INFORMATION SOCIETY TECHNOLOGIES (IST) PROGRAMME

ECVision

European Research Network for
Cognitive AI-enabled Computer Vision Systems

Thematic Network

5th Six-Monthly Periodic Management Report

IST 2001 Workprogramme
Section IV.2.1 – Real-Time Distributed Systems
Sub-section (ii) – Cognitive Vision Systems

Project Acronym: *ECVision*
Project Full Title: European Research Network for Cognitive
                          AI-enabled Computer Vision Systems

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1. INTRODUCTION

This document summarizes the main activities of *ECVision* during its fifth six-month period of operation, from 1st March 2004 to 31st August 2004. As has been the case in previous reporting periods, the network has been busy and productive. Three specific actions were approved and launched, the 2nd ECVision Summer School was held, and progress on the Research Roadmap received a major boost.

The report also presents a synopsis of the main outcomes under the headings of the various deliverables identified in the contract. As always, the deliverables represent work in progress with several versions of the same deliverable developed over the lifetime of the project. The versions reported on in this document represent current progress in the achievement of the overall goals.

Finally, we review the current financial standing of the network. Even though it is achieving all its goals, the network is continues to spend less than was originally budgeted, due mainly to lower than expected expenditure on travel, particularly in relation to the six-monthly meetings.

2. NEW MEMBERS

Three new members joined ECVision in this semester. These are as follows:

September 2004	**Murray Shanahan**, Imperial College London.
July 2004	**Antonios Gasteratos,** Democritus University of Thrace
August 2004	**Justus Piater,** University of Liège, Belgium

3. HIGHLIGHTS OF THE SEMESTER

The following highlights of activities have been abstracted from the announcements and news sections on the *ECVision* website (see http://www.ecvision.info/news/News.htm for full details).

March 2003	The fourth ECVision six-monthly meeting were held in Frankfurt on the 26th March. This meeting was devoted to the Research Roadmap. The presentations and associated documents can be accessed on-line at: http://www.ecvision.org/information/Fourth_Six-Monthly_Meeting_(Roadmap).htm.
April 2003	Specific Action 21-2: A second specific action was launched to extend the CCV Ontology on aspects related to imprecise knowledge representation in cognitive vision, tools and methods for dealing with imprecise spatial information, and information fusion issues and methods. This is a follow-up action to SA 21-1.
	Specific Action 39-2: a specific action was awarded to Vasek Hlavac to make this Statistical Pattern Recognition Toolbox more easily accessible. to users: (a) researchers, (b) teachers, and (c) students, improving documentation, and tailoring demos to cognitive vision tasks. In addition, a series of (self) teaching lessons will be prepared to lead the user in her/his first tour through the toolbox.
May 2003	The ECVision Prize for Best Paper in Cognitive Vision at ECCV 2004 was awarded to: K. Okuma, et al. "A boosted particle filter: Multitarget detection and

tracking." In T. Pajdla and J. Matas, editors, Proceeding of the 8th European Conference on Computer Vision, ECCV 2004, volume I of LNCS, pages 28–39. Springer, 2004.

The ECVision Prize for the Best Application Development in Cognitive Vision Systems has been won by Inx Systems Corp., Finland.

June 2003	Hans-Hellmut Nagel, University of Karlsruhe, kindly made available the Motris ("Model-Based Tracking in Image Sequences") Framework for 3-D model-based tracking under a GNU Lesser General Public Licence at: http://kogs.iaks.uni-karlsruhe.de/motris/
July 2004	A new and improved version of the Statistical Pattern Recognition Toolbox (SA 39-2) was completes in July and can be accessed at: http://cmp.felk.cvut.cz/~xfrancv/stprtool
	A special issue of AI Magazine on cognitive systems has been published. The volume can be seen at http://www.aaai.org/Library/Magazine/Vol25/25-02/vol25-02.html.
	Funding for a Student Exchange Specific Action (SA 16-2) between the University of Bielefeld and the University of Surrey was approved.
August 2004	The 2nd ECVision Summer School on Cognitive Vision, organized by Wolfgang Förstner, was held at the Activotel, Much, Germany, from August 16th to August 20th, 2004. The event was very successful and 50 people participated. For more details see: http://www.ipb.uni-bonn.de/events/summerschool04/summerschool04.html
	Gösta Granlund and Michael Felsberg presented a tutorial on 'Cognitive vision systems: representation and organization' at ICPR 2004, Cambridge, United Kingdom on August 22. Full details can be found on the ICPR website at: http://www.ee.surrey.ac.uk/icpr2004/tutorials/Cognitivevisionsystems_000.htm

Apart from the above, perhaps most significant item of the past six months is the progress that has been made on the ECVision research roadmap. The first complete draft is now available on the website: http://www.ecvision.org/research_planning/Research_Roadmap.htm)

4. SUMMARY OF ACTIVITIES BY AREA

4.1 Research Planning

This was an important semester for the research planning area, with very significant progress having been made on the ECVision research roadmap. The first complete draft is now available on the website: http://www.ecvision.org/research_planning/Research_Roadmap.htm) This roadmap is the product of two workshops (26th March and 26th May), considerable written communication, and much writing and editing. The next six-monthly meeting on the 24th September is devoted to the finalization of the document, after which it will be formally released.

4.2 Education and Training

The Education and Training activities, coordinated by Wolfgang Förstner and Bob Fisher, have had another productive semester.

The 2nd ECVision Summer School on Cognitive Vision, organized by Wolfgang Förstner, was held at the Activotel, Much, Germany, from August 16th to August 20th, 2004. The event was very successful and 50 people participated. The summer school modules were given by acknowledged experts in each key area.

