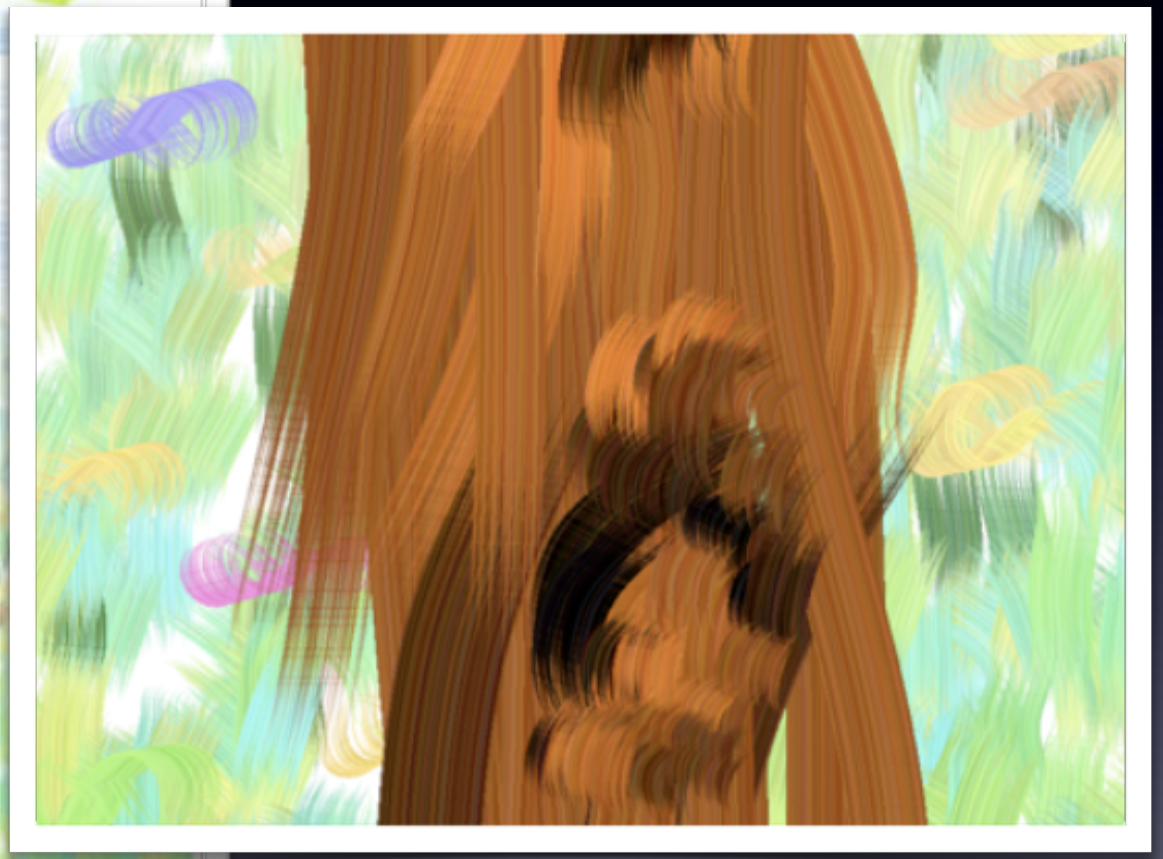


CFDG Module


images
annotations
segmentations
items
collections
scenes
pictures
clouds.xml
Generation Settings
CFDGImageGenerator
$/cfdgs/clouds/clouds.cfdg
$/cfdgs/clouds
clouds.cfdg
startshape startclouds
background { a -1 }
rule startclouds {
10* { x 1 } startcloud { a -1 }
}
rule startcloud {
side { y -0.5 }
}
rule startcloud {
side { y 0.5 }
}
rule cloud {
step { }
horiz { s 0.7 }
side { }
}
rule side {
step { }
cloud { x -1 a 0.001 }
// Values up to 'a 0.005' or such are also good in this rule. All increasing it makes the cloud thicker.
}
rule side {
step { }
cloud { x 1 a 0.001 }
// Values up to 'a 0.005' or such are also good in this rule. All increasing it makes the cloud thicker.
}
rule side 0
rule horiz {
step { }
rotatecloud { y -1 }

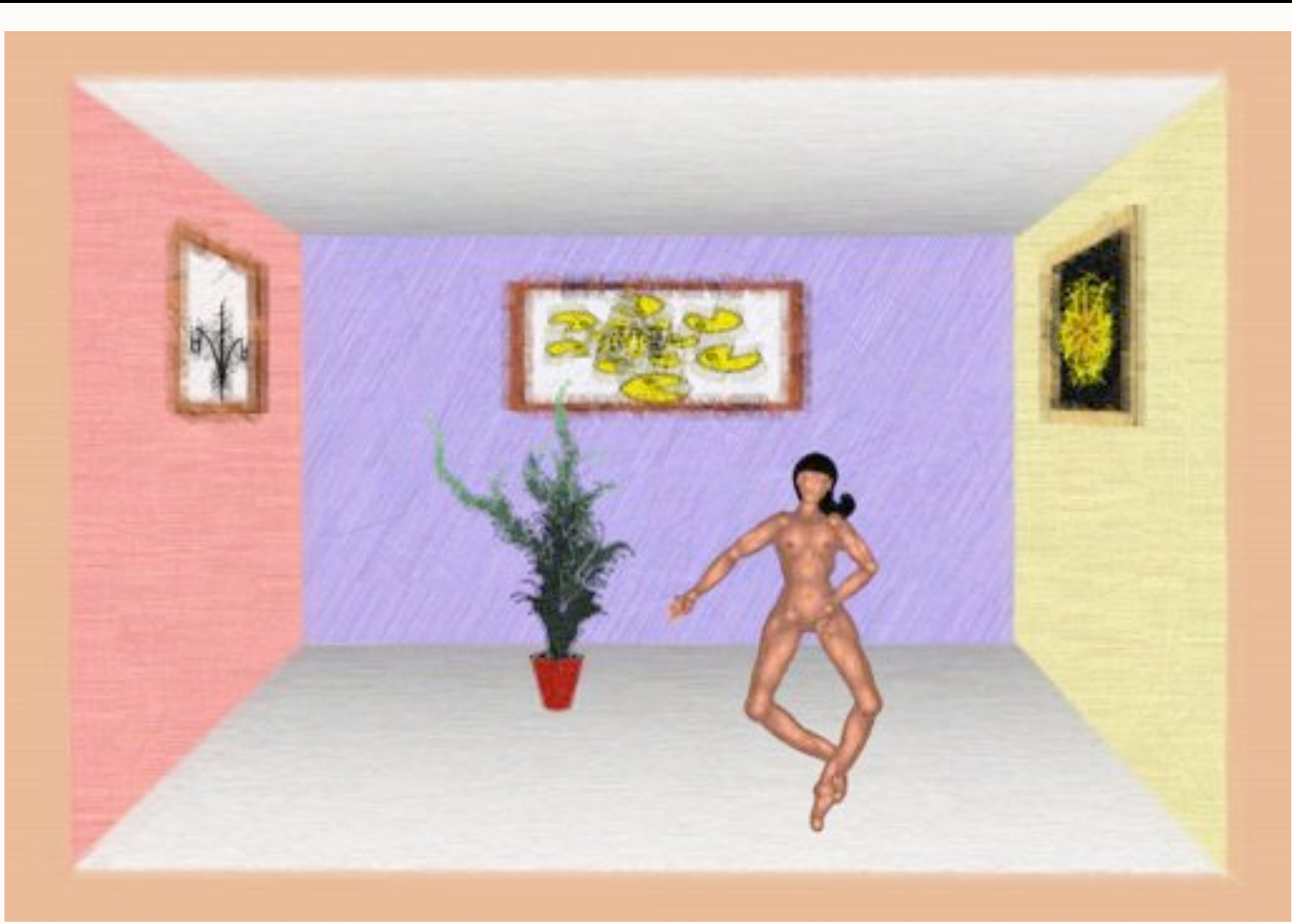
PresidENTS Series





Fish Fingers Series

After AARON Series

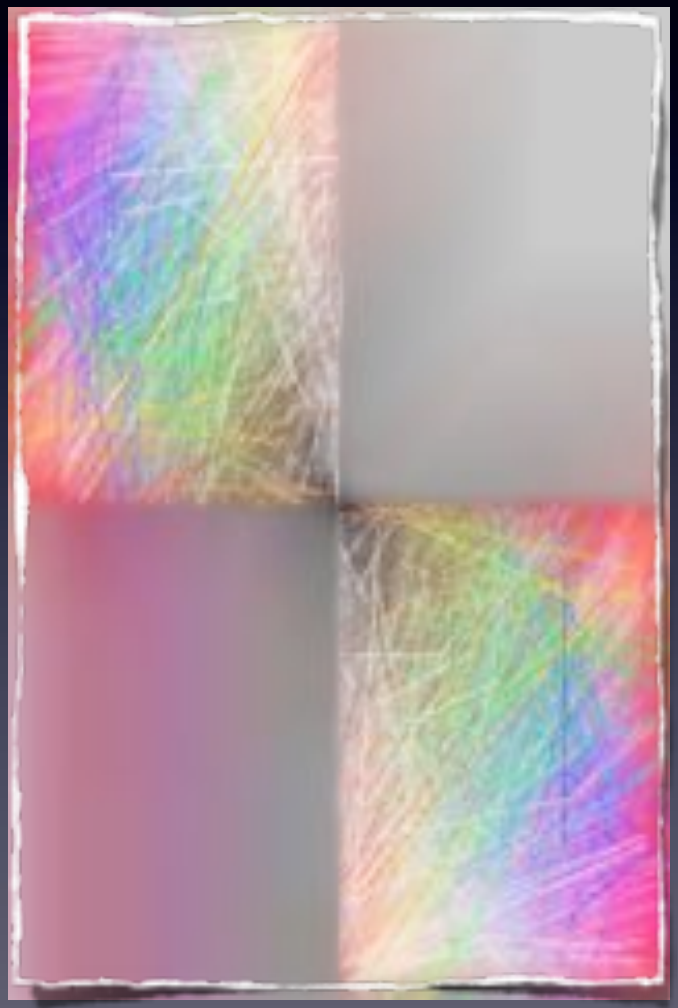


Countryside Series

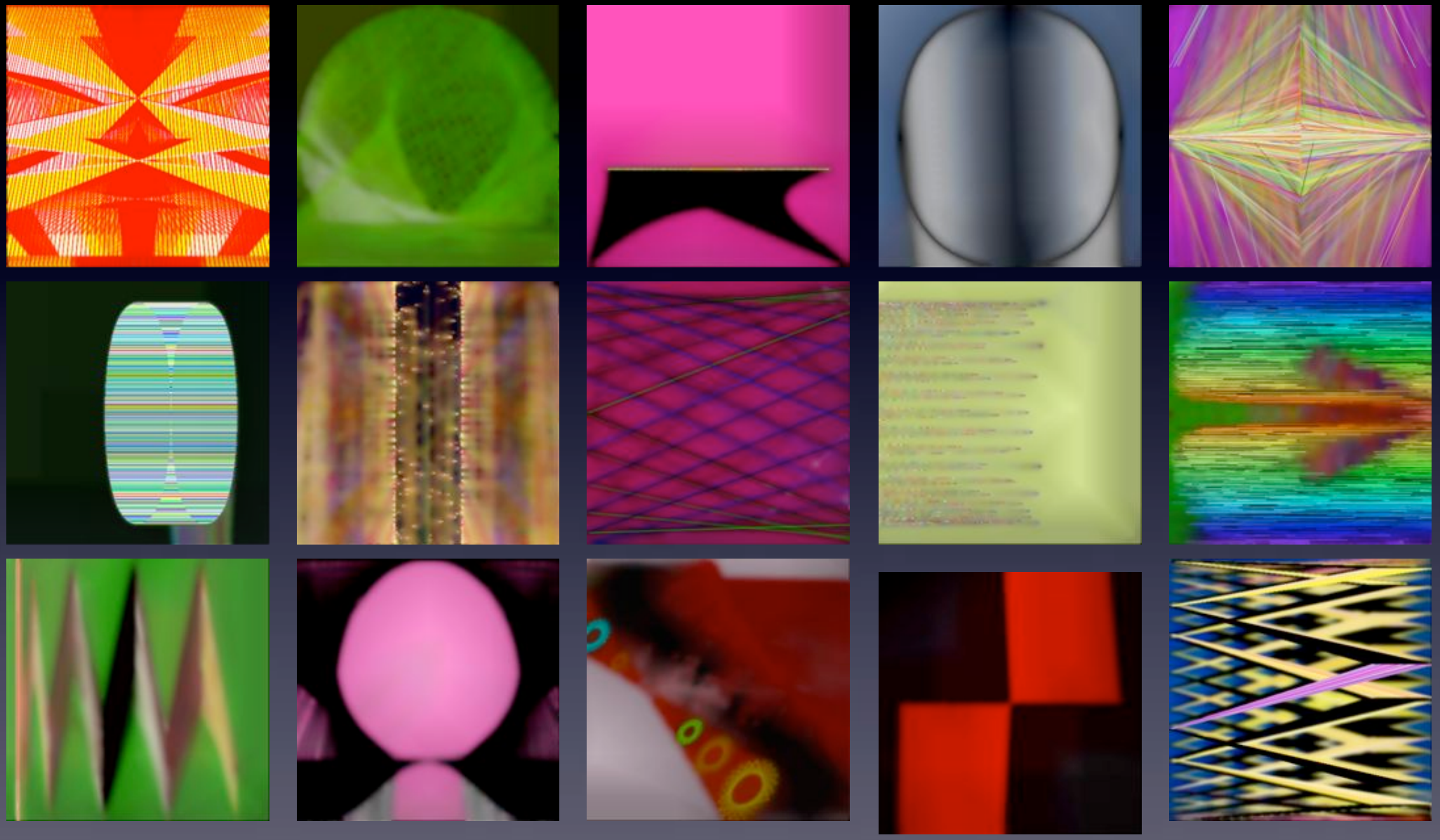
Countryside Series

Evolutionary Art Module

Ask me for details about ELVIRA



A Particle-Based Wrapper



There is amazing visual variation in this wrapper

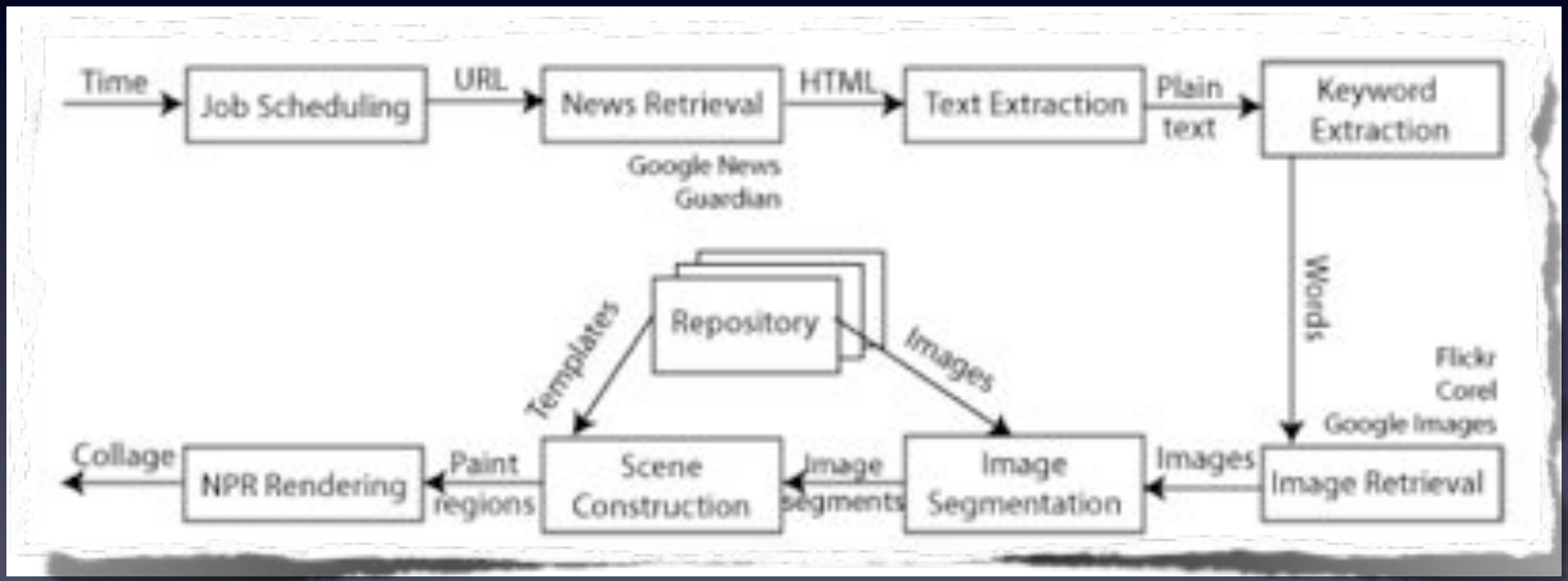
Stage 3.3

Automatic Scene Construction

Constructing scenes for a purpose

- 2009 MSc. Project of Anna Krzeczkowska
- Joint with Jad El-Hage and Stephen Clark (CompLab, Cambridge)
- Deals (partially) with the question of *intent* in creative systems:
  - Usually the user supplies all the intentionality in creative projects, software acts as a (possibly intelligent) tool
- Idea is to react to news stories to paint pictures which make people think more about certain issues

Automated Collage Generation

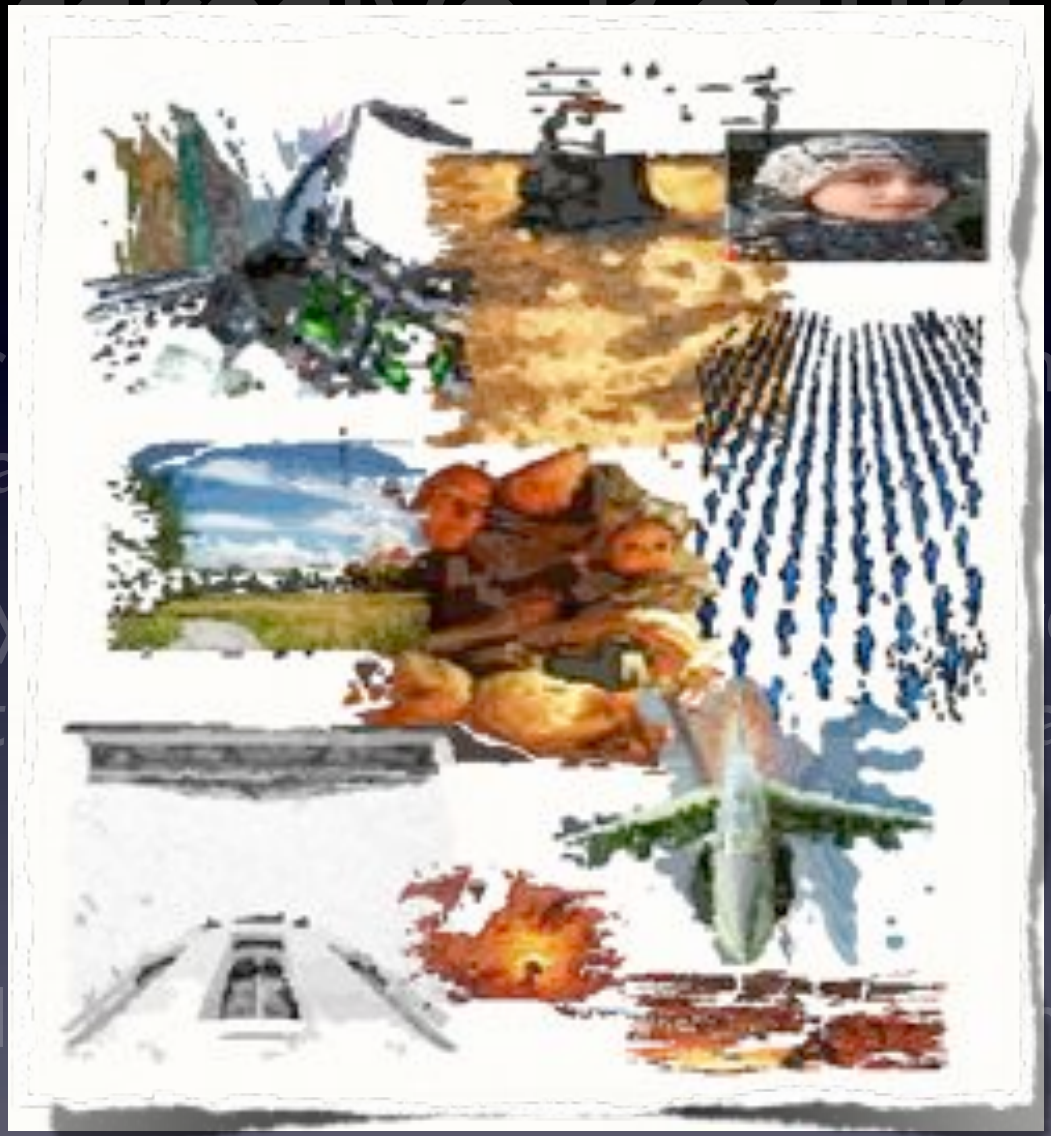


Illustrative Result

- Guardian news story on the war in Afghanistan
  - Keywords: *afghanistan, brown, forces, troops, nato, british, speech, country, more* and *afghan*
  - Images retrieved from Flickr
- Highlights the potential for poignancy

