Dialogue Between Art & Science – Digital Film Making as an Example

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A Common Thing between Scientists & Artists at the Beginning

…creative minds that create compelling new, being passionate about their craft, strong followers of their own ideas, and like to play with the challenges…

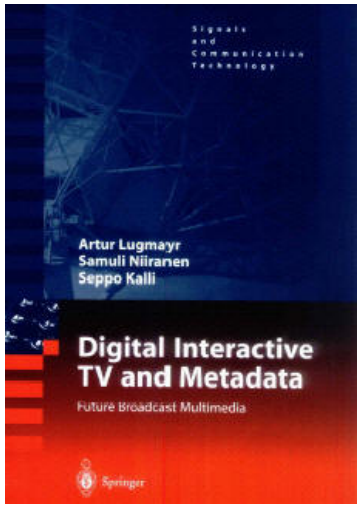
Van Gogh a mathematician?

sternennacht-2425.gemaelde-webkatalog.de/

- "Gogh paintings display scaling properties similar to the observed in turbulent fluids […] consistent with the way that a mathematical model"
- "the probability distribution function (PDF) of luminance fluctuations of points (pixels) separated by a distance R is consistent with the Kolmogorov scaling theory in turbulent fluids"
- "the most turbulent paintings of van Gogh coincide with periods of prolonged psychotic agitation of this artist"

Source: Kolmogorov scaling in impassioned van Gogh paintings, J.L. Arag´on, Gerardo G. Naumis,M. Bai, M. Torres, P.K. Maini, arXiv:physics/0606246 v1

://Dr. Artur Lugmayr



My vision is to create entertainment experiences

Head of the **New AMbient MUltimedia Group – (NAMU) the Digital Media Institute at the Tampere University of Technology**, Finland – as part of the Centre of Excellence 2006-2011, SPAG, Institute of Signal Processing, ENTHRONE EU project

School of Motion Picture, TV and Production Design (ELO), Helsinki, Finland – studying & establishing a research group around digital production

- **New book** on ambient intelligence in progress…
- **NIJINSKI project:** digital workflow of the first fully HD + blue screen produced film in Finland
- **The world's first book** on Digital Interactive TV and Metadata, Springer-Verlag
- ISO/IEC standardization - chairing of MPEG ad hoc group "MPEG-21 in broadcasting" 2003-2004
- Inventor of the MPEG-21 based **"Digital Broadcast Item Model"**

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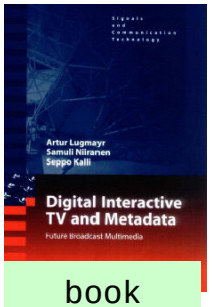
book homepage: www.digitalbroadcastitem.tv

:// NAMU
New AMbient MUltimedia Research Group

- Digital Media Institute
  Tampere University of Technology
  - 28 Professors, 440 researchers, > 100 projects
  - expertise in software, intelligent data processing, adaptive processors and wireless/wired communication, signal processing
- The NAMU group
  - head of group: Dr. Artur Lugmayr
  - approx. 8 international members
  - scientific creative core of the CoE 2006-2011
  - NAMU glimpses the ***FUTURE OF ENTERTAINMENT EXPERIENCE TECHNOLOGY AND MEDIA***
    - technology for ambient media
    - asset management and metadata (e.g. television)
    - emotional computation
    - smart software
- Projects
  - IST ENTHRONE2 – MATool+ (QoS management)
  - Centre of Excellence 2006-2011 – Digital Aura
  - Previous: Future TV, future interaction TV, HCTV, UMedia,…
    Teaching: Broadcast multimedia, Wireless ambient multimedia, Virtual reality seminar, Modern techniques for producing creative content (NEW COURSE!)
- Cooperation
  - SWAN LAKE: Moving Image & Music Award (http://www.swan-lake-award.org/)
  - IST ENTHRONE: external consultant for MPEG-21 (http://www.enthrone.org)
  - ISO/IEC standardization