- Bob Fisher, UK
- Martin Giese, Germany
- Ales Leonardis, Slovenia
- Markus Vincze, Austria
- Monique Thonnat, France

As with last year's event, the objective was to provide post-graduate students with a comprehensive introduction to all of the constituent areas of cognitive vision. This will help create a new generation of researchers in the area and will help maximize the impact of the ECVision network in the long run. In addition, it will provide practising researchers with an opportunity to learn about areas outside their main specialization and, hence, foster the cross-fertilization of ideas that is essential for real progress in the area. For more details see:
http://www.ipb.uni-bonn.de/events/summerschool04/summerschool04.html

A second specific action (21-2) was launched to extend the CCV Ontology on aspects related to imprecise knowledge representation in cognitive vision, tools and methods for dealing with imprecise spatial information, and information fusion issues and methods. This is a follow-up action to SA 21-1. This new contribution will contain a formal method description for both fuzzy sets and belief functions. This includes also an important aspect of dealing with spatial information in fusion problems. This action is being undertaken by Isabelle Bloch, Ecole Nationale Superieure des Telecommunications.

A first invitation for contributions to the handbook on cognitive computer vision was issued and ten authors have now committed to providing material for the book.

Funding for a Student Exchange Specific Action (SA 16-2) between the University of Bielefeld and the University of Surrey was approved. Ingo Lütkebohle, from Bielefeld, will spend time at Surrey and work done during the visit will be part of his diploma thesis on the design and implementation of an evaluation scheme for a cognitive vision system.

Hans-Hellmut Nagel, University of Karlsruhe, kindly made available the Motris ("Model-Based Tracking in Image Sequences") Framework for 3-D model-based tracking under a GNU Lesser General Public Licence at: http://kogs.iaks.uni-karlsruhe.de/motris/ Motris was developed as a successor to XTrack and its main purpose is to provide a flexible framework for exploration and exchange of ideas as well as to facilitate comparisons between algorithmic approaches.

A specific action (39-2) was awarded to Vasek Hlavac to make his Statistical Pattern Recognition Toolbox more easily accessible to users. Both supervised and unsupervised learning methods are included in the toolbox which has proved to be very useful in prototyping including cognitive vision tasks, e.g. in human face detection. Documentation has been improved, demos tailored to cognitive vision tasks have been included, and a series of (self) teaching lessons have been prepared to lead the user in her/his first tour through the toolbox. The toolbox was completed in July and can be accessed at: http://cmp.felk.cvut.cz/~xfrancv/stprtool

4.3 Information Dissemination

This area has seen progress on a number of fronts this semester. Some of these are developments of ongoing work, others are new initiatives.

A special issue of AI Magazine on cognitive systems has been published. The volume can be seen at http://www.aaai.org/Library/Magazine/Vol25/25-02/vol25-02.html.

The ECVision Prize for Best Paper in Cognitive Vision at ECCV 2004 was awarded to: K. Okuma, A. Taleghani, N. de Freitas, J. Little, and D. Lowe. "A boosted particle filter: Multitarget detection and tracking." In T. Pajdla and J. Matas, editors, Proceeding of the 8th European Conference on Computer Vision, ECCV 2004, volume I of LNCS, pages 28–39. Springer, 2004. The paper captures a key aspect of the cognitive vision paradigm in its use of adaptively learned models to leverage improved performance from already-robust vision capabilities.

Three workshops were supported by ECVision this semester. A workshop on generic object recognition and categorization was held at CVPR '04 on the 27th June. This was funded by ECVision under SA 25-1. It was organized by Ales Leonardis and Bernt Schiele. A workshop on statistical learning for computer vision was held at ECCV '04 in May. This was funded by ECVision under SA 33-1. It was organized by Horst Bischof. Finally, a workshop on attention and performance in computer vision (WAPCV '04) was held in conjunction with ECCV '04 in May. This was funded by ECVision under SA 37-2. It was organized by Lucas Paletta.

An article was written for a general technical audience to introduce them to the challenges and capabilities of cognitive vision; some or all of it will appear in a forthcoming issue of the CORDIS magazine. The article, entitled **Cognitive Vision – The Development of a Discipline** can be accessed at http://www.ecvision.org/about_ecvision/Cognitive_Vision.pdf

4.4 Industrial Liaison

The Industrial Liaison activity is led by, Patrick Courtney and Monique Thonnat. The past six months have seen on-going efforts to build links with industry and enhance opportunities for early commercial exploitation. This is being facilitated by specific action (7-3) to strengthen the impact of industrial activities, to support ECVision member projects (especially those without industrial participation) and their technologies, and to promote the use of resources developed by TA4 (Industrial Liaison). This action is being undertaken by Patrick Courtney, PB Consulting. Details of the current status of the action can be found at: http://www.ecvision.org/information/Specific_Action_Status.htm#7-3 Several industrial workshops has been held so far.

ECVision sponsored a competition to identify the company that has best adopted the cognitive vision philosophy of adaptive learning in its products. This prize was awarded in May 2003 to Inx Systems Corp., Finland for its Optigrader on-line volume and quality measurement timber inspection system. The Optigrader uses self-organizing feature maps to effect learning via supervised training to yield a parameter-less classification / inspection system. According to the winner, "The OptiGrader system is fully automatic and the grading processes do not require special staff. The production process with measurement, optimizing and grading is reliable and the sawmill do not require special technical staff to keep the system up and running, because there are no special parameters to adjust and the whole unit do not need any special service".

For more details, see the Inx Systems Website. http://www.inx.fi/ecvision_eng.html

Partick Courtney (left), ECVision Area Coordinator for Industrial Liaison, presents Risto Pettinen (right), Inx Systems Export Director, with the prize of the best application development in cognitive vision systems at ECCV 2004 in Prague in May 2004.