Illustrative Result #2

- Guar
  Afgha
  - Key
    nat
    es, *troops*,
    and *afghan*
- Highl
  ncy



#2

es, troops,

and *afghan*

ncy

Illustrative Result #2

var in

, forces, troops,
nore and *afghan*

ignancy

lt #2

ar in

forces, troops,
ore and *afghan*

gnancy

Interesting Observation

- All of these words are affect-neutral
  - *afghanistan, brown, forces, troops, nato, british, speech, country, more* and *afghan*
- Raises questions of intentionality
  - 5 agents at work here: programmer, software, journalist, audience, flickr taggers
- In stage 5, we increased the explicit intentionality of The Painting Fool through portraiture

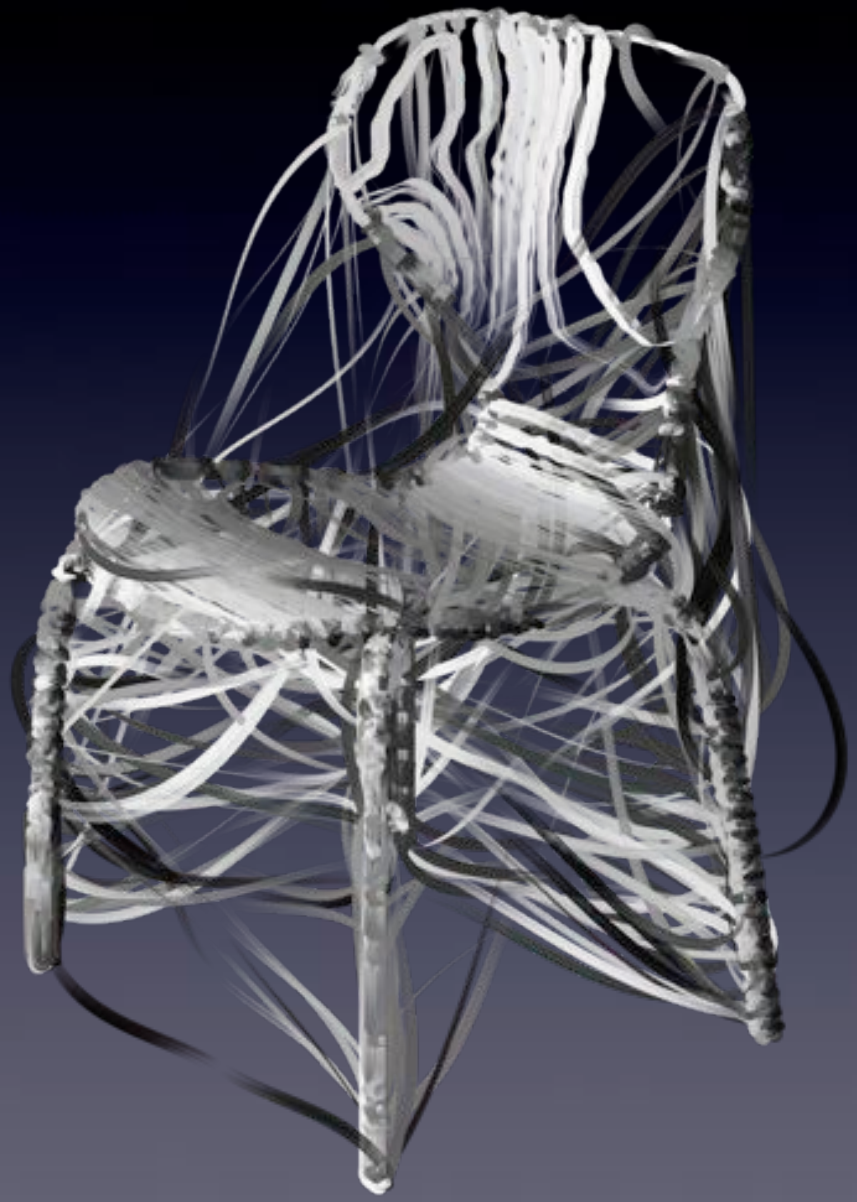
Stage 4
Multimedia
(Skill and Imagination)

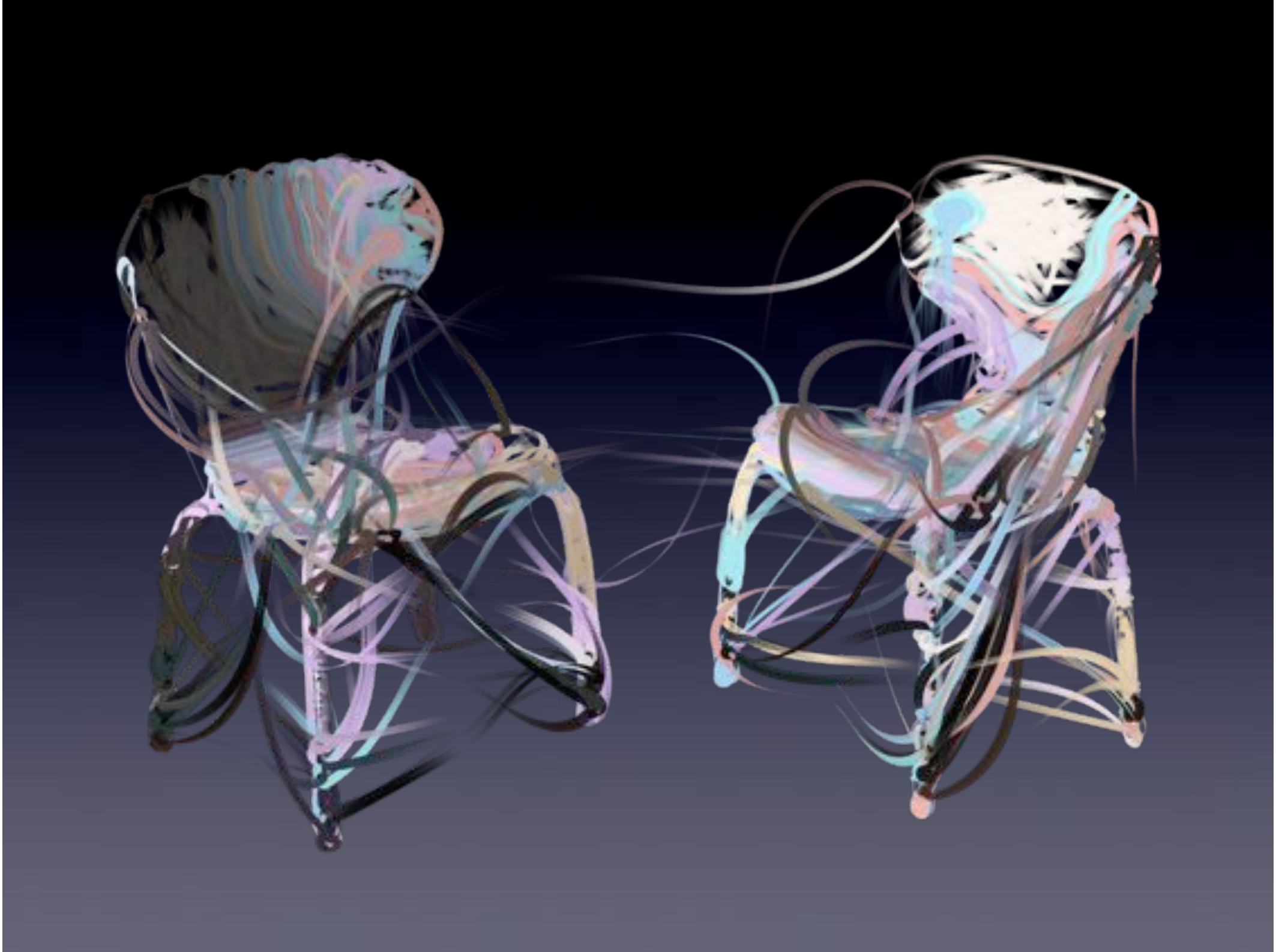
Multimedia

- Moving into video, text, sculpture and gallery design
  - Into the third and fourth dimensions!
- Aims:
  - To enable The Painting Fool to produce art that couldn't be produce by people
  - Enable it to produce more sophisticated artworks
    - With a knowledge of space/light/arrangement

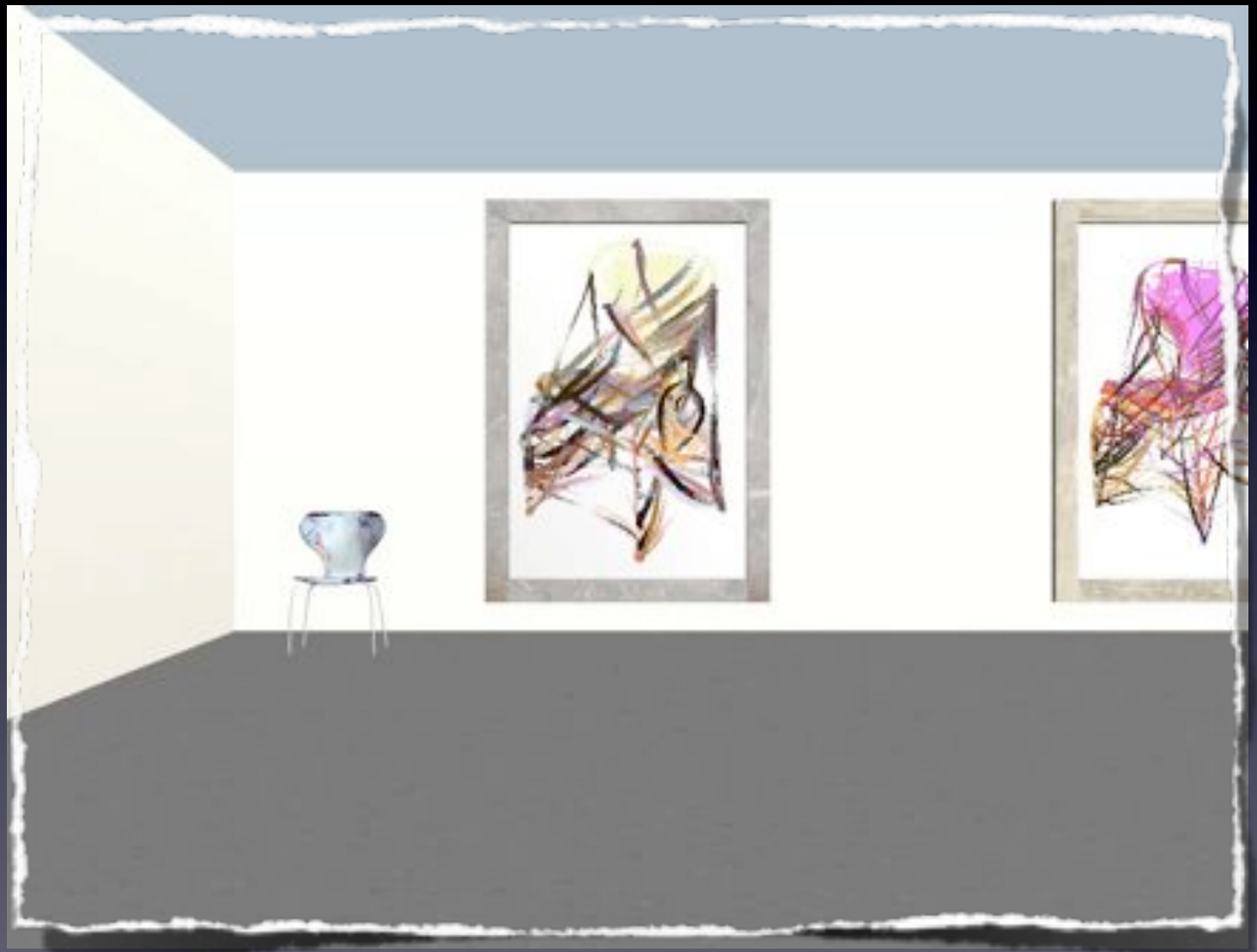
Sculptures

3D Scene Generation





Gallery Design



Video Pieces

Paint Dance Animations

Paint Dance Animations

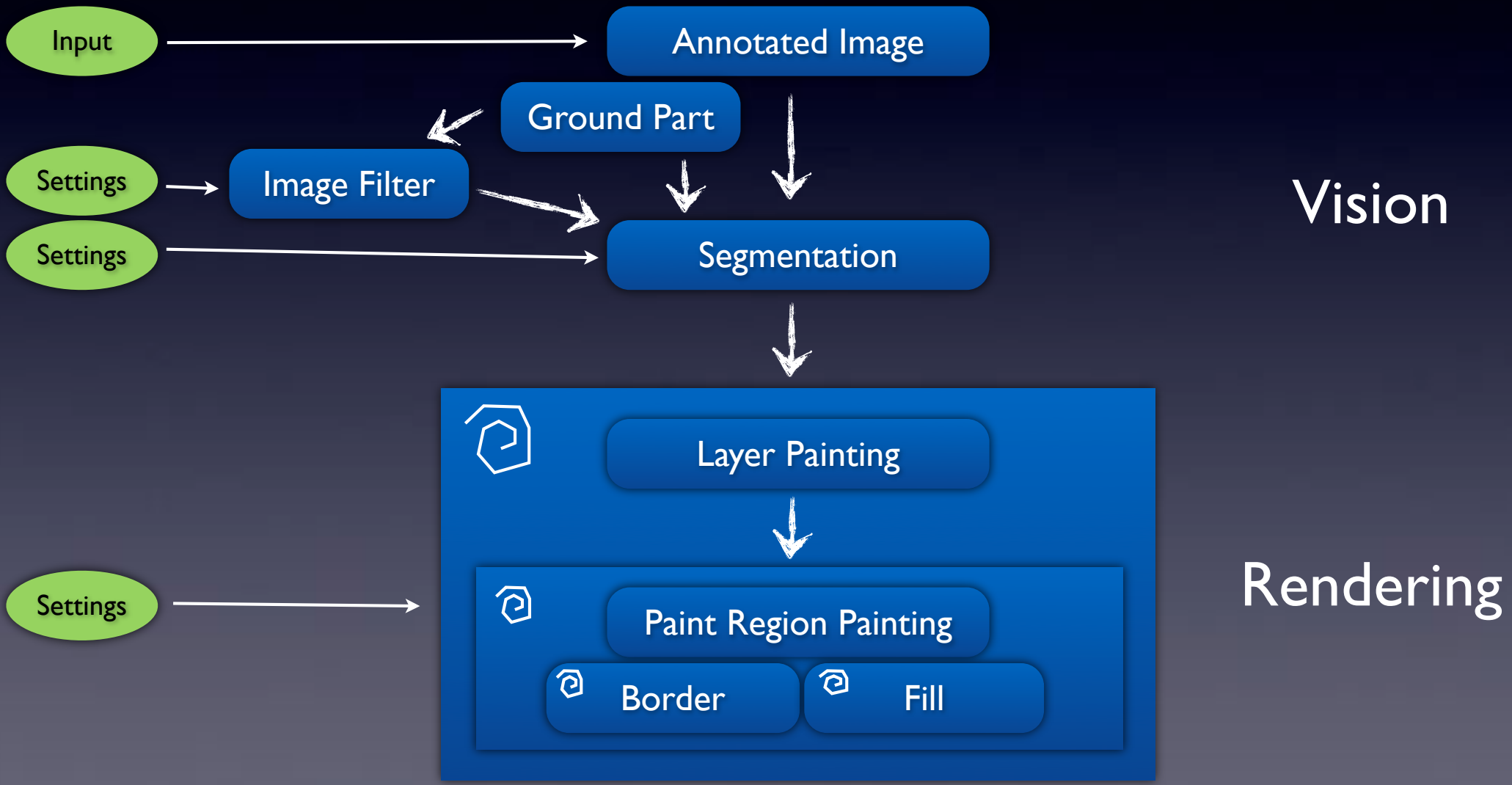
Paint Dances

Technical Issues

- Choosing a representative subset of paint strokes from the set of original paintings
  - K-means clustering
- Assigning strokes from the representative set back to the paintings without losing too much fidelity
- Producing smooth animations without a vertical crossover effect

