

1st Joint VAMPIRE Workshop with Industry

Pommersfelden, Mai 2004

1 Workshop Overview

The industry workshop took place in Pommersfelden near Erlangen, Germany, on May 26/27. 45 persons participated in the workshop. Besides 23 researches from the VAMPIRE partners, 8 representatives from medium-sized companies (DTS Medien GmbH, Herford, Germany; Imagination Computer Services, Wien, Austria; Sira Ltd., Kent, UK; VRVis GmbH für Virtual Reality und Visualisierung, Wien, Austria; Busch-Jaeger Elektro GmbH, Lüdenscheid, Germany; Frequentis Innovations Graz, Austria; Ars Electronica Futurelab, Linz, Austria; Alicona Imaging GmbH, Graz, Austria), and 11 persons in leading research positions of corporate companies (DaimlerChrysler AG, Siemens AG, Honda Research Institute Europe GmbH) attended the workshop. Additionally, Patrick Courtney represented the ECVision research network, and Cécile Huet the European Commission. As a University cooperation partner Joachim Denzel, University of Passau, participated in the workshop.

Gerhard Sagerer (Bielefeld U) opened the workshop presenting an overview of the workshop program and the VAMPIRE project. After that Heinrich Niemann (U of Erlangen-Nuremberg, *Real-time Tracking and Image-based Modeling*), Axel Pinz (TU Graz, *Hybrid Tracking for Mobile AR*), and Josef Kittler (U of Surrey, *Contextual Scene Interpretation for Video Annotation*) gave introductory talks on the work done by the corresponding partner in VAMPIRE. A special interest by the industrial participants was dedicated to the following demo session:

TU-Graz presented a mobile Augmented Reality (AR) demonstrator that included a localization based on artificial landmarks and a 3-d cursor for human-machine interactions.

University of Surrey presented a preliminary version of an automatic video annotation systems.

University of Erlangen-Nuremberg presented an active object recognition system for localization, tracking, and recognition in real time.

Bielefeld University presented different demonstration systems: (i) An AR system for interactive object recognition; (ii) a context aware AR system that displays additional information about scene objects triggered by the user interaction; (iii) a mosaicing algorithm that partitions the scene into different planar sections. (iv) the dialog and attentional systems of a mobile robot developed within cooperating projects BIRON and COGNIRON in Bielefeld.

The demonstrations facilitated discussions about technical details of algorithmic solutions presented before and initiated discussions on further application areas, like medical surgery support, quality assessment on assembly lines, or gestic-based light switching.

In the session for industry presentations topics ranged from introductory talks on specific industrial research projects to possible application scenarios of VAMPIRE techniques.

- Manfred Prantl from Alicona Imaging showed results from a 3-d surface measurement system working on microscopic images.
- Konrad Karner reported about research at VRVis focussing on Virtual Reality applications.
- Christian Wöhler, DaimlerChrysler AG, focussed in his presentation on different applications in the area of car manufacturing. While assembling and quality control is currently performed sequentially, manufacturing time could be significantly reduced by integrating the two steps using VAMPIRE techniques. Another area discussed was that of distant parallel teaching where an expert trains the system for supporting a specific manufacturing task that is then in turn duplicated and used by trainees on the task.
- Patrick Courtney, Perkin Elmer, introduced to different kinds of activities offered by ECVision's industrial liaison. He gave a convincing example on the use of cognitive vision techniques in an application of a wood processing company, that saved money by optimizing the wood cutting process.
- Cecile Huet reported about the Cognition area in IST.
- Edgar Körner, Honda Research, showed research activities in the area of humanoid robots. A special focus was on an active vision system for localization and recognition of objects.

On the second day, Helge Ritter and Sven Wachsmuth (both Bielefeld U) discussed aspects on interactive object learning and system integration, respectively. After that Gerhard Sagerer (Bielefeld U) summarized what has been learned from the workshop so far and opened a more intense feedback discussion on VAMPIRE and possible following projects.

2 Reporting in Press, Radio and Television

In press the workshop was reported about by the German news magazine 'Focus' (June 7, 2004, p. 102) and by the local newspaper 'Fränkischer Tag' (May 29, 2004) who both sent reporters to Pommersfelden. Besides these, the workshop was announced in German, European, and world wide media. Local newspapers in Bielefeld and Erlangen published main articles about the project (Westfalenblatt, May 19, 2004; Neue Westfälische, May 19 and June 29, 2004; Erlanger Nachrichten, May 26, 2004). The German radio

broadcast Deutschlandfunk conducted a story for their science magazine (Deutschlandfunk, 'Forschung aktuell. Aus Naturwissenschaft und Technik', May 28, 2004, 4:35pm); BBC made a telephone interview with Josef Kittler; German national newspapers like 'Die Tageszeitung' (TAZ) and Frankfurter Allgemeine (FAZ) published short notes about the on-coming event; A couple of business magazines published articles about the VAMPIRE project (*Microsoft Magazine* (Germany), vol. 03, 2004, p. 8; *iBusiness ExecutiveSummary* (Germany), vol. 15/16, August 2004, p. 10); The Québec, Canada, based magazine *L'actualité* published an article about VAMPIRE (July 2004, p. 80); German-based television channels SAT-1 and WDR visited the VAMPIRE lab in Bielefeld and recorded videos for their broadcasting shows (SAT-1, local news show '17:30', July 26, 2004; the broadcasting date for WDR has not been fixed, up to now); Various newspapers and magazines all over the world reported about the VAMPIRE project on their online websites (Spiegel-Online - Germany, ABC.com - USA, The Boston Globe - USA, Caracol Noticias - Venezuela, Ciberespacio - Venezuela, Daily Times - Pakistan, Radio-Canada, TheStraitsTimes - Singapore, Terra Networks, tiscali - Italia, Wiener Zeitung, Liberation - France, Yahoo, Google, etc.)