Finally, the creation of a database of vision vendors is also on-going. The working version can be found at http://www.ecvision.info/industrial_liaison/Database_of_Vision_Vendors.htm

4.5 Information Infrastructure

www.ecvision.org and www.ecvision.info continue to be run in parallel, along with the four email lists:

members@lists.ecvision.info	This address targets all members of the network.
executive@lists.ecvision.info	This address targets all members of the Executive Committee.
everymember@lists.ecvision.org	This address targets all members of the network.
exec@lists.ecvision.org	This address targets all members of the Executive Committee.

All four of these lists are actively used, with members slowly migrating back to the .org versions. All four are moderated on a daily basis by the coordinator.

By the end of the semester, the website has received approximately 9700 hits and it is the first page returned by Google when one searches for 'cognitive computer vision'.

The website has been regularly maintained and updated.   The majority of the effort expended has been devoted to developing and enhancing the website and moderating the email from the two four email distribution lists.

Guidelines for contributors to the website can be found at:
www.ecvision.org/informationGuidelines_for_Web_Authors.htm

4.6 Management

The Management activity at network level continues to be handled cooperatively by the Coordinator, David Vernon, and the Executive Committee, with the bulk of the work being handled by the Coordinator. The Executive Committee plays an important role in vetting all proposals for specific actions. No specific action can be sent to the Commission for approval without a majority of the Executive Committee being in favour.

All of the management work required to coordinate specific areas (*e.g.* research planning, education and training, etc.) is devolved to the two area leaders in each area:

Research Planning:	Henrik Christensen & James Crowley
Education and Training:	Bob Fisher & Wolfgang Förstner
Information Dissemination:	Hilary Buxton & David Vernon
Industrial Liaison:	Patrick Courtney & Monique Thonnat

This semester has been particularly busy for the network coordinator (David Vernon) as he took over responsibility for producing the research roadmap, in addition to the normal work of network coordination, information dissemination coordination, administration of the website and email lists, processing claims for reimbursement, preparation of cost statements, processing membership applications, organization of meetings, and processing applications for funding of specific actions. As a result, the total effort expended on ECVision this semester exceeded 500 hours, considerably in excess of the number charged on the cost statement.

5. SPECIFIC ACTIONS

As noted in Section 3 – Highlights – three specific actions were launched during the semester. These are:

1. Specific Action 16-2: Student Exchange, G. Saegerer, University of Bielefeld

2. Specific Action 21-2: Encyclopedia of Cognitive Vision, I. Bloch, ENST

3. Specific Action 39-2: Pattern Recognition Toolbox, V. Hlavac, Czech Technical University in Prague

Complete details of these actions are contained in Appendix I of this report.

A total of 25 specific actions have now been funded since the launch of the network.
A summary of the current status of each specific action can be accessed on the website at:
http://www.ecvision.orgo/information/Specific_Action_Status.htm

6. DELIVERABLES

Most ECVision deliverables reflect work in progress and are reported on over the lifetime of the project. These deliverables are distinguished by a delivery month and are denoted *TAx.y.n; x* denoting the target areas (see below), *y* the deliverable number, and *n* denoting the month at which the current version is to be delivered. Any outstanding work in one of these deliverables is automatically carried forward to the next period.

The Target Areas are:

1   Research Planning
2   Education and Training
3   Information Dissemination
4   Industrial Liaison
5   Information Infrastructure
6   Management

Some deliverables identified in the contract are due to be undertaken and completed in a given semester. If they are not completed, they are either be formally removed from the work-plan, with the agreement of the Commission, or explicitly carried forward to the next period for completion. To date, only the periodic distribution of web-site content on CD has been formally removed.

In this section, we report on all the deliverables identified in the work-plan. In this context, note that this is month 30. **Updates and/or amendments since the previous report are noted in bold face type**.

6.1   Research Planning

TA1.1.n   Workshop proceeding/report; n = 6, 12**,** … **30**, … 36
                            Status: The Dagstuhl Seminar 03441 was held from 27-31 October. The official report and a list of participants with copied of their talks is available at site listed below.

                            A Cognitive Computer Vision Colloquium was held in Prague on the 12 and 13 January 2004.

                            Action: None.
                            On-line Documents: http://www.dagstuhl.de/03441/
                            http://cmp.felk.cvut.cz/cmp/events/colloquium-12-Jan-04/
                            http://www.ecvision.org/research_planning/SA_39-1_Cognitive_Vision_Colloquium.htm

TA1.2.n   Position paper; n= 6, 12**,** … **30**, … 36
                            Status: This activity is being subsumed by the research roadmap.
                            Action: None.
                            On-line Documents:

TA1.3   Advances in computer vision (due month 6)
                            Status: This work has been being subsumed into the forthcoming Dagstuhl book on cognitive vision which, among other things and in various forms, will include surveys of the current state-of-the-art in computer vision, set specifically against the backdrop of required functionalities for cognitive vision. To a lesser extent, the forthcoming research roadmap will also contain a similar review.
                            Action: carry forward to next period.

TA1.4   Advances in artificial intelligence (due month 6)
                            Status: This work is on-going. Bernd Neumann has written a summary of cognitive vision and artificial intelligence for the original (and now abandoned) version of the research roadmap
                            (see: http://www.ecvision.info/research_planning/ECVisionRoadMapv2.5.pdf).
                            Another paper is being drafted by Hilary Buxton.
                            Action: carry forward to next period.

TA1.5.n   White paper on cognitive vision research; n= 6, 12**,** … **30**, … 36
                            Status: **This activity is being subsumed under the Research Roadmap.**
                            Action: Carry forward to next semester.
                            On-line Documents: N/A.

TA1.6   Benchmark applications (due month 6)
                            Status: **Considerable progress has been made on this activity in the context of the new Research Roadmap.**
                            Action: carry forward to next period.