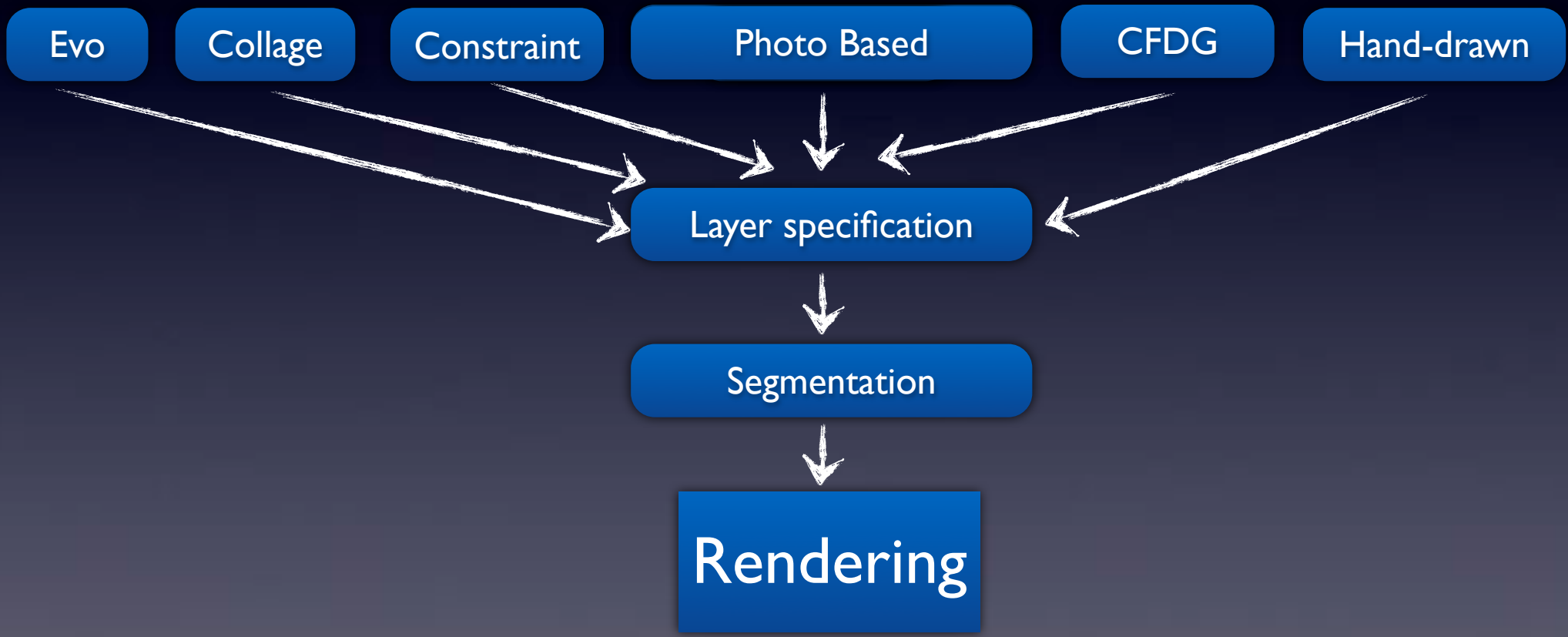
Skill-based

Graphics Workflow



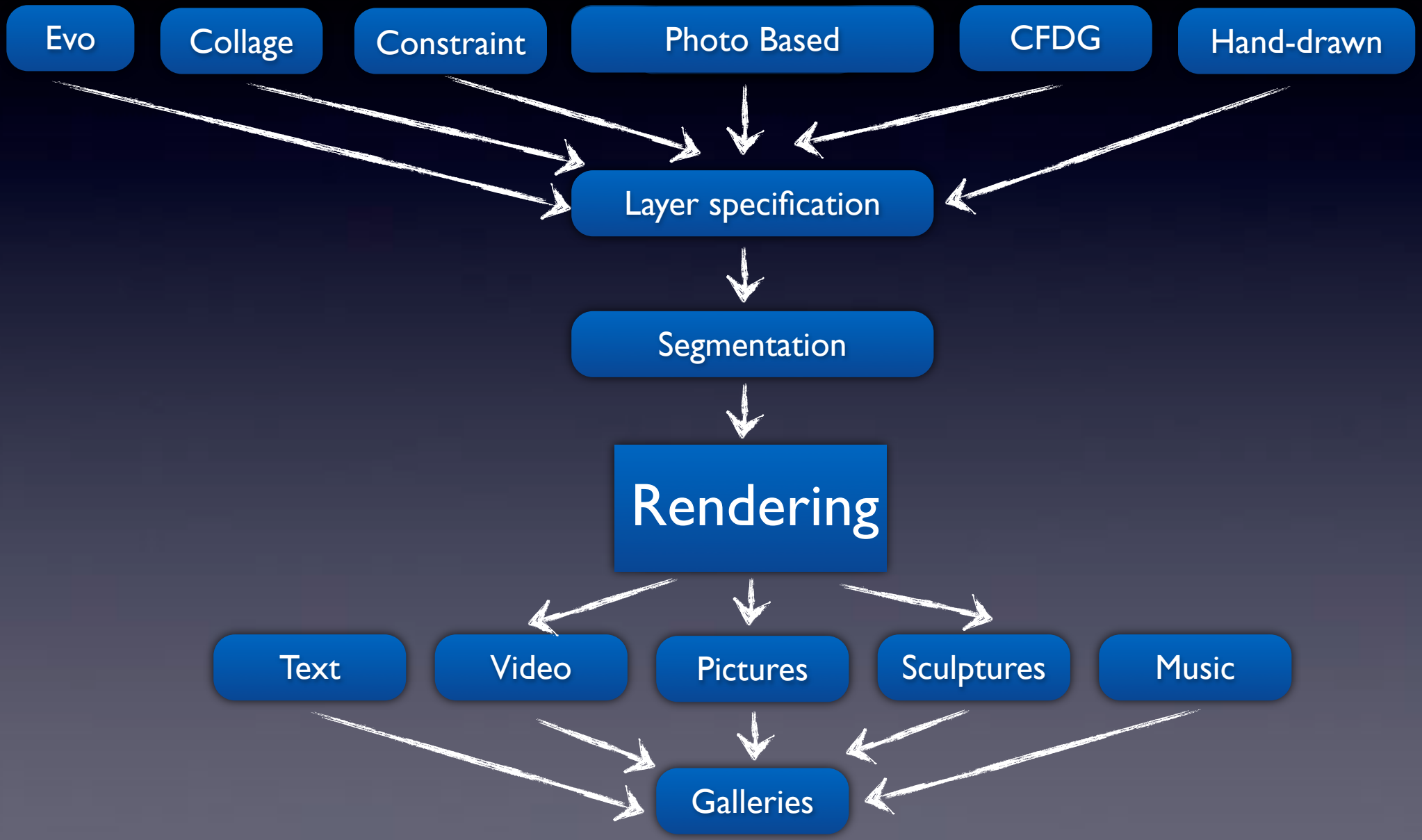
Imagination-based

Graphics Workflow



Multimedia-based

Graphics Workflow



Let’s take a breather...

Stage 5
Live Portraiture
You Can't Know my Mind

(Skill, Appreciation, Imagination, Intentionality, Reflection and Learning)

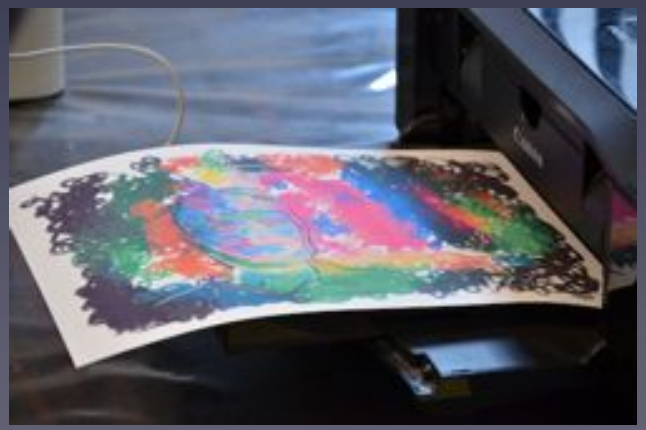
Joint work with Dan Ventura
Brigham Young University, USA

Aims of the Subproject

- We want to see if people will accept the software as an artist
  - Not necessarily a good or particularly creative artist
  - In particular, we wanted to see if there any easy criticisms left, other than: "it's not a person, so it can't be artistic/creative"
- Manage the perceptions of people interacting with the software:
  - Explicitly managed people's impression of the creative behaviours required to avoid being called uncreative
  - Explicitly mangaged people's perception of the (physical) artistic process
- Made it clear that people are not controlling the software to produce an image, rather it is controlling them to express itself
  - Introduce the idea of autonomous creativity in software by presenting people with a model of *accountable unpredictability* in The Painting Fool

Overview

- It's portrait painting: people sit in front of a laptop and some of them come away with a printed portrait, after watching a hand paint/draw on-screen
- The 'mood' of the The Painting Fool determines whether or not a portrait is painted, and the nature of the portraits that are produced
- A commentary is also given, where The Painting Fool describes what its mood was, why, its intention for the portrait and whether it has achieved its goals
- The successes and failures are recorded, and the software learns from these, trying out new approaches when in a reflective mood
- Wall text is used to prompt the portrait sitters and audiences to think abou the behaviorus being expressed by The Painting Fool



You Can't Know my Mind

A Festival of Computational Creativity

Computational Creativity offers the promise of changing how we view music, literature, the sciences and the arts, and research in Artificial Intelligence may one day lead to us happily co-existing with creative computers. As part of a festival of Computational Creativity, we present several evening events highlighting the idea of the computer as a creative, intelligent, collaborator. Right now, Computational Creativity asks the question: "can computers create?", and we hope you will be stimulated into thinking about our technological future through this festival. In addition to the visual arts produced by computer - as shown in this gallery - it is also interesting to ask the Computational Creativity question about areas such as music, poetry and even cooking.

Moody Music

We present an evening of electronic music with Stéphane Bissières, in which he will play three sets while reacting to musical input from software based on a model of mood. In each set, the type of input will be different and together Stéphane and the computer will generate three different styles of music. In each of the three sets, the music is supposed to reflect the mood of the computer in different ways using musical constructs such as volume, reverberation, decay and choice of sound palette. See if you can hear the moods reflected from the moody computer.

Paris-based electronic musician Stéphane Bissières won the Paris Youth Talents competition in 2007 and a Sacem et Ineb prize in electroacoustic composition. An improvisor for France Musique since 2005 and a sound designer for France Inter., he developed motion capture interfaces for the DAFACT society and has realized interactive installations for Le Fresnoy (Roubaix, FR). Today his work revolves mainly around the creation of electroacoustic music in real-time, augmented with analog processes.

Poems and Potage

An evening of poetry will feature readings from a selection of both computer-generated and human crafted poems. These will be curated and read by Russell Clarke, who will also discuss and relate the poems. Since graduating from Christ Church, Oxford with a degree in English Language and Literature, Russell has combined tutoring and teaching with miscellaneous literary activities such as editing a work of philosophy and writing occasional academic articles.

We will also showcase a human/computer collaboration in gastronomy in which some computationally produced soups are paired with food created by chef Sophie Grilliat. Computer program PIERRE will generate soup recipes cooked over an afternoon, and Sophie will choose three to incorporate into a menu including dishes she prepares to complement them. While finishing a Phd in Urbanism at la Laboratoire Technique Territoire et Societie/Universitie Paris-Est, Sophie has concurrently developed a culinary enterprise as a chef à domicile for two years and obtained a CAP diploma. Her approach is characterised by an insistence upon the integrity of fresh produce, sustainably sourced and the search for a balance between culinary technique and the social dimension inherent in serving food.

Computational Creativity is the philosophy, science and engineering of computational systems which, by taking on particular responsibilities, exhibit behaviours that unbiased observers would deem to be creative.

You Can't Know my Mind

The Painting Fool is software that we want to be taken seriously as a creative artist in its own right, one day. It has been trained for the last 10 years to take on more and more creative responsibility, employing techniques from artificial intelligence, computer graphics and machine vision, guided always by art theory and philosophy. In the You Can't Know my Mind exhibit, The Painting Fool will produce portraits of people who sit for it. The software has reached a level of maturity where it is now impossible to determine in advance what it will produce, and why, and the software makes all its own decisions about what to paint, how to use its materials and, working with computational critic DARCI, together they decide whether or not the final product is suitable. As demonstrated here, The Painting Fool exhibits behaviours which have emerged in Computational Creativity research as being important for the perception of creativity in software. In particular, the software exhibits:

Intentionality: By attempting to produce a portrait which either explores its materials and techniques; expresses its mood; or tries to improve upon failed experiences, the software shows that it knows what it wants to do.

Imagination: By using its mood to conceptualise a portrait, the software produces a new backdrop for each portrait, changing colours and abstraction levels in the face in order to express that mood.

Skill: By painting live on-screen with simulated paint brushes, pencils and pastels, the software shows that it has all the artistic skills required to produce interesting and characteristic portraits.

Appreciation: By using artificial neural networks learned through direct experience with artists and art lovers, the system is able to tell visually whether it has achieved the aims dictated by its mood.

Reflection: By criticising failures to express a mood, the software reflects on its artistic process and tries later to improve by producing a new portrait expressing the same mood, but using different conceptualisations and painting styles.

Learning: By recording successes and failures, the software is able to constantly learn about how to express mood through its processes---how different conceptualisations and painting styles produce more or less mood in pieces, making the software unpredictable in a non-random way.

You can't know its mind.

The You Can't Know my Mind exhibit has been realised by: Blanca Pérez Ferrer, Dan Ventura and Simon Colton. Blanca is a historian of arts who has a masters degree in cultural mediation from the École du Louvre and is currently working as a cultural mediator and curator for the Ligue de l'Enseignement. Dan is a Professor in the Computer Science Department at Brigham Young University. His research focuses on creating artificial intelligent systems that incorporate robustness, adaptation and creativity and includes work on systems for understanding visual art, automatic music composition and even recipe generation. He is the leader of the group producing the DARCI artificial art critic. Simon is a Professor of Computational Creativity in the department of Computing at Goldsmiths College, London. His research focuses on getting software to take on creative responsibilities in the arts and sciences, and the philosophical discussions that this raises. He has worked in autonomous creative systems in graphic design, video game design, pure mathematics, literature and the visual arts. He is the author of The Painting Fool software which has produced the artwork in this exhibition.

ThePaintingFool

www.thepaintingfool.com

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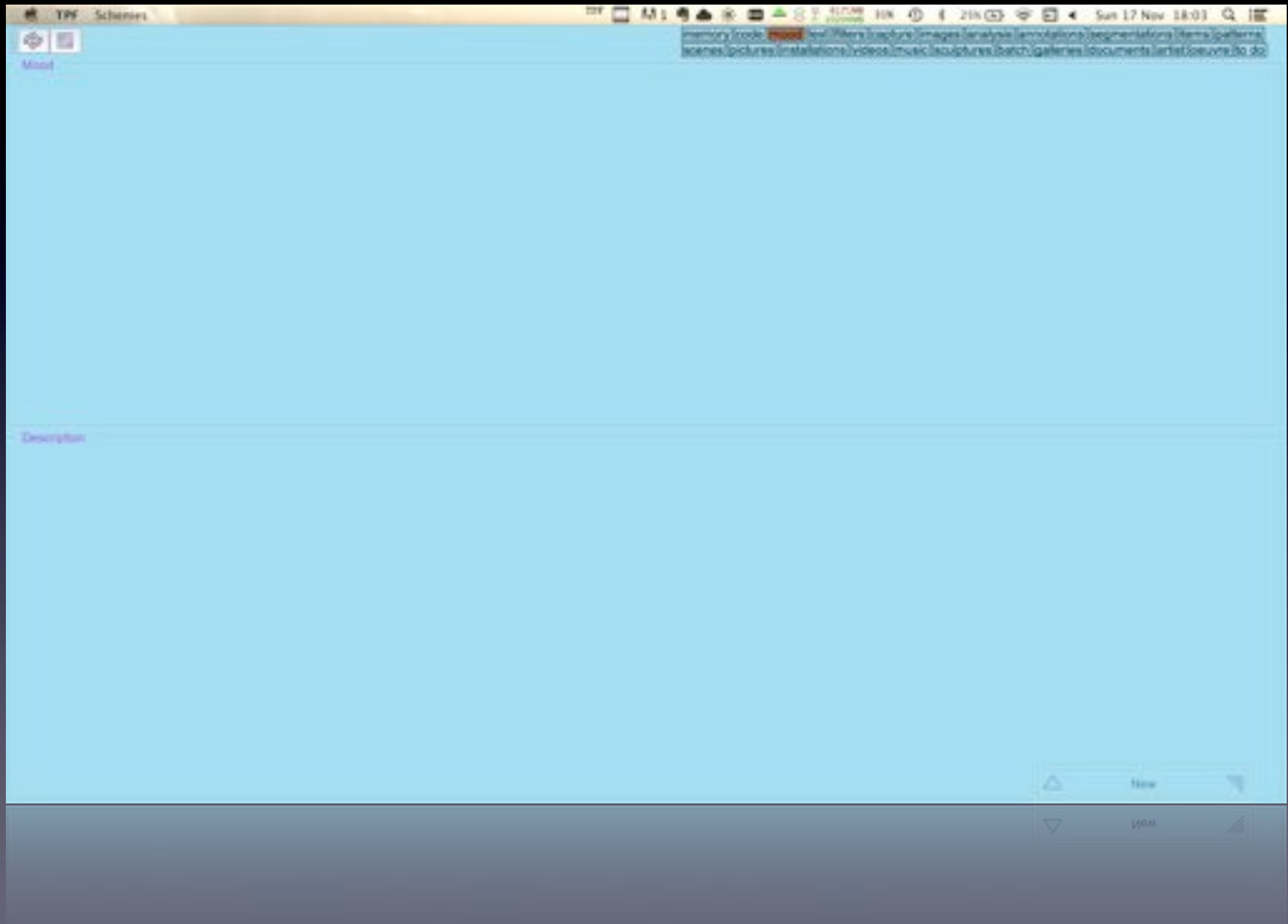
Mood Model

- We argue that software needs to add value to its work by framing it in terms of describing what its done and why, and what it's achieved (see my later lectures)
- Unpredictable behaviour leading to surprise in audiences has always been an desirable quality of creative systems
  - But random number generation has zero cultural value, i.e., if it turns out that the root decision was caused by a trivial process
  - Software can be unpredictable but not (yet) capricious
- So software needs to be equipped with *unpredictable yet accountable* behaviours which influence its generative processes and produces surprising results, yet enable the production of sensible explanations for its behaviour

Mood Model

- The Painting Fool has offline access to all 120,000 Guardian (newspaper) articles that were posted online last year
- When it starts, it chooses the article posted most closely to the *time of day* at the time of initiation. This provides a seed which is accountable (if a little arbitrary)
- It uses a simple sentiment analysis approach to estimate whether the article has positive, negative or neutral valency
- It then extracts keyphrases using TextRank (similar to PageRank)
    - It then uses these keyphrases to search for other articles, and chooses the first of those which hasn't been seen before
    - It doesn't allow the same keyphrase from an article to be used twice, which cuts down on repeated articles. When exhausted, it re-initialises
- Details: it has mood stabilising and balancing routines to smooth things out and try to ensure that it regularly goes through the full range of valencies