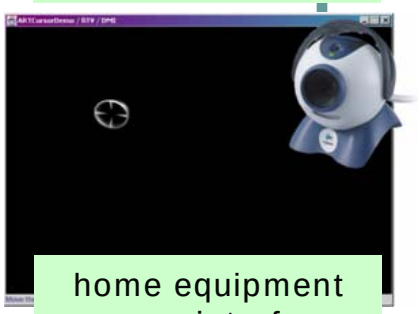


book

location based visitor guide


DRM system for mobile devices


Hyperlinked TV

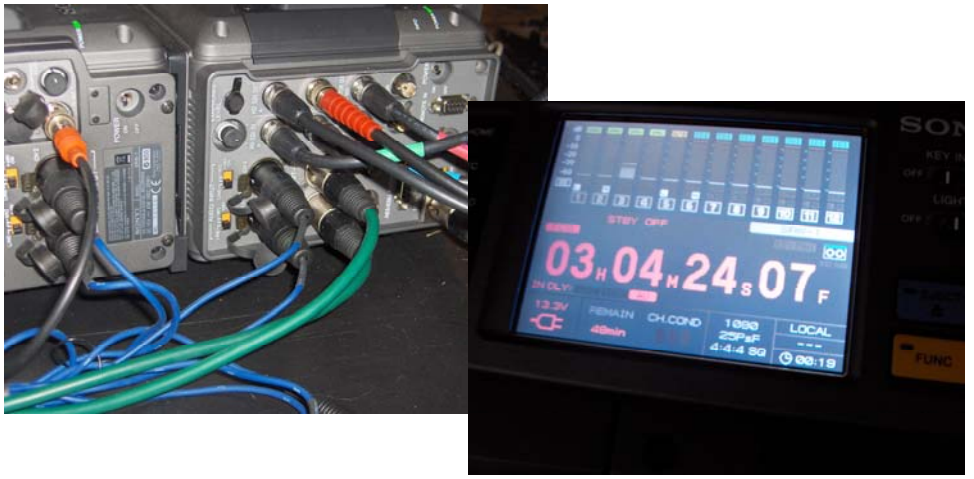

home equipment as user-interfaces

Digital Broadcast Item Model (DBIM)

The vision of the group is to develop the *DIGITAL AURA* – an ambient system architecture for the nomadic user for multimedia entertainment services

rationalism vs. intuition

- scientists ask
  - how can I improve this?
  - which methodologies can I introduce to optimize?
  - how does this work?
  - are the results of my experiments better?
  - why are we doing this?
- artists ask
  - how can I express this?
  - how can I achieve this affect from the audience?
  - but how could I do it?
  - how can I tell my message to society?
  - how can entertain my audience?



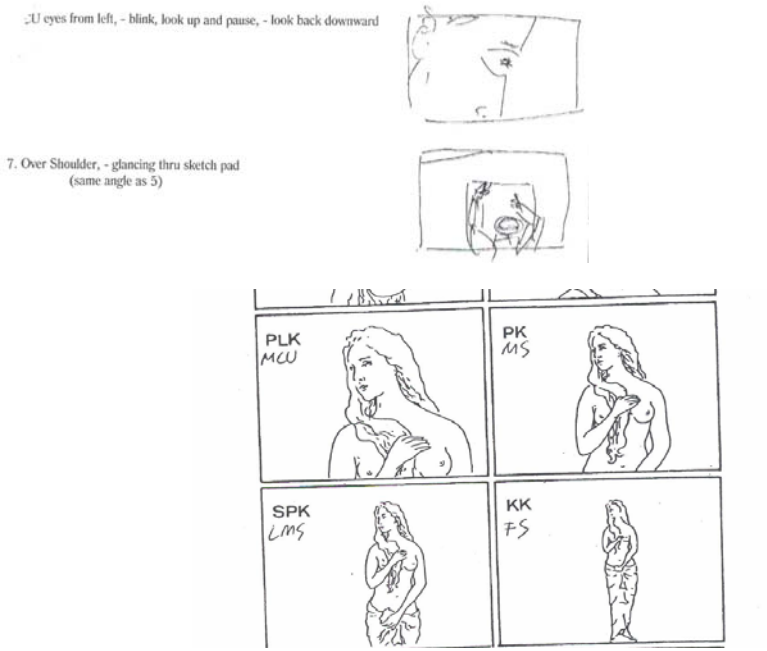
vs.