TA1.7.n   Research Roadmap; n= 6, 12**,** … **30**, … 36
                            Status: **The first complete draft of the new roadmap has been released.**
                            Action: The 5th six-monthly meeting, scheduled for 24th September, is being devoted to the finalization of the roadmap.
                            On-line Documents: http://www.ecvision.org/research_planning/Research_Roadmap.htm

TA1.8.n   Database of European research; n= 6, 12**,** … **30**, … 36
                            Status: A database of active research groups in Europe, ordered by country, has been

developed by KTH. A supplementary list of groups with specific interest in cognitive vision is also available.

Action: Continue to maintain and update.

On-line Documents:

 http://www.ecvision.info/research_planning/EU_Computer_Vision_Groups.htm
http://www.ecvision.info/information/Research_Groups.htm

6.2 Education and Training

TA2.1   Survey of existing courses on cognitive computer vision
               Status: Complete: an email survey and web searching has been done for existing
               courses that present material linked to Cognitive Computer Vision. About 8000
               requests were sent, 100 replies received and about 50 relevant web-based pieces of
               information obtained. Most of the surveyed materials were presented as a part of a
               broader course, that range from 1-60 hours of lectures, with about 20 as average. The
               survey results have been categorised according to a developing ontology of cognitive
               vision, which will feed into the encyclopedia and model curriculum activity of the
               project second half-year.
               Action: continue to maintain and update.
               On-line Documents: http://www.dai.ed.ac.uk/homes/rbf/CCVO/CCVOentry.htm

TA2.2   Web-based repository of existing courseware and/or course slides
               Status: Complete: this has been created as a subset of CVonline.
               A Specific Action (8-3) was launched to develop course material on Probabilistic
               Graphical Models for Cognitive Computer Vision.

               **Specific Action 21-2: A second specific action was launched to extend the CCV
               Ontology on aspects related to imprecise knowledge representation in cognitive
               vision, tools and methods for dealing with imprecise spatial information, and
               information fusion issues and methods. This is a follow-up action to SA 21-1.**

               **Specific Action 39-2: a specific action was awarded to Vasek Hlavac to make his
               Statistical Pattern Recognition Toolbox more easily accessible to users; this is
               now complete.**

               **Hans-Hellmut Nagel, University of Karlsruhe, had made available the Motris
               ("Model-Based Tracking in Image Sequences") Framework for 3-D model-based
               tracking under a GNU Lesser General Public Licence at: http://kogs.iaks.uni-
               karlsruhe.de/motris/**

               Action: Continue to maintain and update.
               On-line Documents: http://www.dai.ed.ac.uk/CVonline/
               http://www.ecvision.org/information/Specific_Action_Status.htm#8-3
               http://www.ecvision.org/information/Specific_Action_Status.htm#21-2
               http://cmp.felk.cvut.cz/~xfrancv/stprtool
               http://kogs.iaks.uni-karlsruhe.de/motris/

TA2.3   Web repository of MSc and PhD project proposals
               Status: Complete (but unpopulated!) Concerns over the protection of valuable
               intellectual property rights inherent in the ideas involved in a good proposal are
               inhibiting this activity.
               Action: continue to maintain and update.
               On-line Documents: http://www.dai.ed.ac.uk/homes/rbf/CCVO/projects.htm

TA2.4   Model curriculum for cognitive computer vision
               Status: This is under development and is evolving well. The classification of
               techniques has proved very useful in a number of contexts.
               Action: Continue to maintain and update.
               On-line Documents: http://www.dai.ed.ac.uk/homes/rbf/CCVO/cvsyldraft.htm

TA2.5   Web-based encyclopedia of cognitive computer vision
               Status: This is under development and is evolving well. It is currently being
               developed under the heading of an ontology of cognitive computer vision. As a
               separate but complementation action, CVOnline has been re-structured to allow
               cognitive vision topics to be integrated transparently.
               Action: Continue to maintain and update.
               On-line Documents:
               http://www.dai.ed.ac.uk/homes/rbf/CCVO/CCVOentry.htm
               http://www.dai.ed.ac.uk/CVonline/

TA2.6   Web-based listings of available positions and people seeking positions
               Status: Complete.
               Action: Continue to maintain and update.
               On-line Documents:
               http://www.dai.ed.ac.uk/homes/rbf/CCVO/joblist.htm

TA2.7.n   Annual Best Ph.D. prizes in Cognitive Vision Systems; n = 12, **30**, 36
               Status: None awarded in this semester.
               Action: None.
               On-line Documents: None*.*

TA2.8.n   Annual summer school on Cognitive Vision Systems; n = 7, 19, 31
               Status: The 1st Summer School was held in Much, Germany, 25th-29th August 2003.
               The 2nd Summer School was held at the same venue from 16th-20th August 2004.
               Action: None.
               On-line Documents:
               http://www.ecvision.info/education/Summer_School_on_Cognitive_Vision_2003.htm
               http://www.ipb.uni-bonn.de/events/summerschool04/summerschool04.html

TA2.9.n   Organization of tutorials; n = 12, **24**, 36
               Status: Complete; this action was subsumed into the five-day summer schools above.

               **Gösta Granlund and Michael Felsberg presented a tutorial on 'Cognitive vision
               systems: representation and organization' at ICPR 2004, Cambridge, United
               Kingdom** on August 22.
               Action: None.
               On-line Documents:
               http://www.ecvision.info/education/Summer_School_on_Cognitive_Vision_2003.htm
               http://www.ipb.uni-bonn.de/events/summerschool04/summerschool04.html
               http://www.ee.surrey.ac.uk/icpr2004/tutorials/Cognitivevisionsystems_000.htm

TA2.10.n   Identification of common development environments; n = 12, **24**, 36
               Status: A list of general computer vision environments is available at CVOnline.
               A new specific action (13-2) has been launched to address this specific issue.
               Action: None.
               On-line Documents: http://www.dai.ed.ac.uk/CVonline/environ.htm
               http://www.ecvision.org/information/Specific_Action_Status.htm#13-2

TA2.11.n   Contribution of code to the VXL and/or OpenCV; n = 12, **24**, 36
               Status: No progress yet on this activity.
               Action: Carry forward to the next semester.
               On-line Documents: N/A.