3 Result of the workshop

The workshop was planned as a dialog between Cognitive Computer Vision research as conducted by the VAMPIRE consortium and industry experience, applications and demands. Therefore, the workshop program consisted of 4 interleaved parts: (i) Presentations from the VAMPIRE consortium that gave insights and motivations with regard to research perspectives; (ii) demonstrations that gave an impression on the performance and exemplary applications of developed techniques; (iii) presentations from industry participants that gave an overview of interesting applications and tasks for cognitive vision techniques in industry; (iv) discussions that implemented the dialog aimed for and which happened all over the workshop.

3.1 Industrial application areas

As a contribution from industry, many general industrial application areas were discussed on the workshop. These ranged from low-level image processing like 3-d surface measurement in the light and electron microscope via Augmented and Virtual Reality (AR/VR) applications to active vision systems for humanoid robots. For the techniques developed in the VAMPIRE consortium, especially AR systems and robots that act as communication partners to humans seemed to be very interesting applications. In medicine, a doctor needs to have control over and feedback from an increasing technology which assists him or her during a surgery. In car manufacturing, visual quality control and assembling done by machines or humans needs to be integrated in order to shorten production cycles. Teaching systems can be trained by advisers and augment the perceived reality for trainees. Robots which perceive their environment and

communicate with human partners need to implement attention cues that focus the perception of the robot on objects and events under discussion.

3.2 Feedback from Industry on VAMPIRE research

The industry participants were generally impressed by the work and demos presented by the VAMPIRE consortium. The project seems to be on a good track of industry relevant research. “Closing the visual processing loop” by a tight human-machine interaction that is mediated by the Augmented Reality gear is a promising approach. Acoustic processing and speech recognition would be a natural extension of the scope of VAMPIRE that would further facilitate the interaction paradigm. The common hardware basis facilitates the project’s success. System integration is a very attractive aspect of VAMPIRE that is under-represented in many other research projects. The realization of a single integrated demonstrator in a definite scenario is seen as a key contribution of the project. The presented concepts seemed convincing with regard to the project’s goals and potential industrial applications. Applications are seen on the mid and long term period, while partial results might be used in a short-term range, too. It is clearly seen that product creation is the task of industry, but a tight cooperation with partners from industry is needed to transfer research results to industry applications. It is envisaged to implement such kind of cooperation following the VAMPIRE project.

3.3 Questionnaire

At the end of the workshop participants from industry were asked to provide additional feedback in a questionnaire. 12 participants from a *corporate group* and 3 participants from a *medium-sized company* completed the questionnaire. Most of them (14) occupy positions in *research and development*, 3 of them are partially or completely involved in *management*, and 1 of them has additional functions in *sales and marketing*.

Your opinion about the workshop:

	mean (1: not at all; 6: definitely)	median
the workshop location was convenient	5.5	6
the catering was nice	5.4	5
attending the workshop was worth the time	5.5	6
the workshop created a productive atmosphere	5.3	6
the presentations were good	5.1	5
the demonstrations were interesting	5.7	6
the workshop rather was a waste of time	1.3	1
I made interesting contacts	4.9	5
an event like this should be repeated	5.7	6

Your opinion about the project:

	mean (1: not at all; 6: definitely)	median
the key aspects of VAMPIRE became clear	5.2	6
cognitive vision is an interesting concept	5.6	6
VAMPIRE is an interesting project	5.4	5
the project's first results are convincing	5.0	5
the project's management structures are successful	5.5	6
the VAMPIRE research is relevant for my company's products	4.5	5
I would like to join a project like VAMPIRE in an advisory board/as a project partner	4.7	6

Cognitive vision research like in VAMPIRE is of

	mean (1: not at all; 6: definitely)	median
short-term relevance for markets	2.6	2
mid-term relevance for markets	4.3	4
long-term relevance for markets	5.5	6

A project like VAMPIRE would benefit from

	mean (1: not at all; 6: definitely)	median
an industrial partner	5.1	5
an industrial advisory board	4.7	5

The results underline the great success of the workshop, that the project is on promising track, and that research in cognitive vision as conducted in the VAMPIRE project is attractive for industry and is quite relevant for future markets. Industry is willing to cooperate with and is aiming to participate in current and especially in future cognitive vision projects.

4 Conclusion

Both, the VAMPIRE consortium and the industry participants greatly benefited from the 1st Joint Workshop with Industry. It became clear that besides new innovations with regard to algorithmic solution

of vision problems like object recognition, tracking and localization, the aspect of system integration is becoming more and more relevant. Therefore, the demonstration session was of special interest for participants from industry as well as from the VAMPIRE consortium. Industry needs and wants to be involved in Cognitive Vision research. The concepts developed in VAMPIRE seem to be ideally suited for a further and tighter cooperation with industry. Following projects with industry participation are highly desirable and will be further discussed and planned. Given the feedback, a 2nd Joint Workshop with Industry at the end of the VAMPIRE project will have great value and is planned for Summer 2005.

5 Acknowledgement

We would like to thank all participants of the workshop for open minded discussions and for the valuable contribution to the workshop. The group of Heinrich Niemann did a great job in the local organization and arrangements. We especially thank all people who contributed to the impressive demonstration systems shown at the workshop. The VAMPIRE project is supported by the European Commission in the IST program. The workshop was additionally supported by the Faculty of Technology, Bielefeld University.

Gerhard Sagerer,
Coordinator of VAMPIRE and General Chair

Christian Bauckhage and Sven Wachsmuth,
Technical Coordinators of VAMPIRE and Program Chairs