TPF
Schemes
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memory
code
mood
text
filters
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annotations
segmentations
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documents
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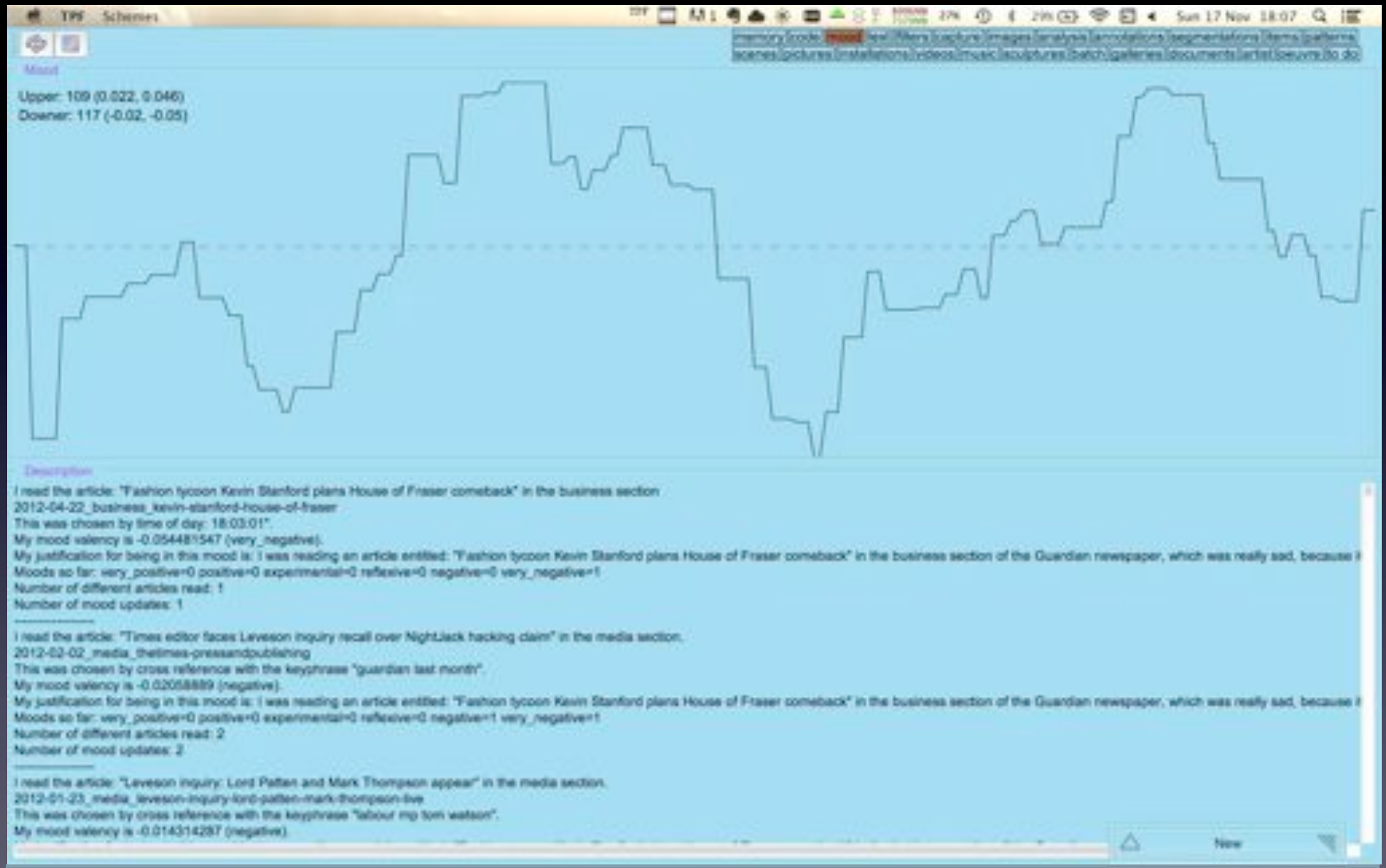
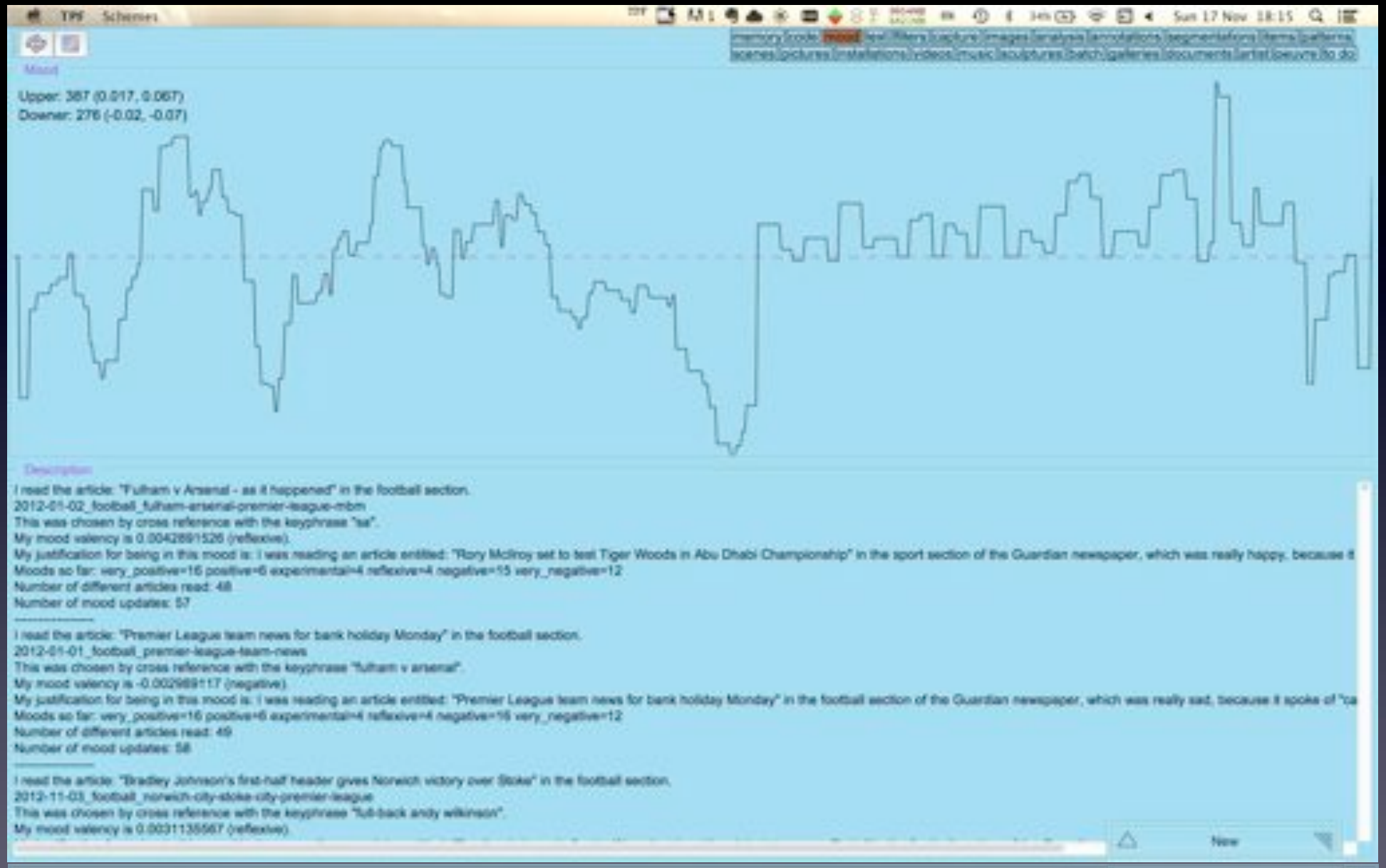
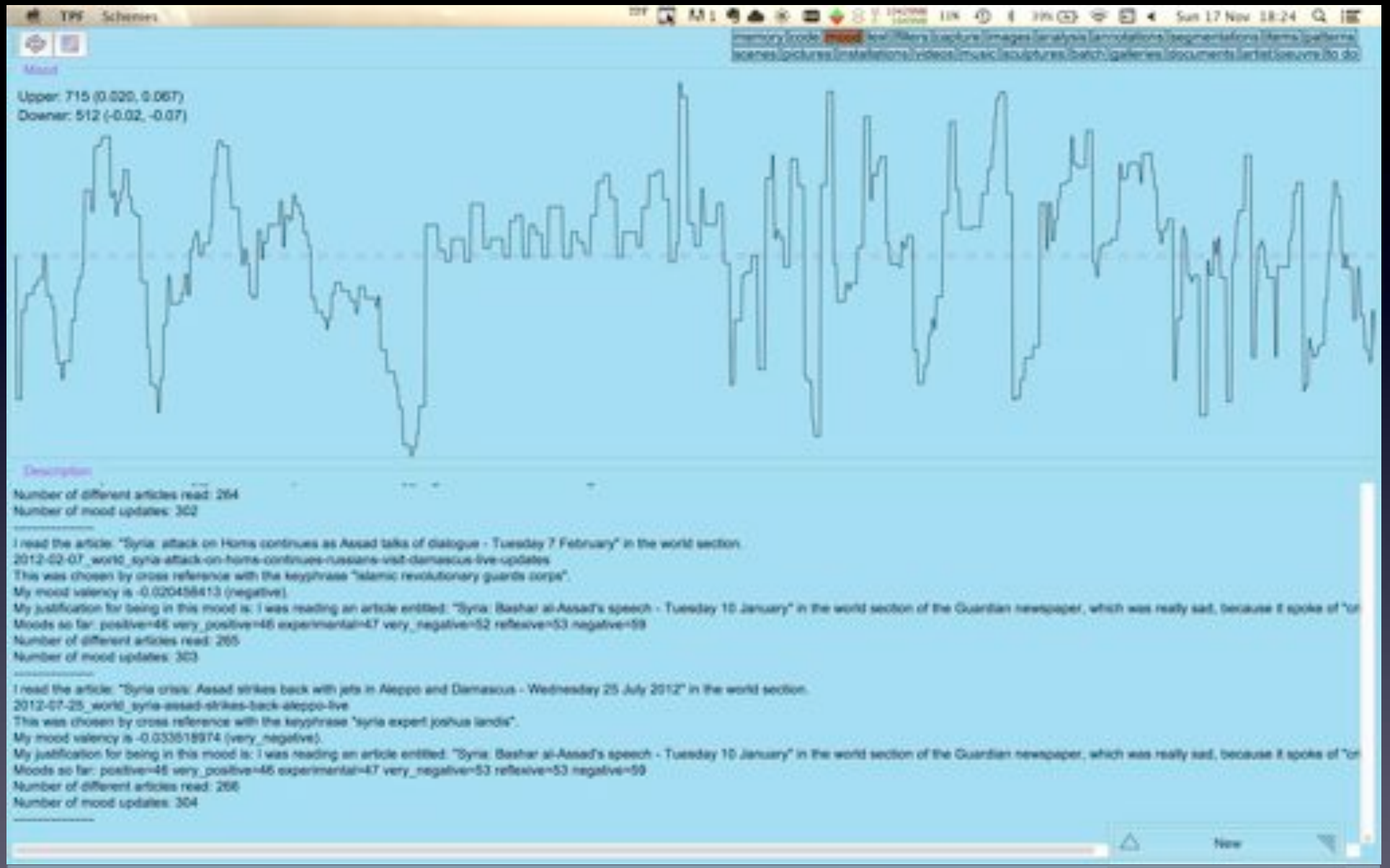
Mood
Description
New


TPS Schemes
Sun 17 Nov 18:07
Mood
Upper: 109 (0.022, 0.046)
Downer: 117 (-0.02, -0.05)
Description
I read the article: "Fashion tycoon Kevin Stanford plans House of Fraser comeback" in the business section
2012-04-22_business_kevin-stanford-house-of-fraser
This was chosen by time of day: 18:03:01".
My mood valency is -0.054481547 (very_negative).
My justification for being in this mood is: I was reading an article entitled: "Fashion tycoon Kevin Stanford plans House of Fraser comeback" in the business section of the Guardian newspaper, which was really sad, because
Moods so far: very_positive=0 positive=0 experimental=0 reflexive=0 negative=0 very_negative=1
Number of different articles read: 1
Number of mood updates: 1
I read the article: "Times editor faces Leveson inquiry recall over NightJack hacking claim" in the media section.
2012-02-02_media_thetimes-pressandpublishing
This was chosen by cross reference with the keyphrase "guardian last month".
My mood valency is -0.02058889 (negative).
My justification for being in this mood is: I was reading an article entitled: "Fashion tycoon Kevin Stanford plans House of Fraser comeback" in the business section of the Guardian newspaper, which was really sad, because
Moods so far: very_positive=0 positive=0 experimental=0 reflexive=0 negative=1 very_negative=1
Number of different articles read: 2
Number of mood updates: 2
I read the article: "Leveson inquiry: Lord Patten and Mark Thompson appear" in the media section.
2012-01-23_media_leveson-inquiry-lord-patten-mark-thompson-live
This was chosen by cross reference with the keyphrase "labour mp tom watson".
My mood valency is -0.014314287 (negative).
New


Upper: 387 (0.0/17, 0.067)
Downer: 276 (-0.02, -0.07)
I read the article: "Fulham v Arsenal - as it happened" in the football section.
2012-01-02_football_fulham-arsenal-premier-league-mbm
This was chosen by cross reference with the keyphrase "sa".
My mood valency is 0.00428691526 (reflexive).
My justification for being in this mood is: I was reading an article entitled: "Rory McIlroy set to test Tiger Woods in Abu Dhabi Championship" in the sport section of the Guardian newspaper, which was really happy, because it
Moods so far: very_positive=16 positive=6 experimental=4 reflexive=4 negative=15 very_negative=12
Number of different articles read: 48
Number of mood updates: 57
I read the article: "Premier League team news for bank holiday Monday" in the football section.
2012-01-01_football_premier-league-team-news
This was chosen by cross reference with the keyphrase "fulham v arsenal".
My mood valency is -0.002989117 (negative).
My justification for being in this mood is: I was reading an article entitled: "Premier League team news for bank holiday Monday" in the football section of the Guardian newspaper, which was really sad, because it spoke of "ca
Moods so far: very_positive=16 positive=6 experimental=4 reflexive=4 negative=15 very_negative=12
Number of different articles read: 49
Number of mood updates: 58
I read the article: "Bradley Johnson's first-half header gives Norwich victory over Stoke" in the football section.
2012-11-03_football_norwich-city-stoke-city-premier-league
This was chosen by cross reference with the keyphrase "full-back andy wilkinson".
My mood valency is 0.0031135567 (reflexive).


Upper: 715 (0.020, 0.067)
Downer: 512 (-0.02, -0.07)
Number of different articles read: 264
Number of mood updates: 302
I read the article: "Syria: attack on Homs continues as Assad talks of dialogue - Tuesday 7 February" in the world section
2012-02-07_world_syria-attack-on-homs-continues-russians-visit-damascus-live-updates
This was chosen by cross reference with the keyphrase "islamic revolutionary guards corps".
My mood valency is -0.020458413 (negative).
My justification for being in this mood is: I was reading an article entitled: "Syria: Bashar al-Assad's speech - Tuesday 10 January" in the world section of the Guardian newspaper, which was really sad, because it spoke of "cr
Moods so far: positive=46 very_positive=46 experimental=47 very_negative=52 reflexive=53 negative=59
Number of different articles read: 265
Number of mood updates: 303
I read the article: "Syria crisis: Assad strikes back with jets in Aleppo and Damascus - Wednesday 25 July 2012" in the world section.
2012-07-25_world_syria-assad-strikes-back-aleppo-live
This was chosen by cross reference with the keyphrase "syria expert joshua landis".
My mood valency is -0.033518974 (very_negative).
My justification for being in this mood is: I was reading an article entitled: "Syria: Bashar al-Assad's speech - Tuesday 10 January" in the world section of the Guardian newspaper, which was really sad, because it spoke of "cr
Moods so far: positive=46 very_positive=46 experimental=47 very_negative=53 reflexive=53 negative=59
Number of different articles read: 266
Number of mood updates: 304

I read the article: "Paperback fiction: February fiction" in the books section
2012-02-21_books_paperback-roundup-february-fiction
This was chosen by time of day: 17:30:31".
My mood valency is -0.028735632 (very_negative).
My justification for being in this mood is: I was reading an article entitled: "Paperback fiction: February fiction" in the books section of the Guardian newspaper, which was really sad, because it spoke of "red pen".
Moods so far: very_positive=0 positive=0 experimental=0 reflexive=0 negative=0 very_negative=1
Number of different articles read: 1
Number of mood updates: 1

I read the article: "Paperback Q&A: Esi Edugyan on Half Blood Blues" in the books section.
2012-02-07_books_paperback-q-a-esi-edugyan
This was chosen by cross reference with the keyphrase "half blood blues".
My mood valency is -0.0111069465 (negative).
My justification for being in this mood is: I was reading an article entitled: "Paperback fiction: February fiction" in the books section of the Guardian newspaper, which was really sad, because it spoke of "red pen".
Moods so far: very_positive=0 positive=0 experimental=0 reflexive=0 negative=1 very_negative=1
Number of different articles read: 2
Number of mood updates: 2

I read the article: "Miami Heat 100 - Oklahoma City Thunder 96 - as it happened" in the sport section.
2012-06-15_sport_miami-heat-oklahoma-city-thunder-live
This was chosen by cross reference with the keyphrase "carpal tunnel syndrome".
My mood valency is 0.008128183 (very_positive).
My justification for being in this mood is: I was reading an article entitled: "The mother of all maternity shoes" in the fashion section of the Guardian newspaper, which was really happy, because it spoke of "great option".
Moods so far: very_positive=2 positive=0 experimental=0 reflexive=0 negative=1 very_negative=1
Number of different articles read: 4
Number of mood updates: 4

Mood Usage

- When someone sits down for a portrait, the software assesses which of six moods it is in:
  - Very positive, positive, experimental, reflective, negative or very negative
- If the mood is very negative, then The Painting Fool tells the person to go away, because it's not appropriate to paint a picture
  - But it does provides a printout explaining its decision, in terms of its mood, and a particularly negative keyphrase it has recently extracted
  - Remember: you can't know The Painting Fool's mind!

ThePaintingFool

You Can't Know my Mind

www.thepaintingfool.com

I was in a particularly negative mood, because
I was reading an article entitled: "Aftershocks
rock Italy earthquake zone" in the world section
of the Guardian newspaper, which was really
sad, because it spoke of "terrified residents".

So, I decided not to paint a portrait.

No random numbers were used in coming to this decision.

Galerie Oberkampf

15_6_2013
19_9_25

ThePaintingFool

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Portrait Conception

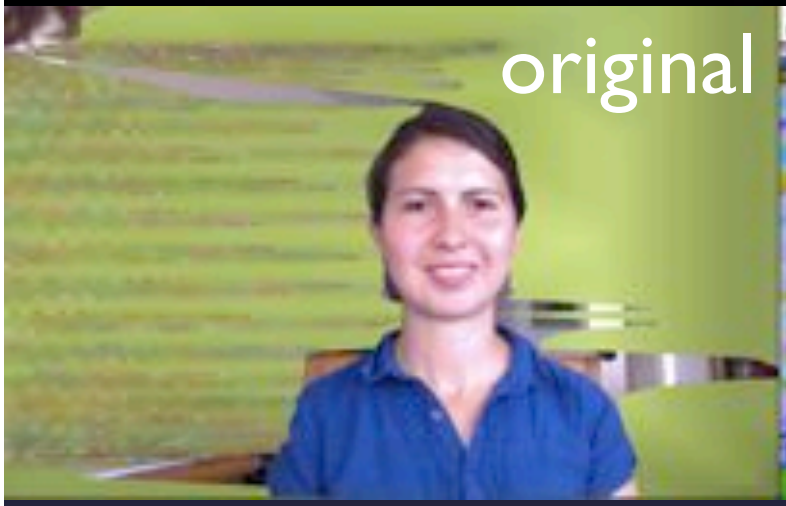
- If The Painting Fool is in a good enough mood to paint a portrait, then...
  - See later for reflective and experimental moods
  - If it is in a positive (very positive) mood, it picks one (two) of 20 upbeat adjectives, like: "bright", "colourful", "vivid", etc. And it asks the sitter to smile
  - If it is in a negative mood, it picks one of 20 downbeat adjectives, like: "dreary", "dull", "bleached", etc. And it asks the sitter to put on a miserable face
- These adjective(s) inform the aim of the portrait process: it will attempt to produce a picture that people are likely to project the adjective onto, e.g., "oooh what a vivid picture!"