TA2.12.n   Short-term exchange/visits of research staff; n = 12, **24**, 36
Status: No exchanges or visits have been funded to date.
An open Call for Proposals for specific actions to sponsor student and staff exchanges was launched
Action: None.
On-line Documents:
http://www.ecvision.org/information/Funding_for_Specific_Actions.htm

TA2.13.n   Short-term exchange/visits of post-graduate students; n = 12, **24**, 36
Status: One student exchange has been approved (SA 16-1) to support an extended visit from University of Bielefeld to the University of Surrey.
A second exchange has been approved to allow Zygmunt Pizlo to visit the Vienna University of Technology in June 2004.
Another exchange between Bielefeld and Surrey was approved.
Action: None.
On-line Documents:
http://www.ecvision.org/information/Funding_for_Specific_Actions.htm

TA2.14   Textbook on cognitive computer vision (due month 36)
Status: Bob Fisher and Wolfgang Förstner are currently soliciting contributions and authors for this project.
Action: None.
On-line Documents: N/A

6.3 Information Dissemination

TA3.1.n
Electronic newsletter, published quarterly; n = 3, 6, …, 36
Status: Complete.
Action: None.
On-line Documents: http://www.ecvision.info/information/news/News.htm

TA3.2.n
Database of existing relevant publications**;** n = 6, 12**,** … **30**, … 36
Status: Complete. This activity has effectively been merged with TA3.3.n (indexed and annotated bibliography). This deliverable accounts for the indexing and dissemination via the website; 3.2 accounts for the creation of the source material.
Action: Continue to maintain and update..
On-line Documents:
http://www.ecvision.info/bibliography/Indexed_and_Annotated_Bibliography.htm

TA3.3.n
Annotated bibliography of literature; n= 6, 12**,** … **30**, … 36
Status: A considerable amount of work has been done on this deliverable as part of Specfic Action 8-1. An initial database of approx 350 citation has been assembled, indexed, and annotated. A website generation utility has also been developed (by the network coordinator).
Action: Continue to maintain and update.
On-line Documents:
http://www.ecvision.info/bibliography/Indexed_and_Annotated_Bibliography.htm

TA3.4.n
Database of research results; n = 12, **24**, …, 36
Status: As yet, a distinct repository of research results has not yet been created. Instead, the website is being used as an access point for these resources, with links now being directly embedded in the menu structure.
Action: Continue to maintain and update.
On-line Documents: http://www.ecvision.info

TA3.5.n
Periodic distribution of web-site content on CD; n = 12, **24**, 36
Status: Cancelled. Since much of the material referenced from the website is hosted by other sites, it was agreed that an off-line resource such as this had less value than originally anticipated and, consequently, it was decided to drop this deliverable.
Action: None.
On-line Documents: None.

TA3.6.n
Special sessions at conferences; n = 12, **24**, 36
Status: ICVS 2003 was devoted to the topic of cognitive vision and is being funded by ECVision (Specific Action13-1). ECCV now has a specific section for cognitive vision (& visual learning).
Action: None.
On-line Documents: http://dib.joanneum.at/ICVS03/

TA3.7.n
Sponsorship of best paper prizes in cognitive vision; n = 12, **24**, 36
Status: Three prizes have been awarded to date, ECCV '02, ECCV '04, ICVS '03.
The ECVision Prize for Best Paper in Cognitive Vision at ECCV 2004 was awarded to: K. Okuma, et al. "A boosted particle filter: Multitarget detection and tracking." In T. Pajdla and J. Matas, editors, Proceeding of the 8th European Conference on Computer Vision, ECCV 2004, volume I of LNCS, pages 28–39. Springer, 2004.
Action: None.
On-line Documents: Previously-awarded prize papers
http://link.springer.de/link/service/series/0558/bibs/2353/23530097.htm (ECCV'02)

TA3.8.n   Thematic workshops; n = 12, **24**, 36
                 Status: In addition to the research roadmap meetings in Nov. 2002 and Feb. 2003, organized by James Crowley, a Cognitive Vision Workshop in Zurich on the 19th and 20th September 2002 was organized by Bernt Schiele and Luc Van Gool.

                 Three workshops were held:
                 CVPR 2004 Workshop on Generic Object Recognition and Categorization
                 ECCV 2004 Workshop on Statistical Learning for Computer Vision
                 ECCV 2004 Workshop on Attention and Performance in Computer Vision - WAPCV 2004.

                 The CVPR '04 workshop was held on the 27th June. It was funded by ECVision under SA 25-1 and was organized by Ales Leonardis and Bernt Schiele.

                 The workshop on statistical learning for computer vision was held at ECCV '04 in May. It was funded by ECVision under SA 33-1 and was organized by Horst Bischof.

                 WAPCV '04 was held in conjunction with ECCV '04 in May. It was funded by ECVision under SA 37-2 and was organized by Lucas Paletta.

                 Action: None.
                 On-line Documents: http://www.vision.ethz.ch/cogvis02/
                 http://www.vision.ethz.ch/cvpr04-gorc/
                 http://slcv.icg.tu-graz.ac.at/
                 http://dib.joanneum.at/wapcv2004

TA3.9.n   Special issues in journals; n = 12, **24**, 36
                 Status: Four special issues are planned (or have been produced). These are:

                           IVC – Understanding visual behaviour 2002
                           IVC – Generative model-based vision 2003
                           IVC – Cognitive computer vision systems 2004
                           AI Magazine special issue 2003

                 A special issue of AI Magazine on cognitive systems has been published (Summer 2004). The volume can be seen at http://www.aaai.org/Library/Magazine/Vol25/25-02/vol25-02.html

                 Action: None.
                 On-line Documents: None.