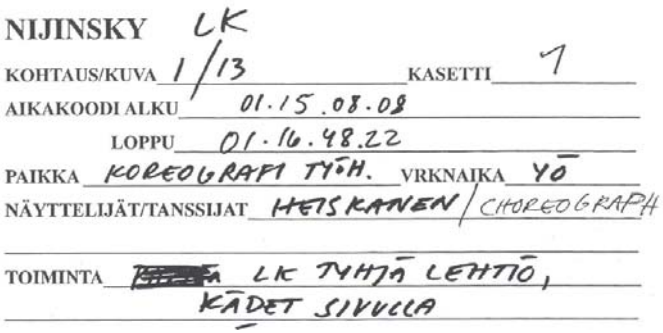
NIJINSKI: 60 minute dance production from the
produced by Kinoproductions Oy, Helsinki, Finland

Three Scenarios

1. Scientists as film-makers
   - PAUL VERHOEVEN (e.g. Starship Troopers (1997)) is holding a degree in mathematics and physics, and came to the world of film by making documentaries for the military
   - Scientific visualization: making complex conceptual models such as the Relativity Theory more understandable, a little movie helps
2. Scientists as creators of technology
3. Film-makers as visionaries of the future
4. Artists as scientists

The Art of Film-Making (1)





- film making is about telling stories and creating experience
  - film directors tell stories they have a personal relation to
  - create an experience for the audience by telling a story
- film making is about drama
  - “drama is life with the dull bits cut out” -- Alfred Hitchcock
- self-expression
  - artistic work aims at self expression: the own thoughts, feelings, and the work becomes a personal piece of oneself
- only the ways and technology how to create experiences and drama – thus the tools how to tell stories changed
- more and more computer science vocabulary enters the world of film-makers
  - film-makers rather purely understand this world, but also engineers do not understand the artistic world
  - film technology evolved from analogue to digital and this creates a lot of confusion around existing directors

The Art of Film-Making (2)

- films deal with **characters**, persons, their stories, artistic environment, and creativity
  - film making does not deal with improved camera systems or data storage media. These are just tools that you need to be professional in working with…
- Film-making deals with the **abstraction of story** in an artistic environment, rendering it audio-visually, and to create a mood for the audience
- Despite scientists work also in **teams**, it is mostly *'one'* that creates the new – in film-making it is the '*we*'
  - Not essentially this is always true, strong personalities as directors always attempt to tell the story the way they want. One example is Stanley Kubrick, which simply told his cinematographer Russell Metty in *Spartacus* (1960) simply to do nothing, as he determines the style. Later, Russell Metty won an Academy Award for his (or Kubrick's?) artistic work (see (IMDb) and (Gelmis 1969)).
- It is important to understand, that film-making is an **evolutionary progress** – story pieces are put together step by step and whole teams decide upon its evolution – but this argument seems to be not valid for strong personalities heading the project