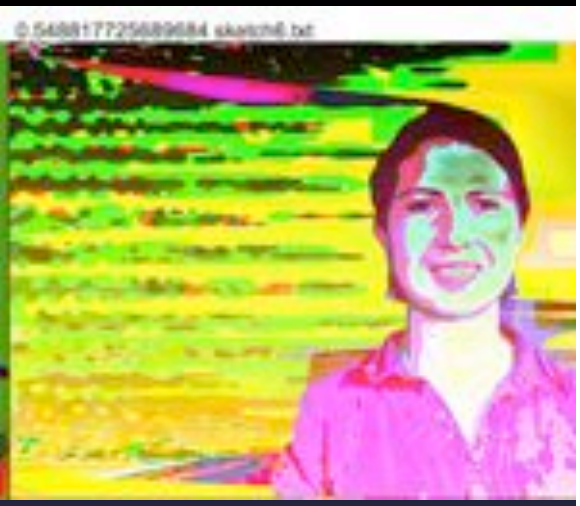
Realising Adjective Descriptions

- In prior work, Dan+team have trained Artificial Neural Networks (ANNs) to predict the likelihood of certain words being projected onto an image
  - Part of the DARCI project: an artificial artist with critical ability
  - Each ANN corresponds to a particular adjective, and uses hundreds of machine vision calculations on an image as input, and outputs a value corresponding to the likelihood of the adjective being used to describe the input image
  - Trained by asking lots of people to tag artworks with adjectives in a freeform way
- We applied it to the results the application of 1000 image filters in Filter Feast to some images of faces
  - To find the best filters with respect to the ANN predictions

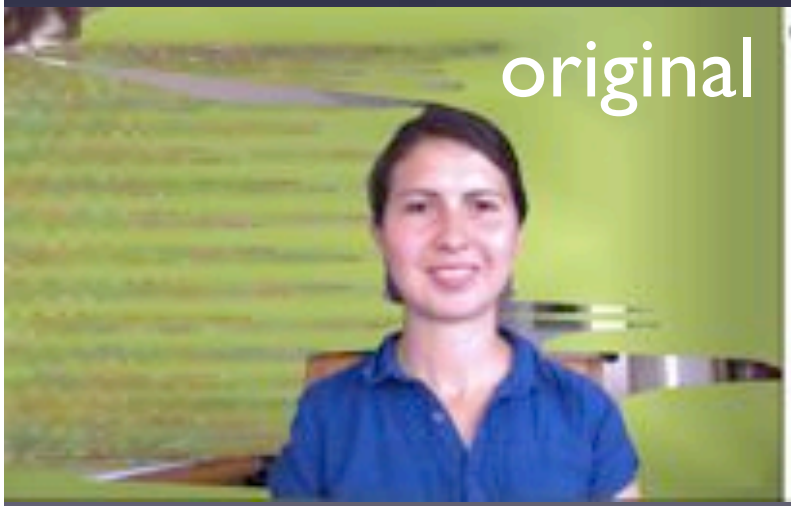
Results

Colourful





Bleached



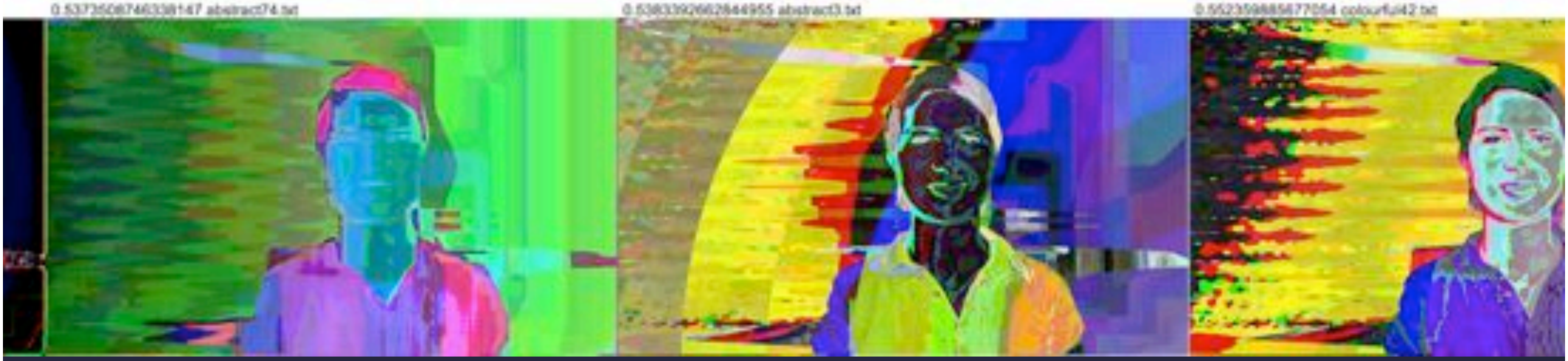
Results

Colourful

Bleached

Results

Colourful



Bleached

Results

Colourful

Bleached

Results

Colourful

Bleached

Conceptualisation

- In order for The Painting Fool to express its mood
  - Given a particular adjective to achieve, it finds the top ten filters for that adjective, and applies them to an abstract art image from ELVIRA, measures each against the adjective ANN and chooses the best
    - There are a million possible backgrounds
  - Using vision techniques, it (tries to) extract the face/hair/body of the sitter from the background image [ask me about this...]
    - And then applies the filter to this image too
  - It then combines the background and foreground into a conception image - a quick sketch that it wants to achieve
- In order to achieve something of a likeness for the portrait, it uses edge detection and smoothing to find features in the face

Example Conceptions

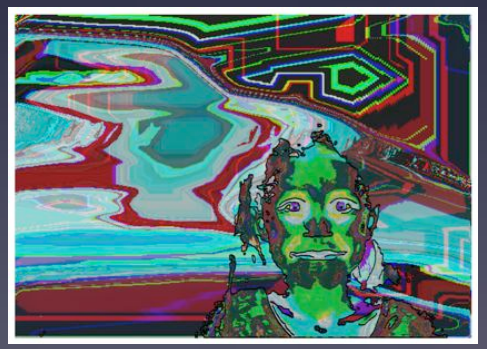
"Crazy"

"Bleached"

"Hot"

"Cold"

"Active"



"Busy and Patterned"

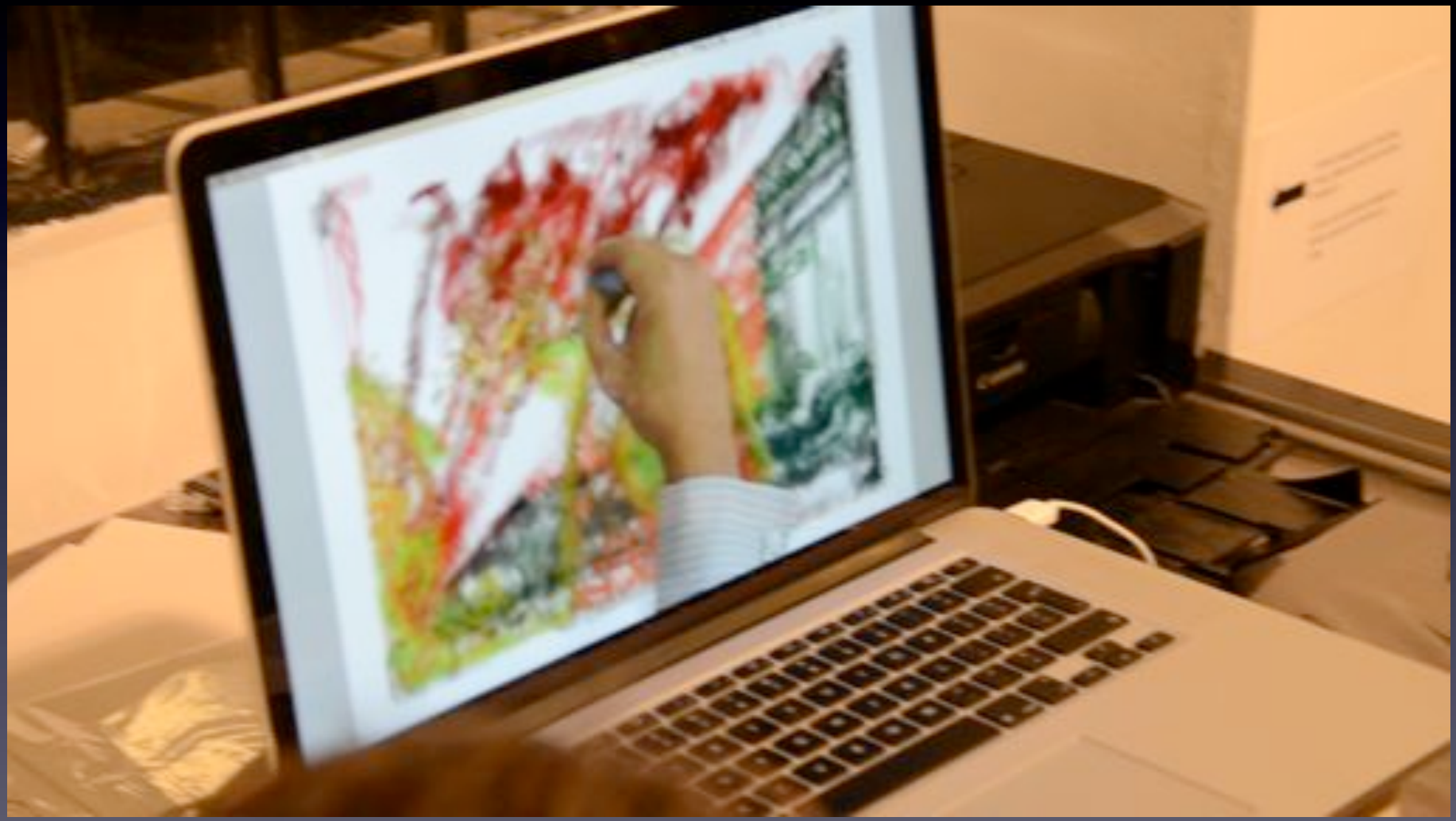
"Plain"

"Bright and Squiggly"

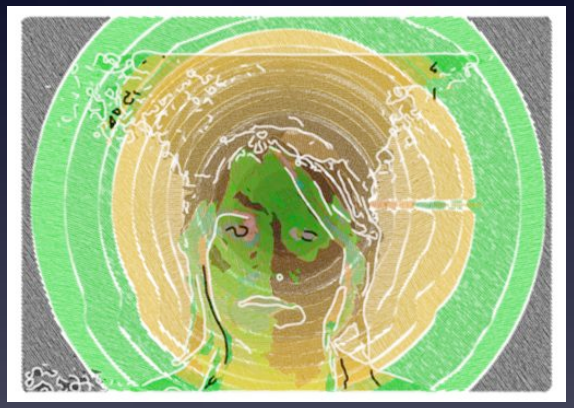
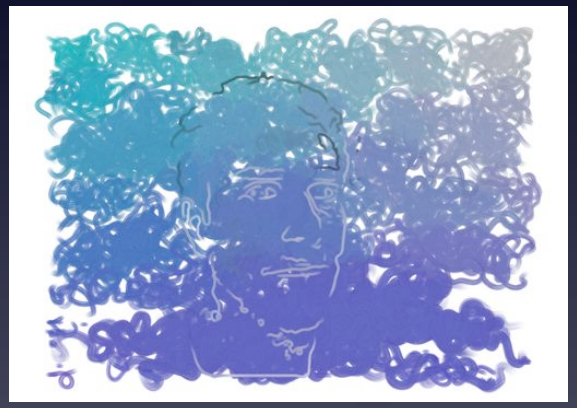
Rendering the Portrait

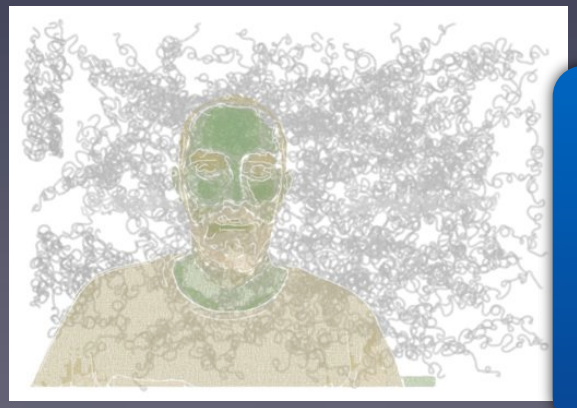
Rendering the Portrait

Rendering the Portrait



Some Portraits



My Curation Coefficient:
around 50%
Evaluation coming soon...

Assessing its Creation

- Remember that The Painting Fool aimed to produce an image onto which people might project a particular adjective
  - The conception was designed for this, but a lot is lost (and sometimes gained) in the rendering
- So, it passes its portrait through the ANNs for the adjectives, and assesses overall quality and loss/gain from the conception
  - Then determines whether it should be happy or sad on both of these counts
- It also assesses the image against other ANNs, to add more framing information - showing that it can appreciate what it has produced
- It puts all this information into a commentary PDF which is printed on the reverse of the portrait for the sitter to take away

Example Commentaries

Galerie Oberkampf
SIMON COLTON

13_6_2013
16_24_16

ThePaintingFool

You Can't Know my Mind

www.thepaintingfool.com

I was in a negative mood.
So I wanted to paint a bleached portrait.
I aimed to achieve something like this:

And this is my painting:

Overall, this is a very bleached portrait.
I think my style has really made it more bleached.
This is a great achievement - I'm very pleased.
And I'm also pleased that the portrait is
bleary, because that suits my mood.

Galerie Oberkampf
SIMON PAUW

16_6_2013
20_1_10

ThePaintingFool

You Can't Know my Mind

www.thepaintingfool.com

I was in a positive mood.
So I wanted to paint a happy portrait.
I aimed to achieve something like this:

And this is my painting:

Overall, this is quite a happy portrait.
My style has significantly lowered the level of happy here.
This is a miserable failure - I'm very unhappy about that.

I was in a negative mood.
So I wanted to paint a bleached portrait.
I aimed to achieve something like this:

And this is my painting:

Overall, this is a very bleached portrait.
I think my style has really made it more bleached.
This is a great achievement - I'm very pleased.
And I'm also pleased that the portrait is
bleary, because that suits my mood.

I was in a positive mood.
So I wanted to paint a happy portrait.
I aimed to achieve something like this:

And this is my painting:

Overall, this is quite a happy portrait.
My style has significantly lowered the level of happy here.
This is a miserable failure - I'm very unhappy about that.

Experimental and Reflective Moods

- At the start of the exhibition, it had no information about which painting styles are good for which adjectives
  - So it chose the rendering style systematically
- Whenever it's in an experimental mood, it chooses a pairing of painting style and adjective that it's not seen before to try out
- Whenever it's in a reflective mood, it looks for the most recent *miserable failure* and chooses the same adjective, but a different rendering style
- In this way, it has built up a knowledge base of which rendering styles enhance which adjectives, and used this probabilistically as the exhibition progressed
  - E.g., pencils are better for cold pictures, paints for vibrant pictures

Galerie Oberkampf
KATOLLIE

13_6_2013
23_20_29

The Painting Fool

You Can't Know my Mind

www.thepaintingfool.com

I was in a reflective mood, and I had previously had trouble achieving a bright and warm portrait. So, I tried again with a different style. I aimed to achieve something like this:

And this is my painting:

Overall, this is quite a bright portrait.
My style has significantly lowered the level of bright here.
This is a miserable failure - I'm very unhappy about that.

I was in a reflective mood, and I had previously had trouble achieving a bright and warm portrait. So, I tried again with a different style.
I aimed to achieve something like this:

And this is my painting:

Overall, this is quite a bright portrait.
My style has significantly lowered the level of bright here.
This is a miserable failure - I'm very unhappy about that.

its own decisions about what to paint, how to use its materials and, working with computational critic DARCI, together they decide whether or not the final product is suitable. As demonstrated here, The Painting Fool exhibits behaviours which have emerged in Computational Creativity research as being important for the perception of creativity in software. In particular, the software exhibits:

Intentionality: By attempting to produce a portrait which either explores its materials and techniques; expresses its mood; or tries to improve upon failed experiences, the software shows that it knows what it wants to do.

Imagination: By using its mood to conceptualise a portrait, the software produces a new backdrop for each portrait, changing colours and abstraction levels in the face in order to express that mood.

Skill: By painting live on-screen with simulated paint brushes, pencils and pastels, the software shows that it has all the artistic sk sting and characteristic portraits.

Appreciation: By using artificial gh direct experience with artists and art lovers, the system is able to te ved the aims dictated by its mood.

Reflection: By criticising failures to express a mood, the software reflects on its artistic process and tries later to improve by producing a new portrait expressing the same mood, but using different conceptualisations and painting styles.

Learning: By recording successes and failures, the software is able to constantly learn about how to express mood through its processes---how different conceptualisations and painting styles produce more or less mood in pieces, making the software unpredictable in a non-random way.

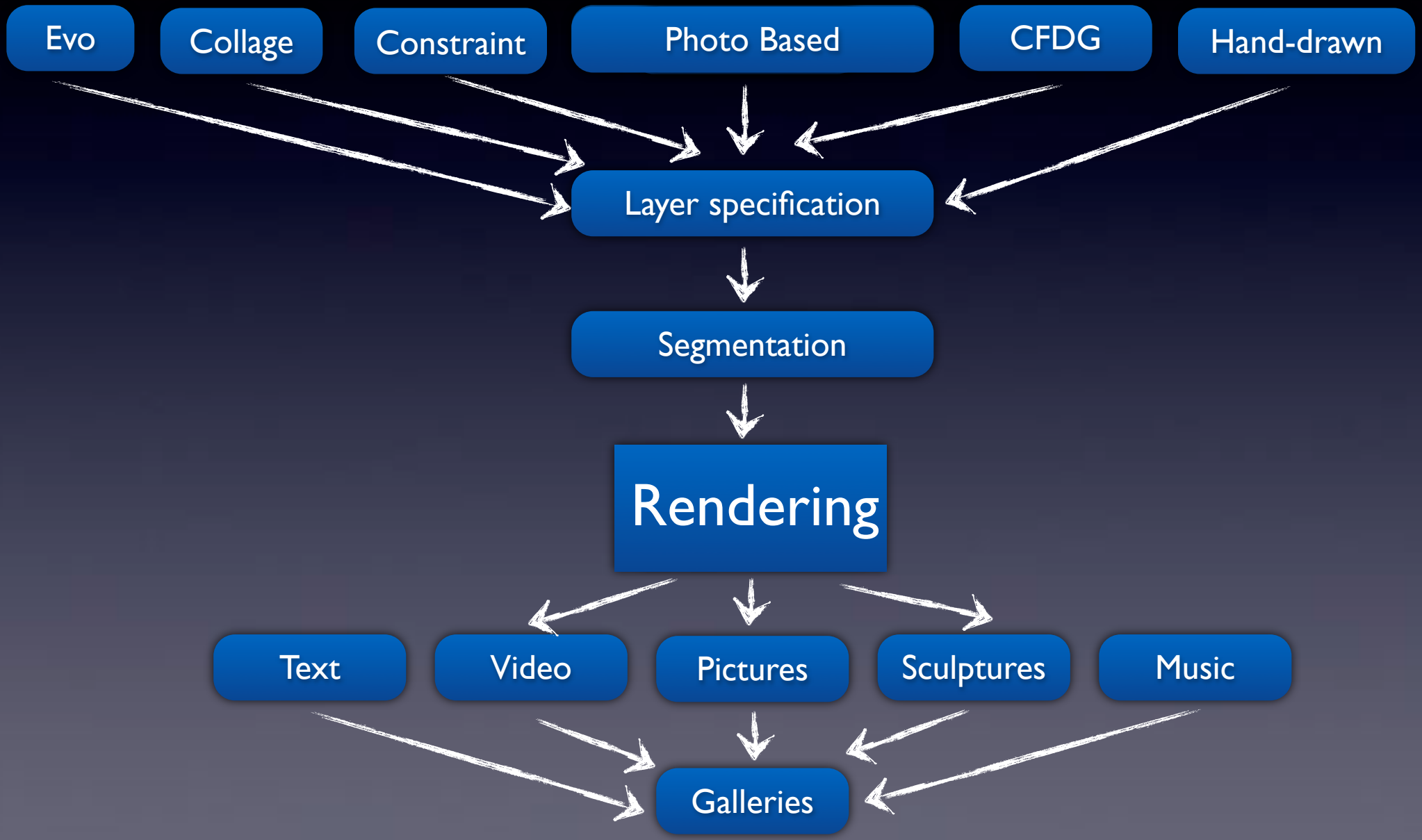
Do you agree?

You can't know its mind.