TA3.10.n   Focussed review papers in journals; n = 12, **24**, 36
                 Status: Two review papers have been written: one in CVIU in 2004, and the other to be published in IVC in 2003.
                 Action: None.
                 On-line Documents: None.

6.4 Industrial Liaison

TA4.1.n   Database of research profiles and application experience, indexed by application,
                 R&D topics, industrial sector; n = 12, **24**, 36
                 Status: No progress has been made yet on this activity.
                 Action: Carry forward to the next semester.
                 On-line Documents: None.

TA4.2.n   Directory of vision vendors, indexed by application, product type,
                 deployed technology, industrial sector; n = 6, 12**,** … **30**, … 36
                 Status: The first version is now complete.
                 Action: Maintain and update.
                 On-line Documents:
                 http://www.ecvision.info/industrial_liaison/Database_of_Vision_Vendors.htm

TA4.3.n   Database of application-motivated R&D problems and information on
                 successful and unsuccessful approaches to solutions; n = 6, 12**,** … **30**, … 36
                 Status: Although no progress has yet been made on an explicit database or
                 information repository, a Specific Action (7-3) was launched to strengthen the impact
                 of industrial activities, to support ECVision member projects (especially those without
                 industrial participation) and their technologies, and to promote the use of resources
                 developed by TA4. In this context, an industrial liaison workshop with the members
                 of the LAVA consortium was held in Grenoble on the 19th and 20th January.
                 Action: Carry forward to the next semester.
                 On-line Documents:
                 http://www.ecvision.org/information/Specific_Action_Status.htm#7-3

TA4.4.n   List of techniques and their usefulness in certain classes of problems;
                 n = 6, 12**,** … **30**, … 36
                 Status: No progress has been made yet on this activity.
                 Action: Carry forward to the next semester.
                 On-line Documents: None.

TA4.5.n   Sponsorship of Best Application Development prizes in Cognitive Vision Systems; n
                 = 12, **24**, 36
                 Status:
                 The ECVision Prize for the Best Application Development in Cognitive
                 Vision Systems has been won by Inx Systems Corp., Finland.
                 Action: Award prize.
                 On-line Documents:
                  http://www.inx.fi/ecvision_eng.html

6.5 Information Infrastructure

SA1.1   CSCW Infrastructure operational
                  Status: Complete.
                  Action: None
                  On-line Documents:
                  http://www.ecvision.info/contacts/Executive_Committee.htm
                  http://www.ecvision.info/contacts/Members.htm

SA1.2   Website core structure implemented
                  Status: Complete.
                  Action: None
                  On-line Documents: http://www.ecvision.info

6.6 Management

SA2.1.n   Periodic management report; n = 6, 12**, … 30**, … 36
                  Status: Complete.
                  Action: None
                  On-line Documents: Project Management Reports

SA2.2   Final report from ECVision (due month 36)
                  Status: Pending.
                  Action: None
                  *On-line Documents:*N/A

7. BUDGETARY STATUS

The network continues to spend less than the planned budget. At time of writing, the cost statement for the 5th period is not yet complete. However, the ECVision financial records indicate that the total expenditure to date is approximately €672,000.   The budget for the same period is €993,900. The under-spend is therefore €321,900, or approximately 32% of the total budget. This represents a slight disimprovement vis-à-vis the previous semester where the under-spend was approximately 25%. It is unlikely that this will drop significantly in the remaining semester and therefore the total under-spend at the end of the contract is likely to be approx. 30%.

There follows a one-page summary of the financial position of ECVision, detailing the expenditure (*i.e.* costs) *vs.* budget for each cost category (travel, computing, other, labour) and for each of the 11 activity areas (research planning coordination, research planning activities, education & training coordination, education & training activities, etc.).   Note that the total of €629,998 is less than the €672,000 cited above because personnel costs for members have not yet been accepted by the Commission and therefore are not included.

An up-to-date summary of costs (and status) of specific actions is kept on
the website at www.ecvision.info\information\Specific_Action_Status.htm

ECVision
Budget vs. Actual Cost by Target Area

Semester 5

Area		Travel	Computing	Other	Labour	Overheads	Total
Research Planning Coordination	Budget:	7500.00	0.00	2500.00	39000.00	9800.00	58800.00
	Cost:	128.00	0.00	0.00	39083.15	6539.46	39236.75
Research Planning Activities	Budget:	7500.00	0.00	7500.00	45000.00	12000.00	72000.00
	Cost:	33051.92	0.00	5005.15	16900.00	10991.41	65948.48
Education and Training Coordination	Budget:	7500.00	0.00	2500.00	39000.00	9800.00	58800.00
	Cost:	0.00	0.00	0.00	32482.70	5413.78	32482.70
Education and Training Activities	Budget:	7500.00	0.00	7500.00	45000.00	12000.00	72000.00
	Cost:	12289.64	0.00	71247.75	23064.90	20551.63	123309.77
Industrial Liaison Coordination	Budget:	7500.00	0.00	2500.00	39000.00	9800.00	58800.00
	Cost:	0.00	0.00	152.31	34675.61	5809.73	34858.38
Industrial Liaison Activities	Budget:	7500.00	0.00	7500.00	45000.00	12000.00	72000.00
	Cost:	10885.82	0.00	2679.33	14508.00	5131.03	30786.18
Information Dissemination Coord.	Budget:	7500.00	0.00	2500.00	39000.00	9800.00	58800.00
	Cost:	0.00	0.00	309.00	29675.14	5238.49	31430.94
Information Dissemination Activities	Budget:	7500.00	0.00	7500.00	45000.00	12000.00	72000.00
	Cost:	6550.87	0.00	3460.00	16660.40	4778.91	28673.44
Network Coordination	Budget:	18750.00	2500.00	6250.00	108150.00	27130.00	162780.00
	Cost:	2530.91	541.34	1869.80	101875.00	21363.41	128180.46
Information Infrastructure	Budget:	0.00	7500.00	0.00	31500.00	7800.00	46800.00
	Cost:	0.00	6869.75	349.72	33450.00	8133.89	48803.36
Six-Monthly Meetings	Budget:	190000.00	0.00	27600.00	0.00	43520.00	261120.00
	Cost:	48095.80	0.00	7144.49	0.00	11048.06	66288.35
Total	**Budget:**	**268750.00**	**10000.00**	**73850.00**	**475650.00**	**165650.00**	**993900.00**
	Cost:	**113532.96**	**7411.09**	**92217.55**	**311837.42**	**104999.80**	**629998.82**

