

Organic computing als biologienahe Informationsverarbeitung

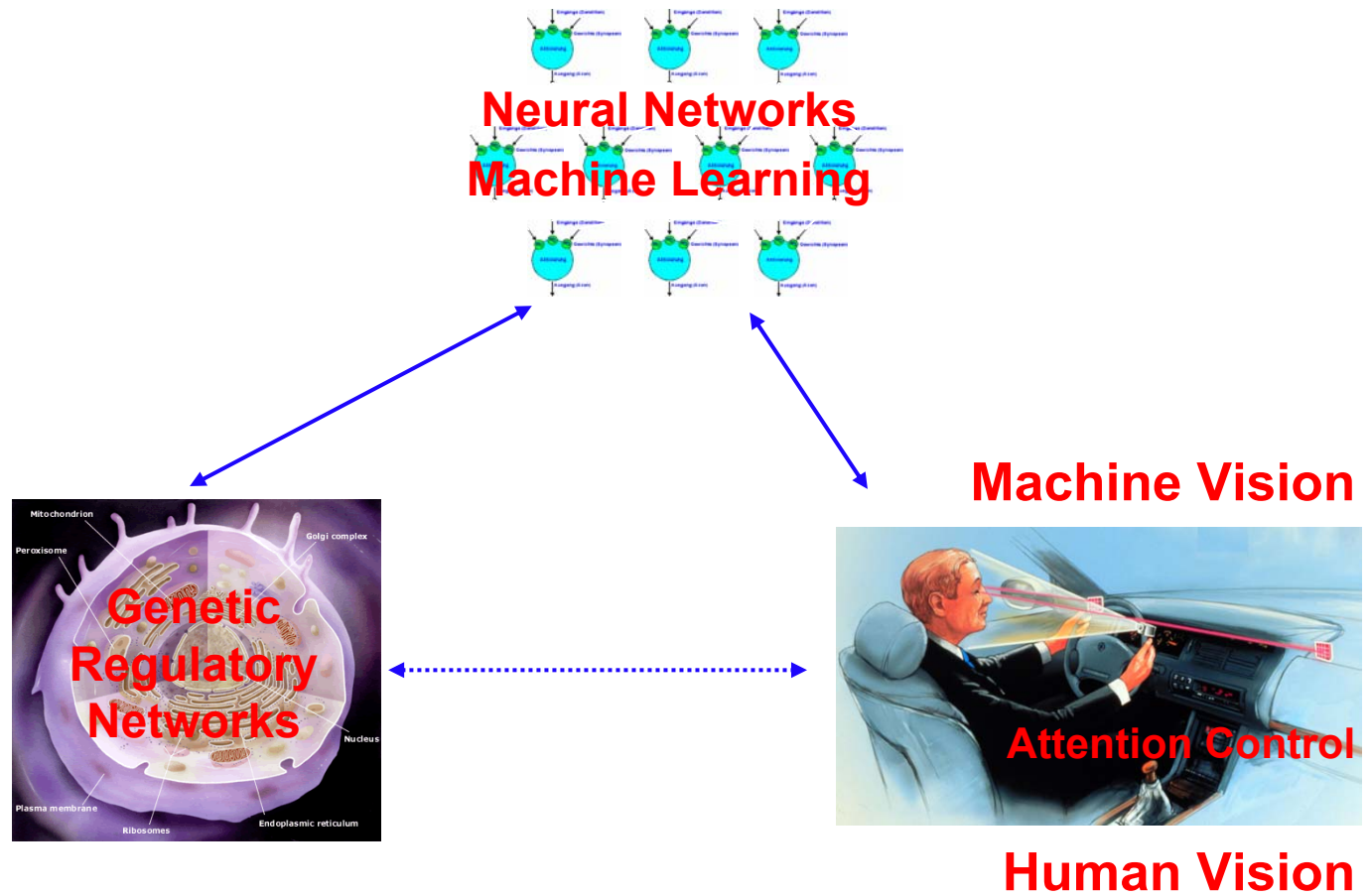
Erhardt Barth

Institut für Neuro- und Bioinformatik

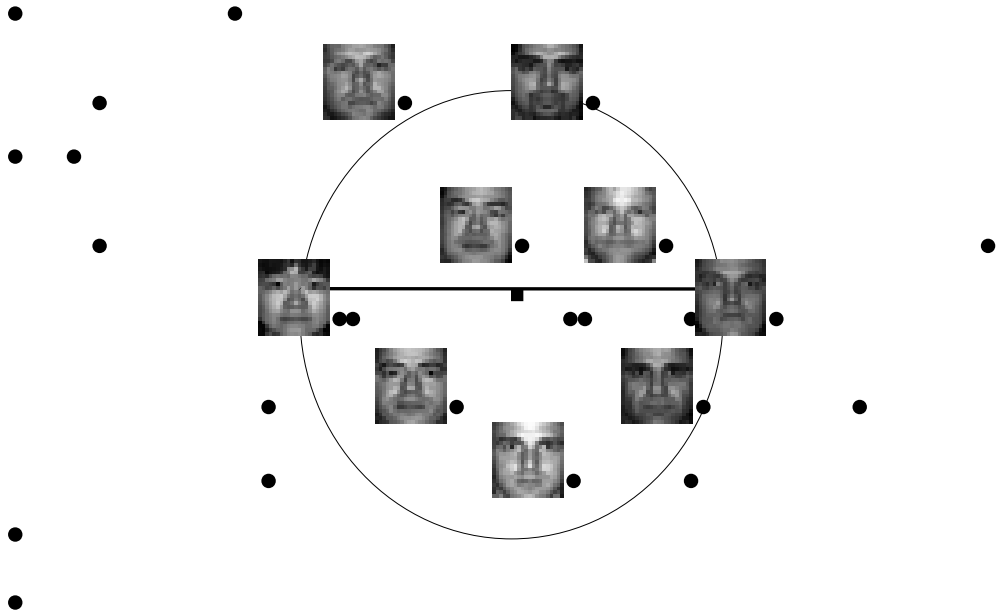
Universität zu Lübeck

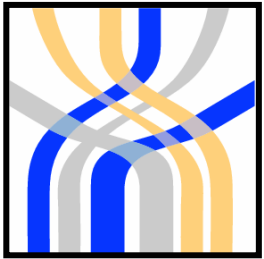


Institute for Neuro- and Bioinformatics



Face recognition





Nonlinear analysis of multidimensional signals:

LOcal adaptive estimation of COmplex MOTion and ORientation patterns

INB



LOCOMOTOR

Im DFG Schwerpunkt 1114: “Mathematical methods for time series analysis and digital image processing”

<http://www.math.uni-bremen.de/zetem/DFG-Schwerpunkt/>



Gefördert unter Ba-1176/2

Cicero Mota

Information technology for active perception: *Itap*

Institute for Neuro- and Bioinformatics
University of Lübeck, Germany

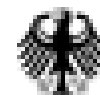
Partners:

Allgemeine Psychologie, Giessen (Karl Gegenfurtner)