The You Can't Know my Mind exhibit has been realised by: Blanca Pérez Ferrer, Dan Ventura and Simon Colton. Blanca is a historian of arts who has a masters degree in cultural mediation from the École du Louvre and is currently working as a cultural mediator and curator for the Ligue de l'Enseignement. Dan is a Professor in the Computer Science Department at Brigham Young

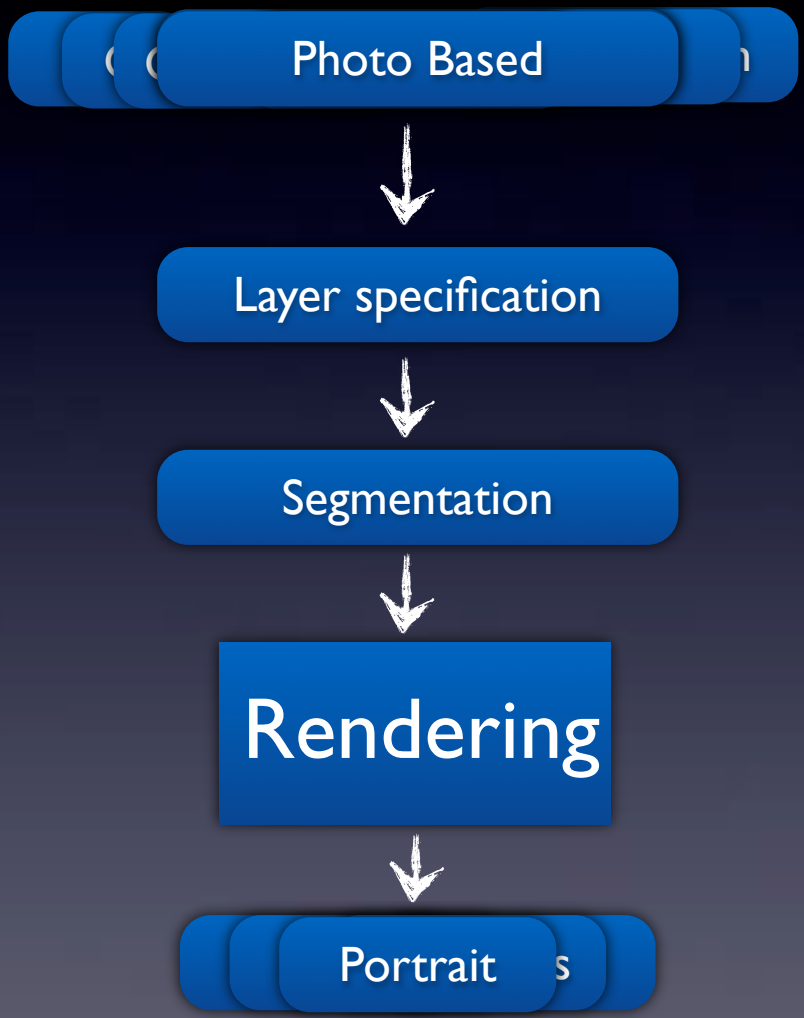
Multimedia-based

Graphics Workflow



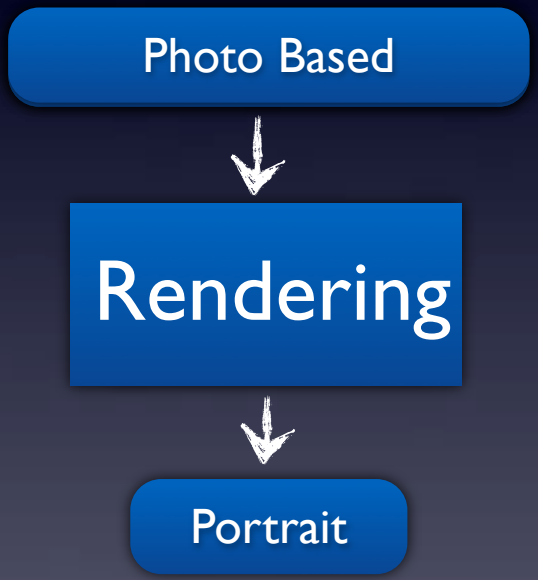
Mood-based

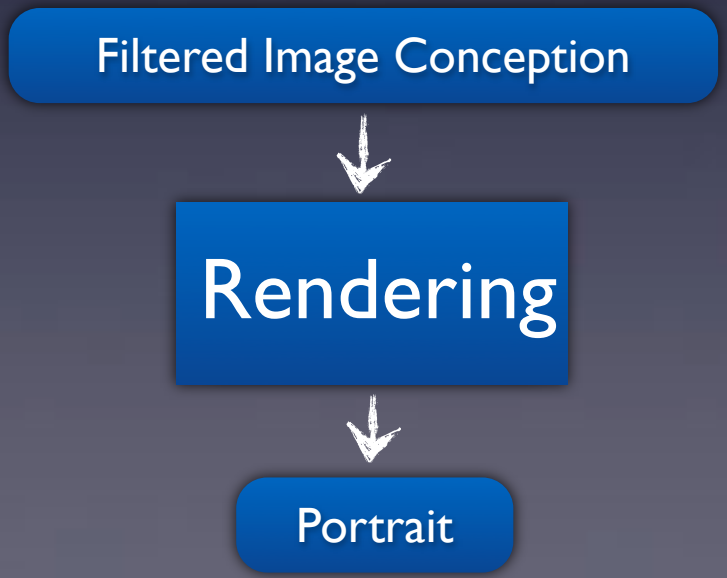
Portraiture Workflow

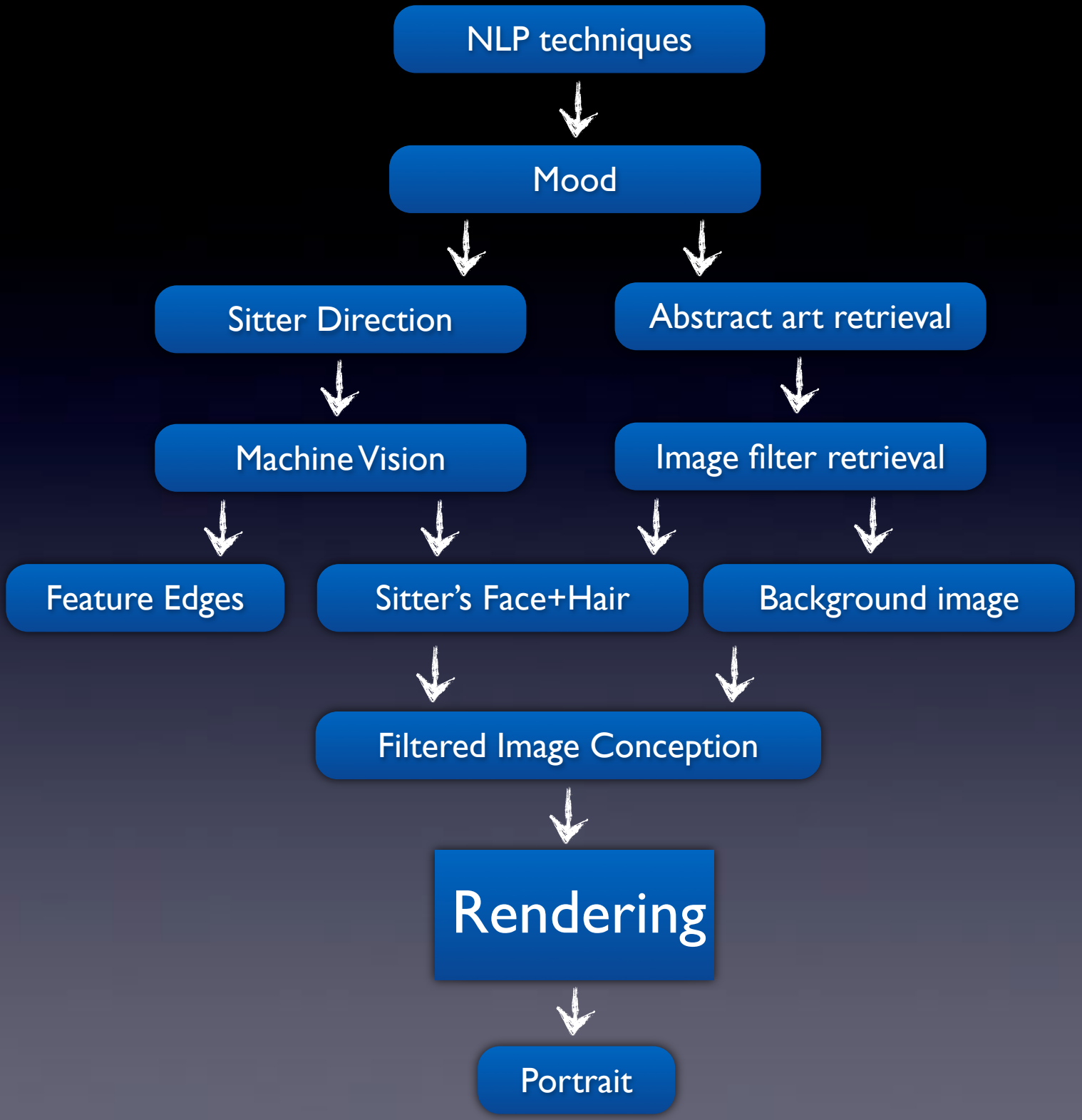


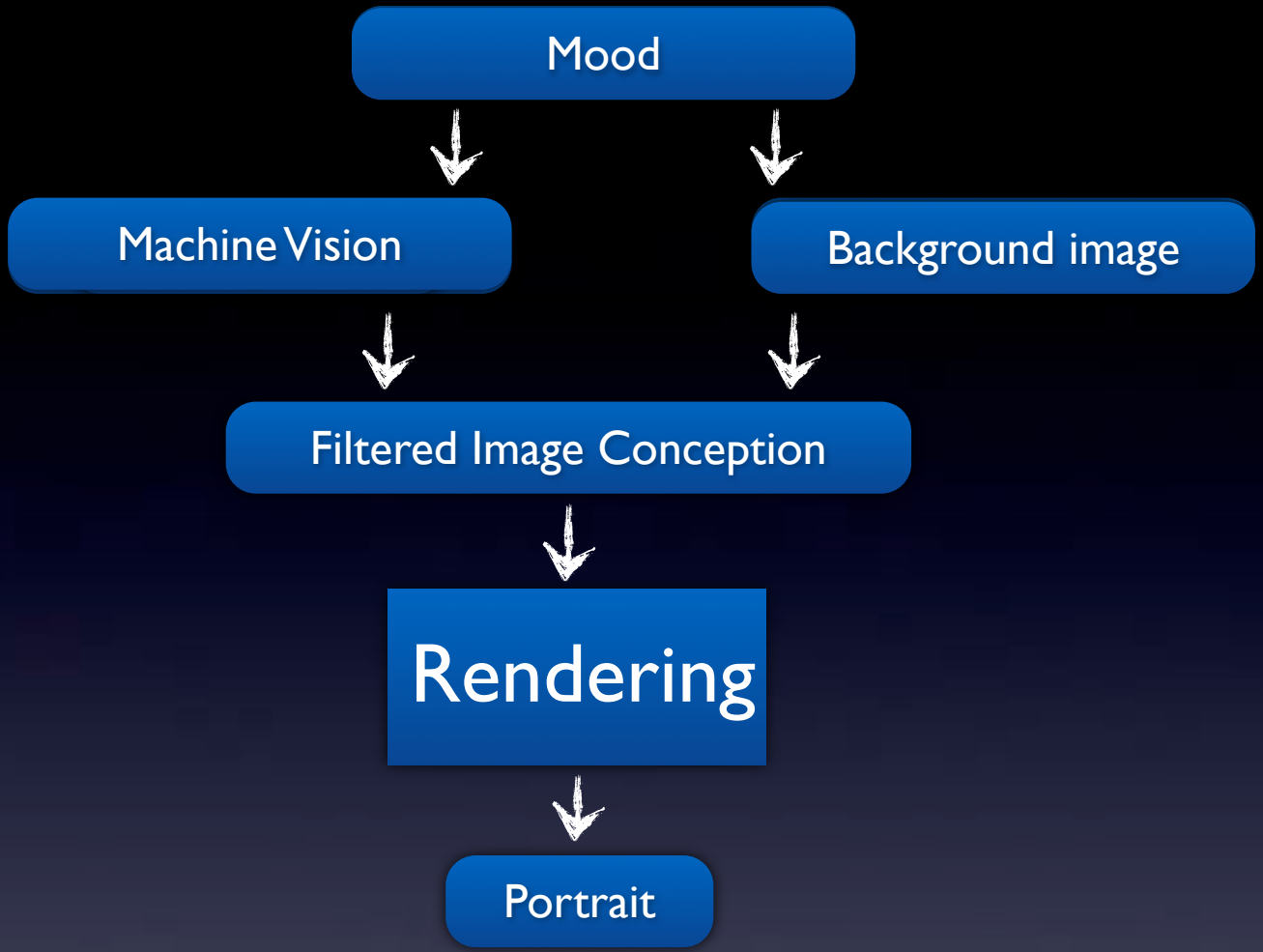
Mood-based

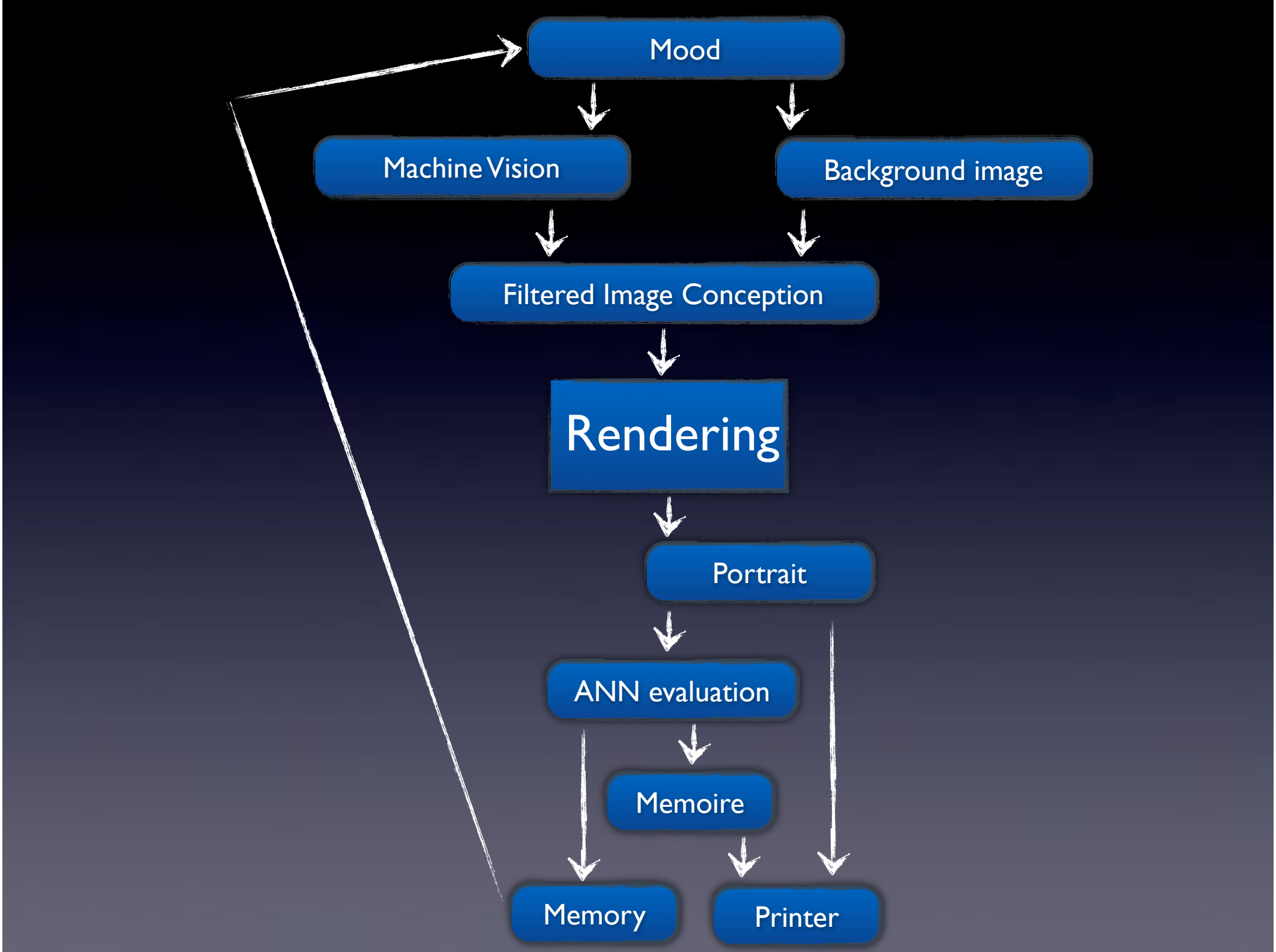
Portraiture Workflow




Filtered Image Conception
Rendering
Portrait


NLP techniques
Mood
Sitter Direction
Abstract art retrieval
Machine Vision
Image filter retrieval
Feature Edges
Sitter's Face+Hair
Background image
Filtered Image Conception
Rendering
Portrait

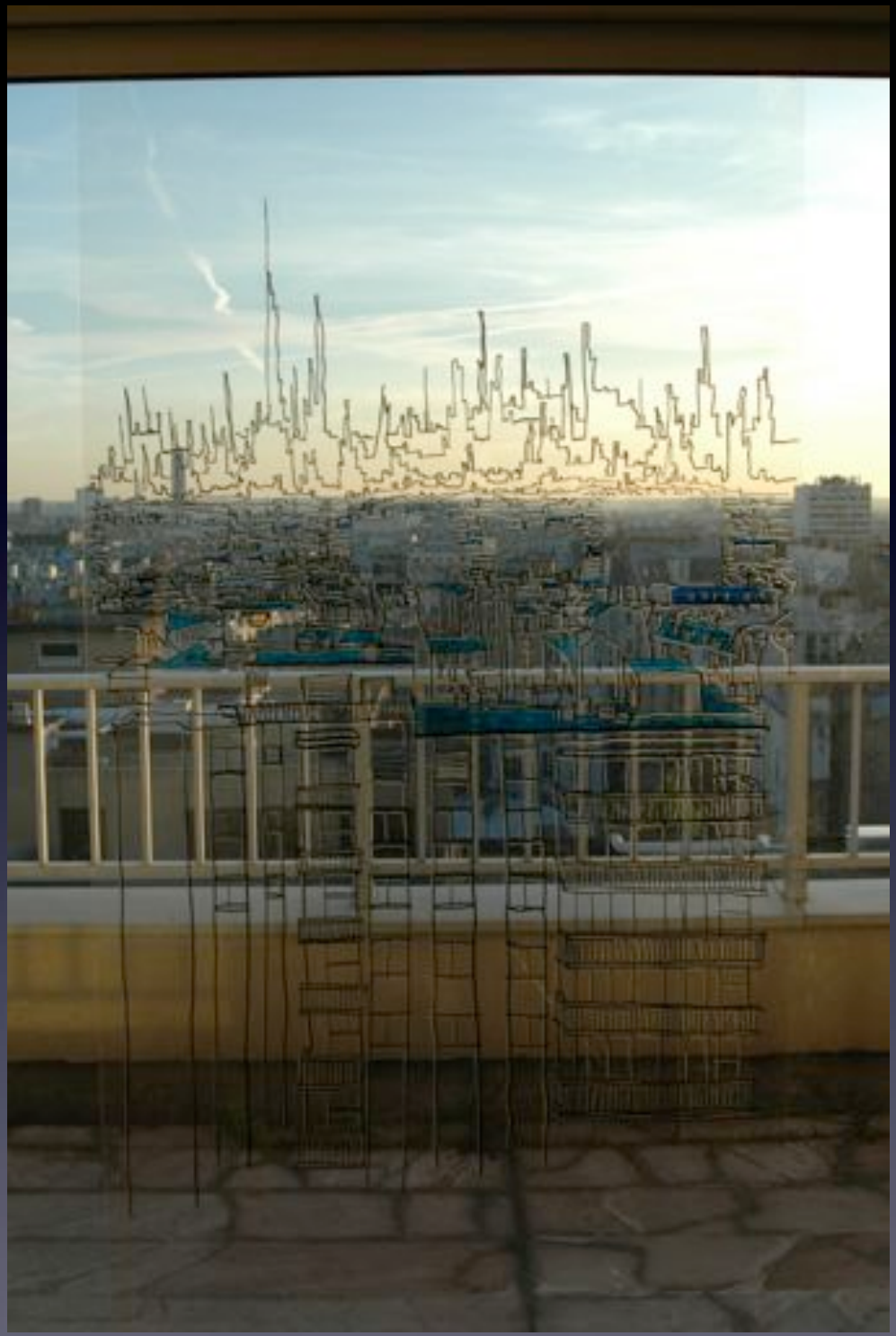

Mood
Machine Vision
Background image
Filtered Image Conception
Rendering
Portrait