Note: budget amounts are for the period to the end of the current semester; actual cost amounts reflect exact expenditure to date and do not include all labour costs (with the exception of coordinator costs, those labour costs submitted by members but not yet accepted by the Commission are not included).

Monday, September 13, 2004

8. CRITICAL ANALYSIS OF ACTIVITIES

The network continues to operate effectively and to grow, with almost all of the expected outcomes being realized and with three new members joining in this semester.

Significant progress has been made on the Research Roadmap this semester. Heretofore, this was the one area in which the Network had not delivered fully. This has been addressed and a complete draft is now available. This will be finalized early in the next semester.

The ECVision Summer School was again a great success and is one of the primary mechanisms that we have for influencing the next generation of researchers in cognitive vision.

9. CONCLUSIONS AND EXPECTATIONS FOR THE COMING SEMESTER

The ECVision network is actively pursing its aims in all of the four target areas, Research Planning, Education & Training, Industrial Liaison, and Information Dissemination. In the coming six months, we will finalize the research roadmap and plans for the creation of a book on cognitive vision. Both will have a strong impact on other goals of ECVision in information dissemination and industrial liaison through the contributions they make toward the definition, development, and exploitation of this emerging discipline.

APPENDIX I – SPECIFIC ACTIONS FUNDED IN THIS SEMESTER

ECVISION SPECIFIC ACTION DESCRIPTION, WORKPLAN, & BUDGET

SPECIFIC ACTION 16-2
STUDENT EXCHANGE

GERHARD SAEGERER
UNIVERSITY OF BIELEFELD
GERMANY

1. Action Area

Education and Training

2. Goals of the Action

The goal of the action is a student exchange between Bielefeld University and the University of Surrey. The idea is to improve relations between European research groups involved in cognitive vision, in general, and the groups of Josef Kittler in Surrey and the group of Gerhard Sagerer in Bielefeld in particular.

The student involved in the exchange is *Ingo Lütkebohle*. The work done during the visit will be part of his diploma thesis which is comparable to a master's degree. As the topic of his thesis he will design and implement an evaluation scheme for a cognitive vision system. Cognitive vision systems need to be strongly memory centered in order to enable contextual interpretations over longer periods of time as well as learning of new concepts and categories. Therefore, the work will focus on an evaluation considering the content of such memories as well as access patterns on the memory and the time-dependent behaviour of recognition algorithms. Non-parametric data mining techniques will be employed to gain insights into the benefits and challenges of a memory centered approach in cognitive vision systems.

The visit in Surrey will promote this research because it allows one to consider a completely different usage scenario in Surrey and Bielefeld with correspondingly different kinds of data available for analysis. Kittler's group in Surrey seems particularly suited for this due to the various work on vision systems and higher level visual processing they are well renowned for.

3. Concrete Outcomes of the Action

The benefit to the diploma thesis of our student will be an improvement of the generality and applicability of the evaluation concept. The results gathered will be an important part of the thesis.

Bielefeld has developed an Active Memory concept as an integration platform for complex vision systems which is exemplified in an office scenario. Surrey uses different kinds of memory buffered processing networks in the domain of sports video annotation.

Application of this evaluation concept on the different vision systems will give us more insights about the systems than could be gathered by looking at them in isolation. It will also constitute a significant transfer of knowledge about the respectively other vision system.

4. The Benefits to the Network from Carrying out the Action

The action will provide insights into cognitive vision frameworks such as the concept of active memories and whether the different concepts can be transferred to other domains at all.

5. Effort

The effort is a 2 month visit, to allow enough time for design and data collection in support of a diploma thesis. The student will join the School of Electronic and Sciences as a Visiting Researcher within the group of Prof. Josef Kittler.

6. Start and Completion Dates

1st August 2004 – 30th September 2004.

7. Funding

Travel Costs   €178.00
Accommodation and Subsistence Costs   €5,325.00

- Accommodation and subsistence at standard rate of €150 per day for the first ten day and €75 per day thereafter.
- Period of Visit: 1st August 2004 to 30th September October 2004, inclusive (61 days).

Computing Costs   €0
Other Project-Specific Costs   €0
Labour Costs   €0

Total Cost   €5,503.00

ECVISION SPECIFIC ACTION DESCRIPTION, WORKPLAN, & BUDGET

SPECIFIC ACTION 21-2
ENCYCLOPEDIA OF COGNITIVE COMPUTER VISION

ISABELLE BLOCH
ECOLE NATIONALE SUPERIEURE DES TELECOMMUNICATIONS
PARIS, FRANCE

1. Action Area

Education and Training.

2. Goals of the Action

This action aims at extending CCV Ontology with aspects related to imprecise knowledge representation in cognitive vision, to tools and methods for dealing with imprecise spatial information, and to information fusion issues and methods. It extends a previous contribution made last year, by adding new sections on fusion.

3. Concrete Outcomes of the Action

Estimated length of the text that will be written: 100-150 pages. A first version will be available as a ps or pdf file, and will then be converted into appropriated web pages to be included in CCV Ontology.