Sensomotoric Instruments GmbH (SMI), Teltow/Berlin

SIEMENS AG, München

Itap is part of ModKog, a project funded by



Bundesministerium
für Bildung
und Forschung

Seeing as an illusion: the door experiment



Seeing as an illusion: change blindness



Visual communication today: same image but different messages

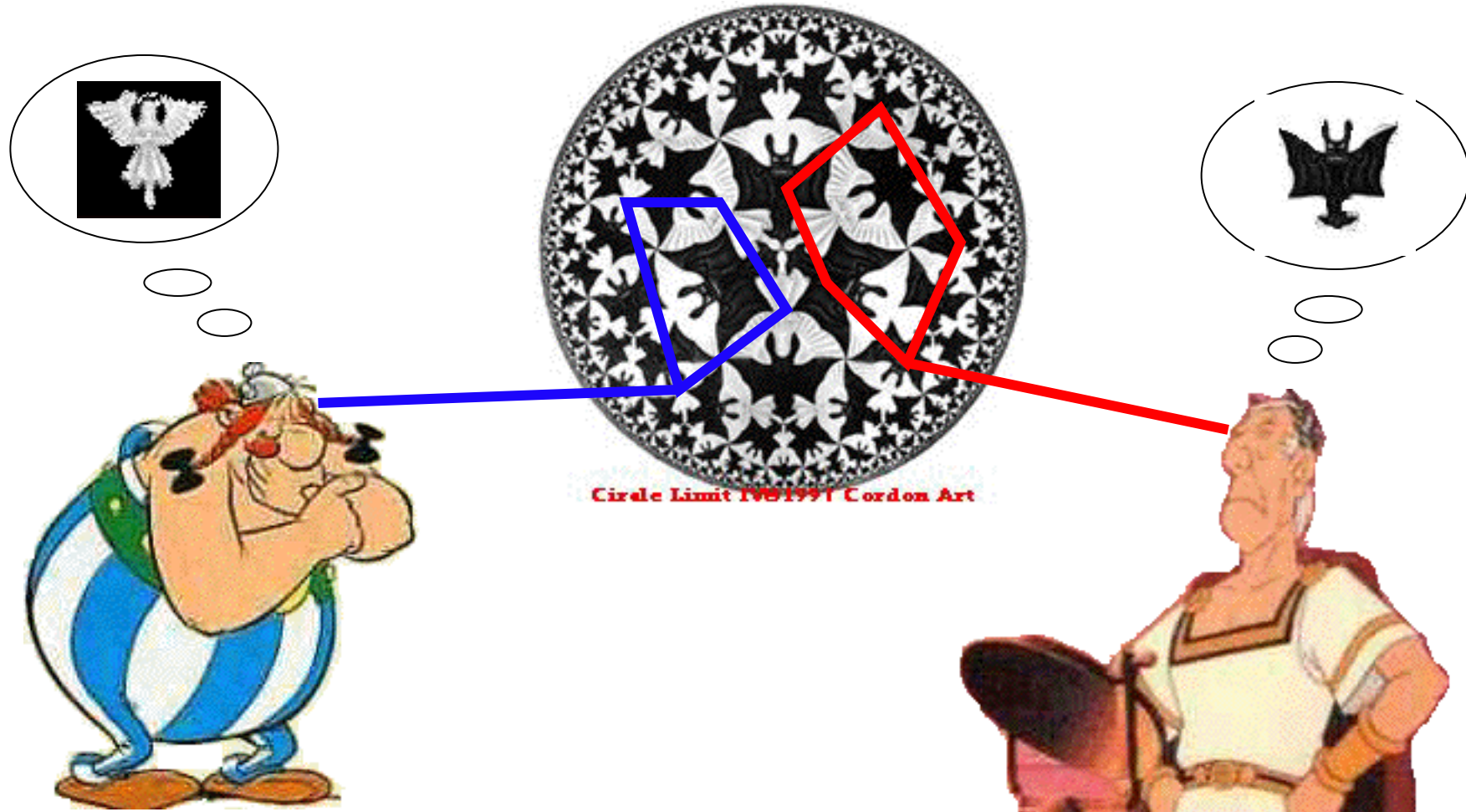


Figure by M. Dorr, INB.

Visual communication today

The message that is conveyed by an image depends very much on the

scan-path,

i.e, the sequence of eye movements that are used to look at an image.

Visual communication systems, however, are based on only the classical image attributes luminance and color.

Itap idea

The *scan-path* and the active component of vision should become part of visual communication systems.

Therefore the *scan-path* must be sensed, processed, and “displayed”.

Major challenges

Remote, user-friendly eye tracking

Understanding of eye movements

Eye-movement guidance

Development of gaze-contingent interactive displays (GCIDs)

Applications

Vision-based communication systems

will be defined not only by brightness and color, but will be augmented with a recommendation of what to see, of how to view the images.

Augmented-vision systems

Attention is directed towards objects or features that have been detected by a computer-vision system.

Automotive applications



Summary on Itap

Itap will improve visual communication by helping people see what they are meant to see.

Itap aims at technology that is active in the background and helps people communicate and interact with other people and with their environments.

Car-passenger sensing

Recognition of seat
occupancy and
head tracking for
airbag control

OoP system

Fatigue
measurement

WakeUp system



Intelligent airbags

Problems:

- Deployment with kids and OoP (harm)
- Useless deployment (cost)



Solution: **video-based** control

OoP: Out of Position

Intelligent airbags: OoP system

EMPTY



Fatigue and attention measurement



WakeUp

SMI

BMW

INB

Übersicht laufende Projekte

- *Itap/Modkog* (BMBF)
- LOCOMOTOR (DFG, maschinelles Sehen)
- WakeUp (SMI, Müdigkeit & Aufmerksamkeit)
- OoP (SMI, Intelligente Airbags)
- Decision support (EU)
- Seeing with sound

Industriepartner

- SMI (SensoMotoric Instruments, Berlin)
 - BMW, VW, Daimler
- ZN (Zentrum Neuroinformatik, Bochum)
- SIEMENS Forschung, München