Mood
Machine Vision
Background image
Filtered Image Conception
Rendering
Portrait
ANN evaluation
Memoire
Memory
Printer

Exhibitions

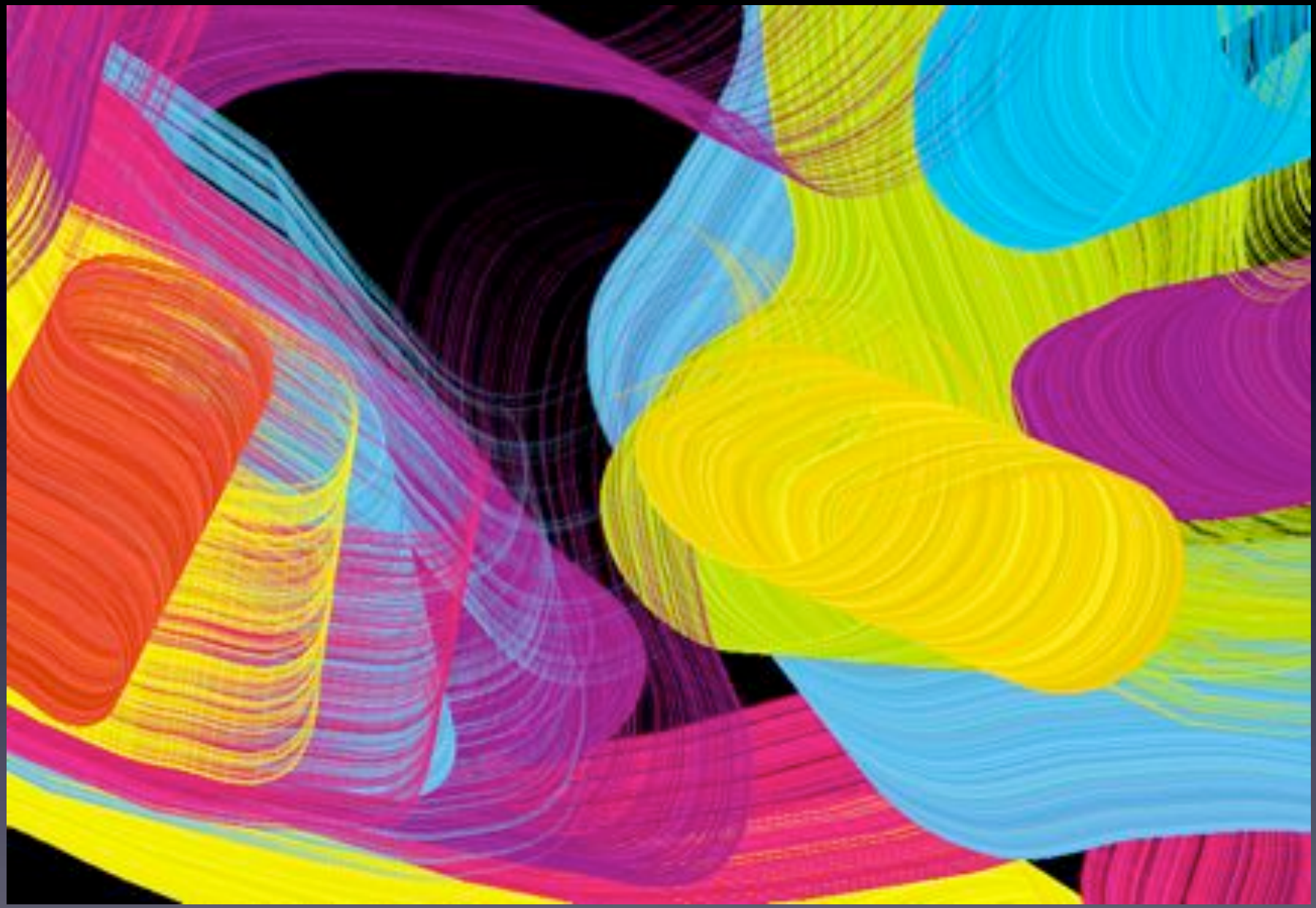
No Photos Harmed Exhibition

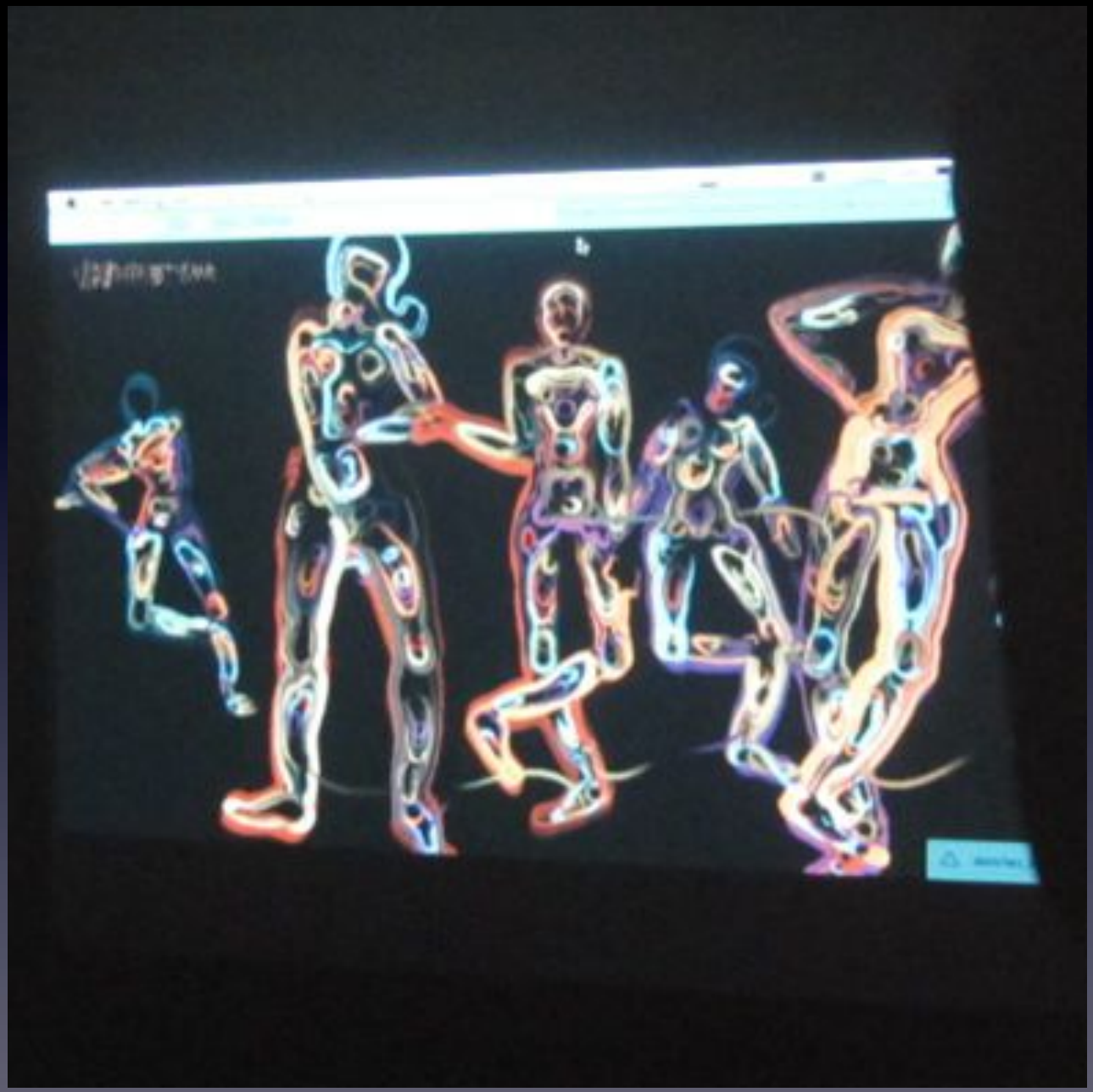
- Joint exhibition with Eileen Chen
  - Dialogue on the nature of handing over creative responsibility in artistic processes
- Two weeks with a vernissage (100 people), middisage (10 people) and finissage (60 people)
- My contribution: two large pieces which emphasise that computer generated art can be neither fractals nor photoshopped, hence "no photos harmed"
  - And a continuous live painting session (around 8 hours)



The Four Seasons

The Dancing Salesman Problem



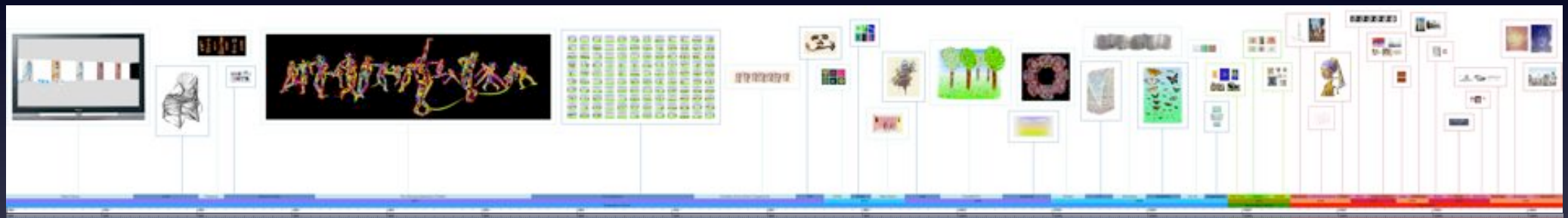


Growth
Exhibition

- Joint exhibition with members of the Sony CSL team
  - "Performing Sciences", including visual arts, musical performances and sculptures
  - At La Maison Rouge contemporary art space in Paris
- I presented a timeline of important pieces from 10 years of The Painting Fool
  - Aim is to highlight the growth that software goes through, how it becomes more sophisticated through training

Timeline

Ten Years of Development



Timeline

Ten Years of Development

Timeline

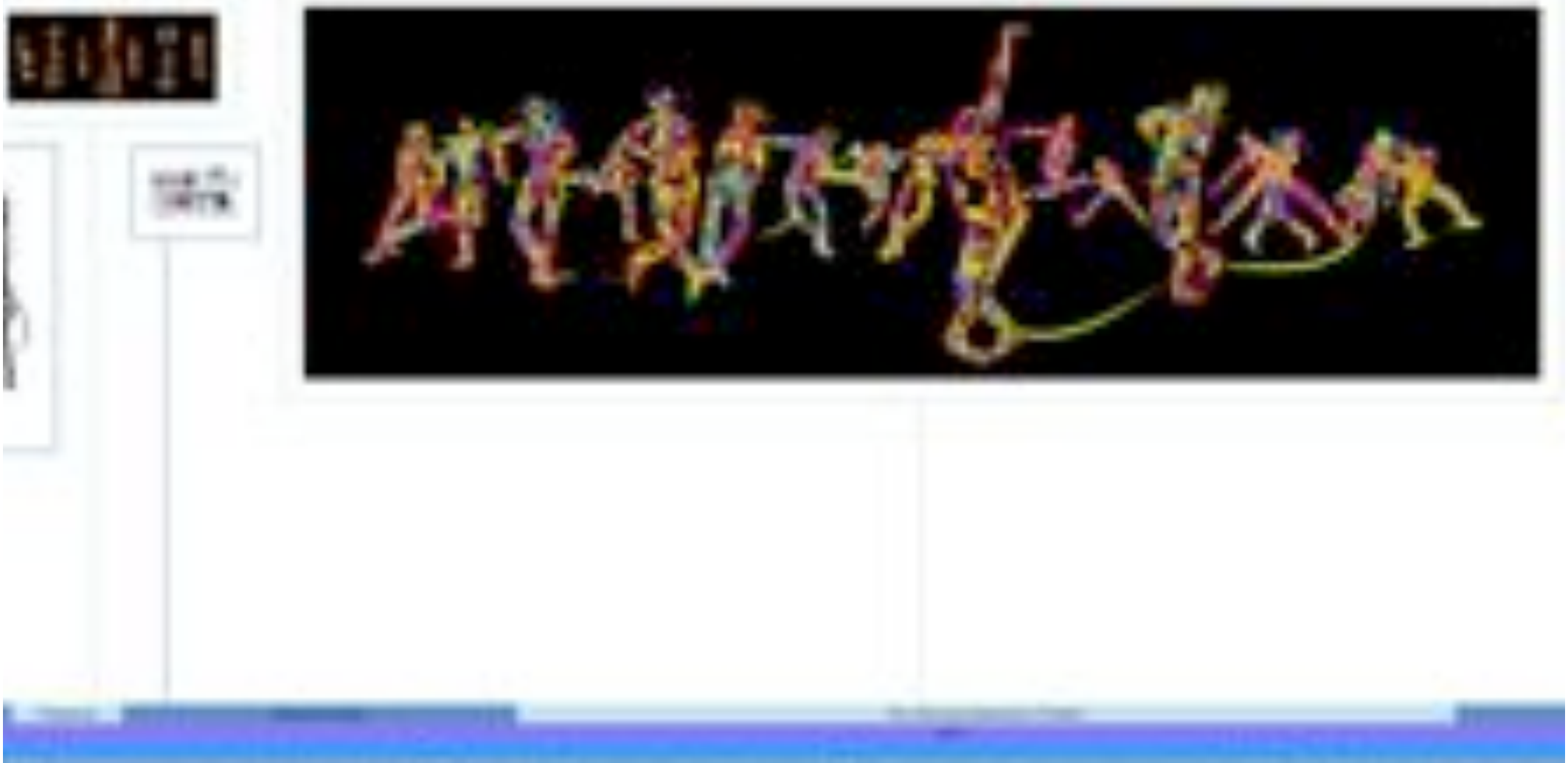
Ten Years of Development

Timeline

Ten Years of Development

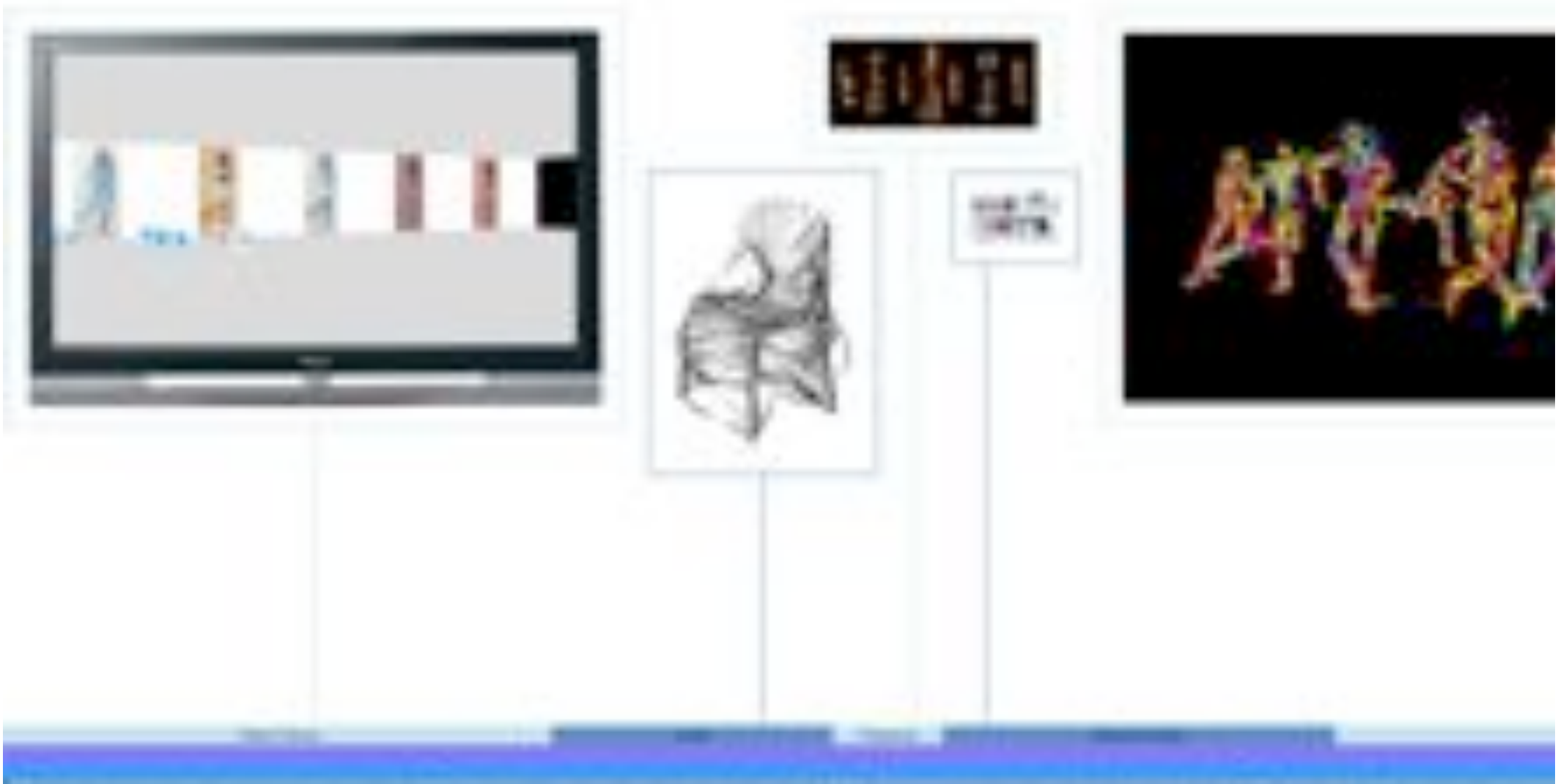
Timeline

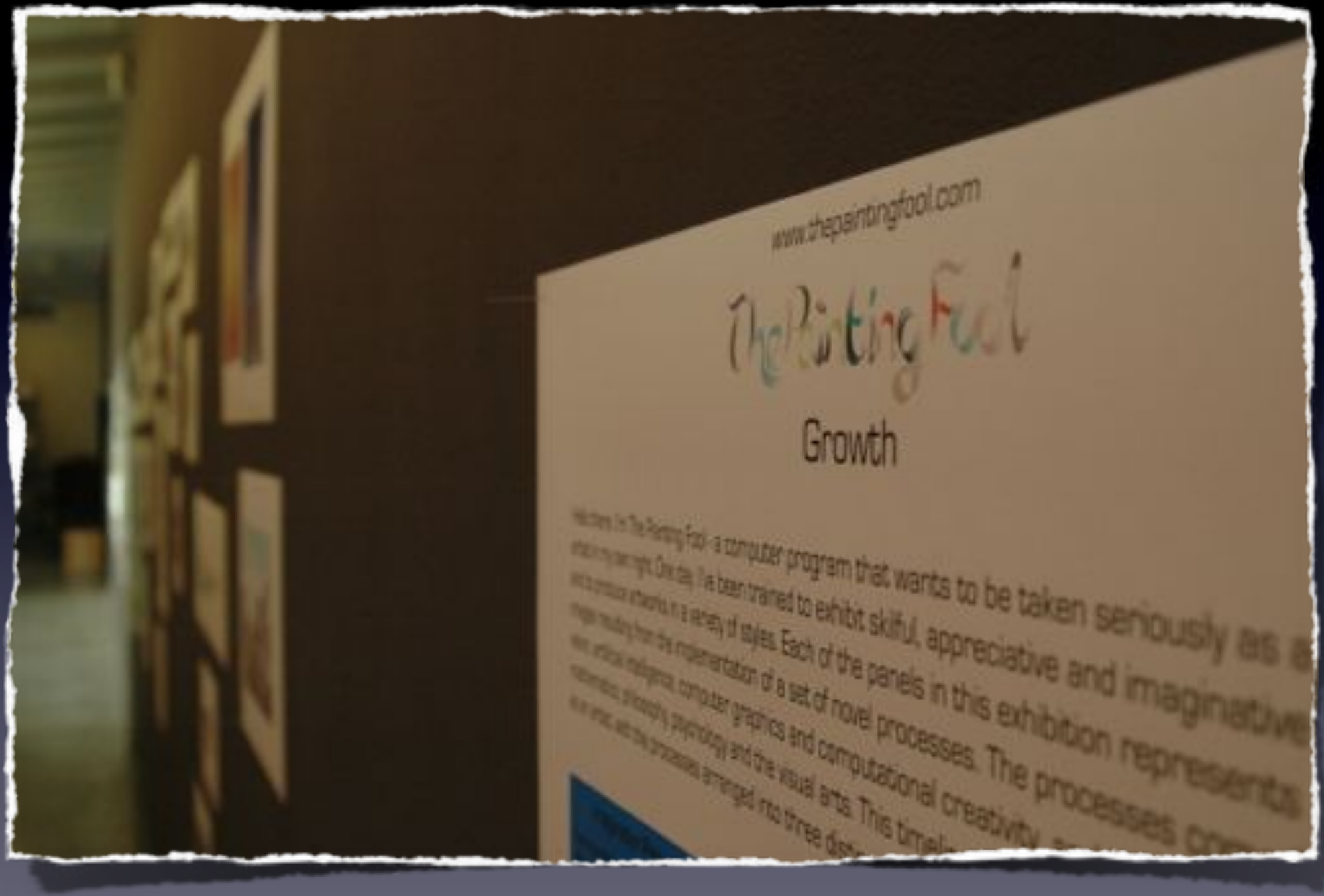
Ten Years of Development



Timeline

Ten Years of Development




www.thepaintingfool.com
Growth

You Can't Know my Mind

Festival of Computational Creativity

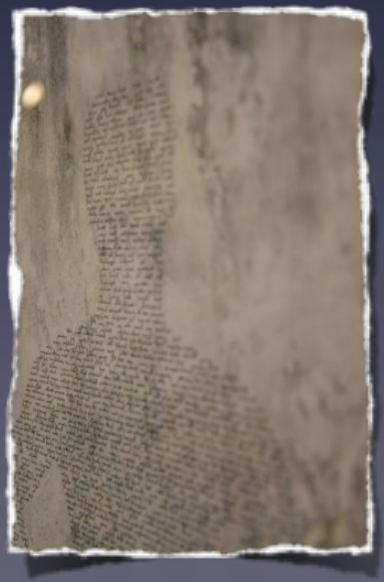
- Seven glorious days in July at the Galerie Oberkampf in Paris
- Art exhibition, including new works, all by The Painting Fool
- Vernissage with portraiture, extending throughout the week
- "Moody Music" night, with the mood software providing midi input to a performing digital musician
- "Poems and Potage" night with recipes designed by Dan's software, and poems produced by The Painting Fool