4. The Benefits to the Network from Carrying out the Action

It appears in CVOnline, that in the fusion section, there is nothing on non-probabilistic methods such as fuzzy sets and possibility theory, or belief function theory. Since these theories are important in cognitive vision when several sources of information are available, this could appear also as a part of the Reasoning section of CCV Ontology (Section 3). The previous contribution contained general consideration on fusion for cognitive vision problems. This new contribution would contain a formal method description for both fuzzy sets and belief functions (Section 3.3: Methods). This includes also an important aspect of dealing with spatial information in fusion problems. A preliminary section about knowledge representation dedicated to fusion issues will be added too.

Contributions on all these aspects will significantly extend the material available in CCV Ontology. It can be very useful for students, mostly at graduate levels, as well as to young researchers involved in these areas.

A more precise scheme of what I propose is attached below.

5. Effort

Estimated work load: 20 days (spread over 4 months)

6. Start and Completion Dates

May 1st, 2004 - August 31st, 2004

7. Funding

Travel Cost   €0
Computing Costs   €0
Other Project-Specific Costs   €0
Labour Costs   €6000
Total Cost   **€6000**

Appendix: detailed scientific content of the proposed contribution

In Section 2 (Knowledge representation):

  Knowledge representation and uncertainty in images
- Numerical representations of imperfect knowledge
- Symbolic representations of imperfect knowledge
- Knowledge-based systems
- Reasoning and inference modes

In Section 3 (Reasoning):

Section 3.3 - Methods:

Numerical methods for information fusion and decision making
1 Probabilistic and Bayesian approaches
1.1 Information measures
1.2 Modeling and estimation
1.3 Combination in a Bayesian framework
1.4 Combination seen as an estimation problem
1.5 Decision
2 Belief function theory
2.1 Modeling
2.2 Estimation of mass functions
- Modification of probabilist models
- Modification of distance models
- A priori on disjunctions as focal elements
- Learning focal elements
- Introduction of disjunctions through mathematical morphology
2.3 Conjunctive combination
2.4 Other combination modes
2.5 Decision
2.6 Axiomatic deduction of Dempster-Shafer's rule
3 Fuzzy and possibilistic fusion
3.1 Modeling
3.2 Definition of membership functions or possibility distributions
3.3 Combination
- operators
- choice of operators

3.4 Decision

Spatial information in fusion
1 At modeling level
2 At decision level
3 At combination level

Logical approaches for fusion and decision making could be shortly addressed to if this is useful to the community.

ECVision Specific Action Description, Workplan, & Budget

Specific Action 39-2
Statistical Pattern Recognition Toolbox

V.Hlavac
Czech Technical University in Prague (CTU)
Center for Machine Perception (CMP)
Prague
Czech Republic

1. Action Area

Education and Training & Dissemination.

2. Goals of the Action

CMP has been developing the Statistical Pattern Recognition Toolbox in Matlab since the year 2000. The first version was developed as a diploma project of Vojtech Franc. He became a PhD student and has continuously extended the toolbox. The toolbox originally implemented methods described in the monograph Schlesinger M.I., Hlavac V: Ten lectures on the statistical and structural pattern recognition, Kluwer, Academic Publishers, 2002. Currently, the toolbox contains much wider collection of algorithms. Vaclav Hlavac has been supervising the project. The toolbox has been in public domain since 2000. The toolbox was downloaded by 6,500 people so far. The toolbox is available at

http://cmp.felk.cvut.cz/~xfrancv/stprtool/index.html

Why is the Statistical Pattern Recognition Toolbox related to cognitive vision? The bridging element is (statistical) learning, which is rigorously studied in pattern recognition and well represented in the toolbox. Both supervised and unsupervised learning methods are part of the toolbox. The toolbox has proved to be very useful in prototyping including cognitive vision tasks, e.g. in human face detection.

Why do we intend to orient a ECVision specific action to the Statistical Pattern Recognition toolbox further development? The today's toolbox is mainly a collection of the research code with very limited documentation and adjustment for teaching or student self-study.

The goal of the specific action is to make the Statistical Pattern Recognition Toolbox more easily accessible to users: (a) researchers, (b) teachers, and (c) students. The toolbox has to be restructured a little. Its documentation has to be written and should serve both as a help file and as a self-standing document. The existing demos have to be improved to show how the toolbox can help the cognitive vision tasks. The other intention is to prepare several (self) teaching lessons which would lead the user in her/his first tour through the toolbox. After this is successfully accomplished then the toolbox will help to disseminate the learning related knowledge in the community.

3. Concrete Outcomes of the Action

The overall outcome is the improved Statistical Pattern Recognition Toolbox which will be provided as a public domain software to research community. The main direction of improvement is user friendliness.

More specifically the action will:

(a) Restructure the toolbox.

(b) Create the documentation which will be accessible during the session (.html).

(c) Improve existing demos and create several new ones with the cognitive vision examples.

(d) Provide several lessons guiding the new user through main toolbox functionalities.

4. The Benefits to the Network from Carrying out the Action

The network users will have a new tool at hand that could help them in their research and teaching. Without the action the network users would not probably use the tool.

5. Effort

The task will be conducted by Mr. Vojtech Franc. His full time PhD study grant expired in Feb 2004 and has been employed as a research fellow since. His effort is estimated as 20 full working days spread in two months. Prof. Vaclav Hlavac will supervise the project and provide a feedback on new developed material. The effort estimated is 5 working days. V. Hlavac's contribution will not be paid by ECVision.

6. Start and Completion Dates

19 April – 18 June, 2004.

7. Funding

Travel Cost	€0
Computing Costs	€0
Other Project-Specific Costs	€0
Labour Costs	€3180
Total Cost	**€3180**