

---

3<sup>rd</sup> NFN "Cognitive Vision" Workshop

# HISTORY OF COMPUTER VISION



Graz, University of Technology, Austria  
Institute for Computer Graphics and Vision



---

Friday, May 9, 2008

A-8010 Graz, Rechbauerstraße 12, Lecture Room VI, Ground Floor

---

## WORKSHOP PROGRAM

Time	Title / Abstract
<b>09:30-09:45</b>	<b>Welcome</b>
	<b>Helmut Grabner (TU-Graz, ICG)</b>
<b>09:45-10:30</b>	<b>From Image Processing to Computer Vision</b>
	<b>Franz Leberl (TU-Graz, ICG)</b>
	Historical roots of today's field of computer vision are in the NASA space program of 1964. This predates the beginnings of digital images in medicine, in aerial remote sensing or in industrial quality inspection or robot guidance. It predates also the field of computer science. The space program to explore other planets had initially been using TV-cameras and sent analog images back to Earth. One may recall the Surveyor program to the Moon, where rockets were shot to crash on the Moon's surface, and as they rapidly approached the surface, a stream of TV-images was sent in real time back to Earth. It was therefore a challenging idea to use a digital camera and to send bits and bytes to Earth from aboard the Mariner 4 satellite in 1964, as it flew by planet Mars. The mission was successful, images were indeed received, and the field of digital image processing images was born as a branch of the field responsible for the cameras, namely electrical engineering. The roots and heroes of the field of Computer Vision date back to the early days in 1964. It may be of interest to explain when and where the initial books were published, how remote sensing came into being, and how the transition was made from processing digitally collected imagery - as a subfield of electrical engineering - into information and thus a subfield of computer science today. This and more will be my contribution to the understanding of the legacy of computer vision.
<b>10:30-11:15</b>	<b>History of CV: A Personal Perspective</b>
	<b>Walter Kropatsch (TU-Wien, PRIP)</b>
	Computer Vision and Pattern Recognition are made possible through cameras and sensors and the modern computing power allowing the tremendous amount of data to be processed. But still it is not just new technology that enables seeing machines it is the researchers and their interaction that pushed our field (as all the other fields of research as well). I therefore want to select some of the great researchers I had the chance to meet, their contributions and development. Of course some room will be devoted to associations and meetings that provide the infrastructure for these fruitful interactions. The topics discussed there give a good survey on the development of our field.
<b>11:15-12:00</b>	<b>(early but free) Lunch</b>

## **12:00-12:45 Computer Vision, Neural Networks and Pattern Recognition: A Look at Historical Interactions**

**Horst Bischof (TU-Graz, ICG)**

In this talk I will outline the interactions between neural networks computer vision and pattern recognition from my own historical perspective, i.e., starting with neural networks, seeing that one is doing pattern recognition and applying this to computer vision. I will also discuss the interactions between NIPS and CVPR (ICCV, ECCV) communities.

## **12:45-13:30 A Machine Learning (Theory) perspective on Computer Vision**

**Peter Auer (Univ. of Leoben)**

I will talk about my experience – as a machine learning person – with computer vision. When I came in touch with computer vision (2002), modern machine learning algorithms started to be used more regularly in computer vision, including Boosting and Support Vector Machines. I will give also a brief history of these algorithms. I believe that the challenging topics in computer vision have not changed much since 2002. Our project proposal from then is largely still a valid research agenda, and I will comment on some of the issues at the intersection of computer vision and machine learning.

## **13:30-13:45 Short Coffee Break**

## **13:45-14:30 Computer Vision - Towards a Simple Brute-Force Utility?**

**Wilhelm Burger (FH-Hagenberg)**

Not only has Computer Vision strong roots in Artificial Intelligence, but both fields also seem to share similar fates. Both can be characterized by a lack of clear definitions of the tasks to be solved, the self-set aims often appearing artificial and/or insurmountable, and problems becoming scientifically unattractive as soon as working solutions exist. On the other hand, vision techniques keep also popping up in unexpected places, such as augmented reality, panoramic imaging, etc. Is computer vision a technology in hopeless search of applications, mixed with sporadic success stories? We should not forget that, apart from scientific and philosophical issues, computer vision constitutes a non-trivial engineering problem, particularly from the computing point of view. While it is interesting to see how the enormous increase in computing power over the last 20 years finally leads to working solutions that were unthinkable in the past, ancient processing techniques still prevail and brittleness is the rule rather than exception. Is brute force technology the key, as in many other engineering disciplines? Do we still need to search for more elegant (mathematical) solutions or biological analogies? And finally, are we prepared to handle the complexity of full, continuous vision systems?

## **14:30-15:15 VISION: Paradigms – Systems – Algorithms – Applications – Evaluation**

**Axel Pinz (TU-Graz, EMT)**

My talk departs from roots of vision research in AI in the 70's and the Marr paradigm (1980), and visits a number of landmarks in the history of computer vision. I agree with Aloimonos and Shulman (1990) on the distinct development of a "recognition" and a "reconstruction" school, and I see evidence for the gradual merging of these two schools since 2000. I select a number of high potential applications and relate them to the underlying paradigms, systems, and algorithms. A critical evaluation shows that there certainly is tremendous progress, but at the same time research seems to re-visit certain issues once every 10 to 20 years. On the other hand, there is a wide acceptance in the community regarding good practice with regard to issues as robustness, sharing of code, and common databases.

## **15:15-15:30 Short Coffee Break**

## **15:30-16:00 Panel Discussion: Where do we come from? What are we doing? Where should we go?**

**16:00 End**

Sponsored by



**OESTERREICHISCHE  
COMPUTER GESELLSCHAFT**<sup>®</sup>  
AUSTRIAN  
COMPUTER SOCIETY