Sliding Doors

Science

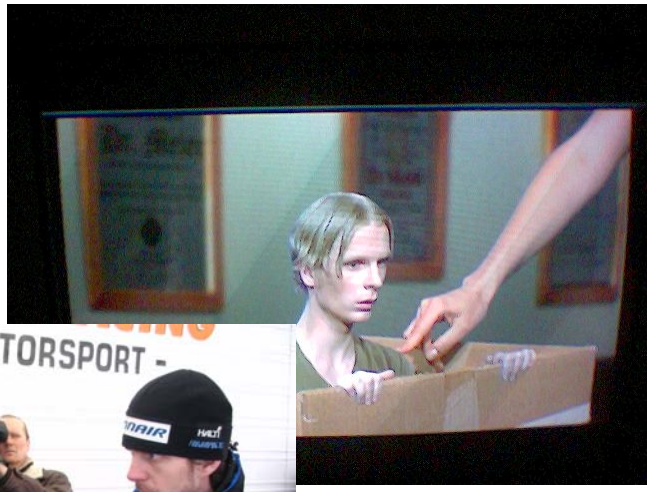
- seeks to **discover** the rules how the world works, and art seeks expression
- self-expression in science?
  - self-expression reduces to motivate oneself to hold through in succeeding in solving problems
- A real scientific break-through is rather seldom made by **specialists**
  - successful scientists improving single formulas by a few details and further on they publish myriads of articles about simple improvements. These scientists are specialists in one single field – following the general trend towards specialization
  - only visionaries have the capability to converge thoughts and disciplines to find a new conceptual model. And only conceptual models leave a trace in history.
  - They understood the theoretical background as well as they had the creative mind to develop a completely new conceptual model by converging fields to conclude to new
  - Examples: Einstein, Newton, or Leonardo Da Vinci
- the typical scientist as film-maker
  - would perceive the film-processes as chaotic and less organized
  - the scientist would ask for technical setups, organization plans, word documents, more transparency and more logical work flow, better equipment, or even think how he could improve something
- **AND HE WOULD GET IT ALL WRONG!**
  - the goal is to create a fictive story universe for the audience in time and space
  - time is linear – a sequence of actions in the film
  - space “is a means of using visual manipulation to take real spaces and real objects and look at them, perceive them, and feel about them in many different ways – ways we can not command” (Brown 2002)

“the key in science is to find new conceptual models”

Technology, Form, and Structure within the Piece of Art

- **At the beginning of each new form of media, there was a scientific invention – new conceptual models and technology**
  - photography, motion pictures, colour film, and now digital techn.
- **This conceptual models and new technology let new forms of art emerge – *FILM-ART***
  - film history, aesthetics, genres, form & style, film analysis, and film techniques (see Bordwell et al. 1997)
- ***film form***
  - theoretical framework for describing ways how to create works was developed. Film form gives information how to create photographs and compose object into a frame; how to put shots into a sequence to create the desired psychological effects for the audience (montage); and the principle of *mise-en-scene*, describing what should actually be in a scene.
- ***film grammar***
  - A more descriptive framework (called *film grammar*) was developed by David Llewelyn Griffith, who established a formal language for describing shots, scenes, and sequences and the events that are taking place within each of them (Wikipedia).
- ***montage***
  - On a more concrete level, also particular mathematical models found their way into film-making. Sergei Eistenstein, the father of montage, described in his works many ways how to mount films on mathematical models as e.g. the metric montage based on joining parts of a film according to a mathematical formula (Eisenstein et al. 1949; Eisenstein et al. 1970; Eisenstein et al. 1975).
- ***film-techniques***
  - Film-techniques deal with the more technical or methodical issues required creating a film. It includes camera work, light, sound, editing, effects, formats, and nowadays digital technology. It is more related to the lower level tasks to be enable the desired film-form

UIAH, Rock Video, 2005



LugyMedia, Suminator, 2006

UIAH, EPOOKI, 2005

"the key in film art is to tell a story and find expression"

Putting it Together

1. brilliant brains
2. degree of perfectionism
3. technical innovation determines artistic limitations
4. there is structure, form, and there are principles and models
5. capturing light, colours, and the narrative space as key sciences to create a new art work for film

"***the key in film art is to tell a story and find expression***"

"***the key in science is to find new conceptual models***"

And Another Common Thing Between Scientists at the End…

…nevertheless, artists and scientists (if not being Steven Spielberg or Albert Einstein) have one thing in common: **“science [and art] is a wonderful thing if one does not have to earn one’s living at it”**

-- Albert Einstein