galerie
oberkampf
Galerie Oberkampf

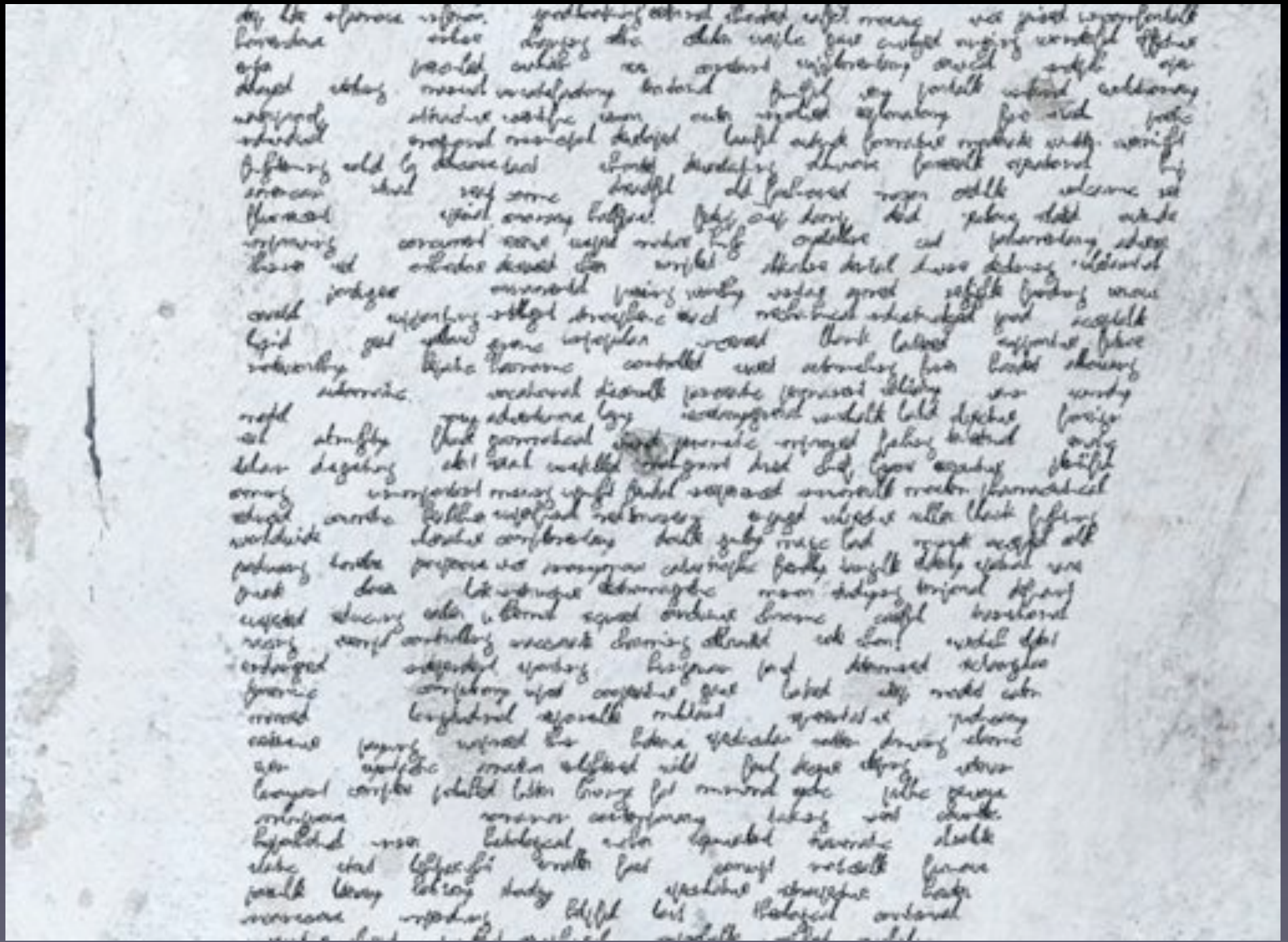
You Can't Know
my Mind

Galerie Oberkampf
www.galerieoberkampf.com
Un Festival de
Computational Creativity

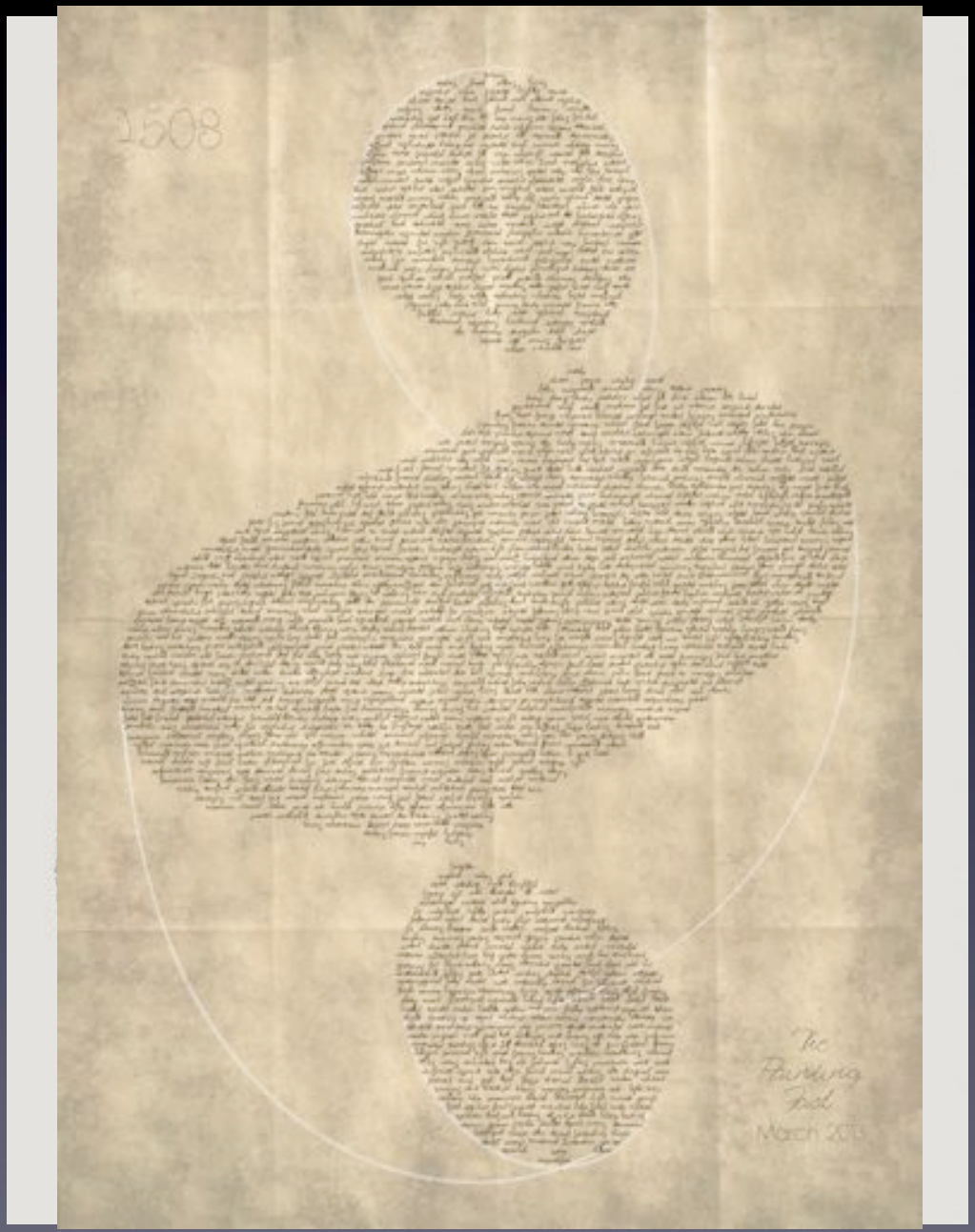
Exhibition



Concrete Nudes



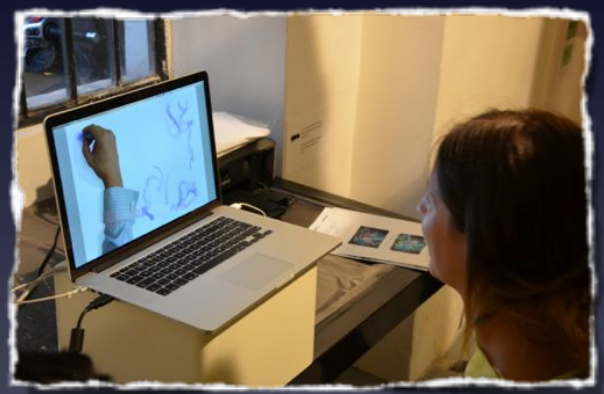
More Handwriting Pieces



Vernissage

Music Night

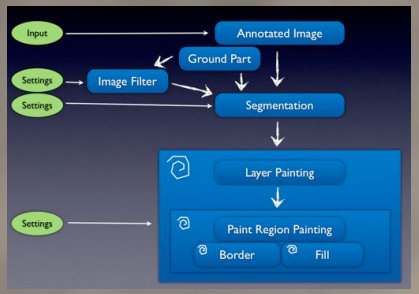
Portraiture

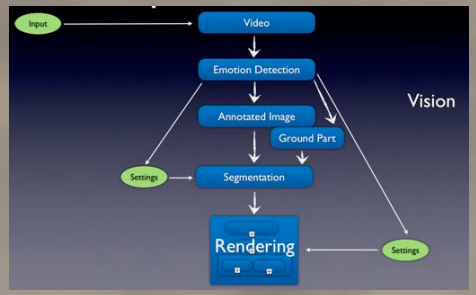


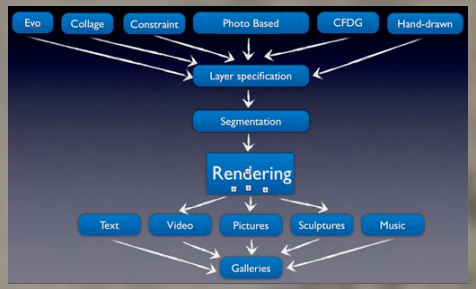
Can't
Mind

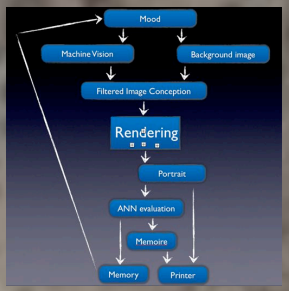
Poems and Potage Night

Future Work

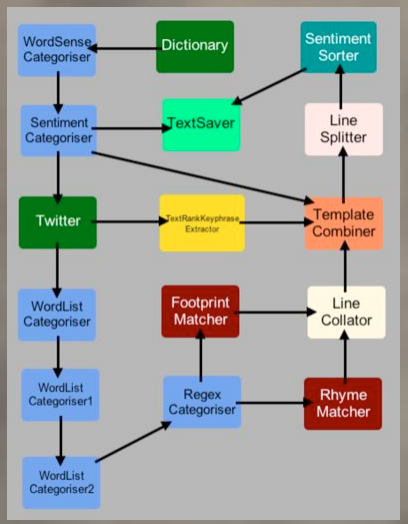


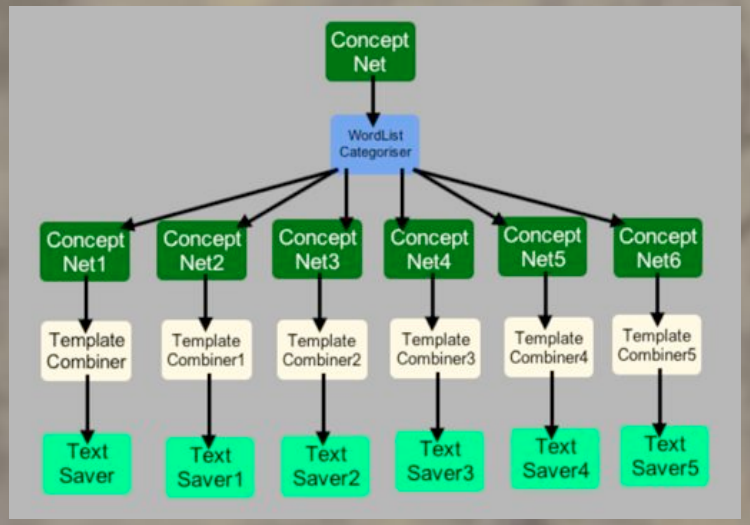


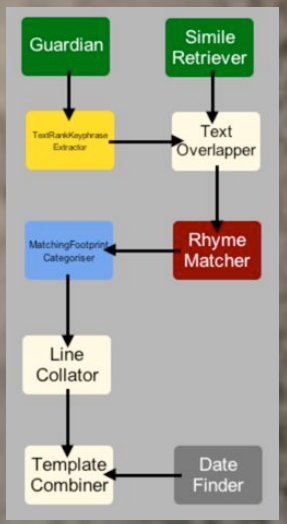




Wouldn't it be better if the software invented these processes itself?







The What-If Machine

- The Painting Fool arguably exhibits:
  - Skill, appreciation, imagination, intentionality, learning and reflection
  - But you wouldn't call it inventive...

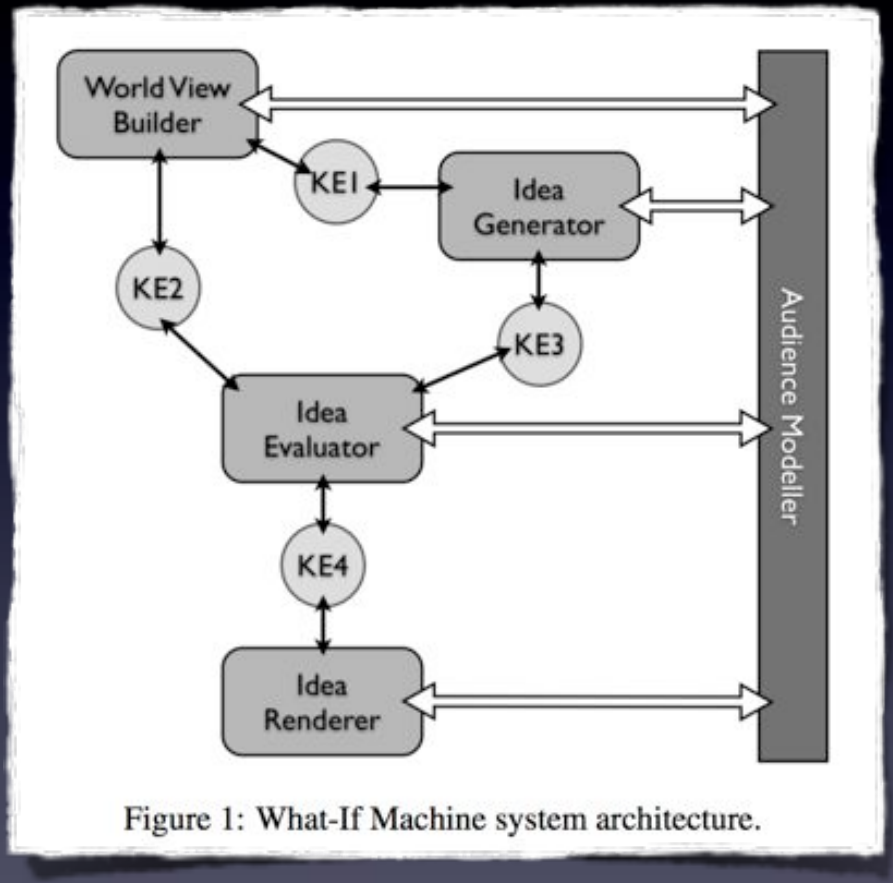


Figure 1: What-If Machine system architecture.

- Three year EU FP7 project
  - Goldsmiths, Cambridge, Dublin, JSI, Madrid
  - See: www.whim-project.eu

Other Technical Talks

I could have given

- About the paint dance animations
- In detail about non-photorealistic rendering
- In detail about shape grammars
- In detail about evolutionary art
- About the evolutionary generative approach more
- In detail about the constraint generative approach
- In more detail about the collage generation
- About the Flow generative framework
- And I can give a demo of The Painting Fool anytime

Responses to Issues

- "We hope that people will eventually take The Painting Fool seriously as a creative artist, because they can no longer find a good reason why it is not"

Responses to Issues

- How can a scientist train an artist?
  - The teaching interface; work with arts students (future)
- The Painting Fool only produces what people can produce
  - Multi-media workflow; abstract art; video pieces
- The Painting Fool doesn't intend to paint anything
  - Collage generation; You Can't Know my Mind
- The Painting Fool is not creative because it doesn't have appreciation or imagination
  - Emotion detection; generative art; fitness function generation; background gen.
- The Painting Fool will always do just what you tell it to do
  - Generative art; collage generation; text-based projects;

These are my conclusions...

- Never forget that painting is a cognitive process and should be automated from an AI perspective
- You will have to combine dozens of approaches in order to get something similar to a painter
- You can't build an automated painter without addressing many of the philosophical issues of the field
  - You will have to manage the public perception of creativity in software as much as you will have to advance technically... work with journalists if you can
- It's a good idea to exhibit the artwork produce, in order to get feedback and change opinions

ThePaintingFool

Questions?

And would anyone like a portrait?

www.the*painting*fool.com

Portraits of the Artist's Programmer as a Grotesque Younger Man, Paris 2011