



Editorial

This issue of the International Journal of Computer Vision is dedicated to Hans-Hellmut Nagel for his 66th birthday.

Hans-Hellmut Nagel (HHN in the sequel), born 15 January 1935 in Berlin/Germany, obtained his ‘Diplom in Physik’ from the Universität Heidelberg in July 1960 and the ‘Dr. Rer. Nat.’ from the Fakultät für Physik der Universität Bonn in February 1964. His Thesis, supervised by Wolfgang Paul, applied a Monte-Carlo approach to study the development of high energy electron-photon cascades in lead. The program developed during this study formed the kernel of a system which has been extended and used subsequently in High Energy Physics laboratories around the world for the preparation and evaluation of high energy particle experiments necessitating the detection and energy measurement of electrons and photons.

In 1964, HHN engaged in efforts to automatize the measurement of high energy particle tracks in bubble chamber experiments at the Physikalisches Institut der Universität Bonn. In this context, he spent a year and a half as visiting scientist at MIT to make himself familiar with the ‘Precision Encoding and Pattern Recognition (PEPR)’ approach developed by Irvin Pless and his collaborators who linked a cathode ray tube to a computer in order to speed up the measurement of bubble chamber tracks. In Fall 1966, HHN was delegated by the Physikalisches Institut der Universität Bonn to the Deutsche Elektronen-Synchrotron (DESY) at Hamburg/Germany in order to cooperate in the development, implementation, and use of a ‘Hough-Powell Device (HPD),’ a digitization device particularly suited for weakly curved high energy proton trajectories, for example those recorded by the 2m Liquid Hydrogen Bubble Chamber operated at CERN, Geneva/Switzerland. He subsequently took over the responsibility to direct the automatic image measurements group at DESY until early 1970.

Based on these experiences in experimental high-energy physics, HHN gradually ‘drifted’ from Physics into the emerging field of Computer Vision. Following his ‘Habilitation in Physik’ (Winter 1970, Universität Bonn), he joined Universität Hamburg as the second full ‘Professor für Informatik’ in Fall 1971. Stimulated by his teaching experiences during the gradual built-up of computer science at the Universität Hamburg, his students together with him migrated the P-Code Pascal Compiler developed by Amman and Wirth at the ETH Zürich onto the Digital Equipment Corporation DEC PDP-10, adding native code generation and a full Pascal runtime environment for this computer. These efforts subsequently evolved into a series of Pascal implementations for Minicomputers which, together with the DEC PDP-10 implementation, spread around the world.

At the same time, HHN began to build facilities in order to record, digitize, and transfer video data into a computer. The well-known ‘Hamburg Taxi’ image sequence originated at that time in his laboratory. Right from the start, his goal has been to extract ‘meaning’ from a video: this implied to obtain trajectories of bodies moving in the scene relative to the recording camera, followed by algorithmic conversion of the resulting geometric information into a natural language text. Investigations into change detection and the estimation of optical flow still constitute important steps along this way.

An invited lecture by HHN at the 1978 International Conference on Pattern Recognition in Kyoto/Japan sort of put image sequence evaluation onto the map, stimulating a series of subsequent scientific events. On a national level, he initiated in the late seventies a focussed research program (Schwerpunkt-Programm) by the Deutsche Forschungsgemeinschaft (DFG) for understanding speech and images, a precursor of broader artificial intelligence research activities in Germany.

In 1983, HHN joined the Fraunhofer-Institut für Informations- und Datenverarbeitung (IITB) in Karlsruhe as Director, in a joint appointment as (full) Professor für Informatik der Universität Karlsruhe (TH) in Karlsruhe/Germany. In this position, HHN had to be concerned with a broad range of applied contract research, comprising among other areas the application of Computer Vision for quality control and control of robots. He was heavily involved in the

initiation of what later became known as the PROMETHEUS program, an international cooperation of the European Automotive Industry to study Information Technologies—in particular Computer Vision—approaches towards increasing safety, efficiency, and comfort of using road vehicles. In this context, HHN coordinated the German PRO-ART (PROmetheus ARTificial intelligence) efforts during the second half of the eighties and the first half of the nineties. Following his 65th birthday in 2000, HHN retired from this position at the IITB, but continues as professor at the Universität Karlsruhe.

In 1973, he initiated a series of national workshops on pattern recognition for speech and images which later evolved into the annual conferences of the ‘Deutsche Arbeitsgemeinschaft für Mustererkennung (DAGM).’ From 1983 to 1988, he served as Chairman of the DAGM, succeeding Hans Marko who had established the DAGM as the national representation within the International Association for Pattern Recognition (IAPR, sponsoring the bi-annual ICPR conference series).

In 1975, HHN initiated the first German Newsletter for Artificial Intelligence which later evolved into the German Scientific Quarterly ‘KI’ (Künstliche Intelligenz = Artificial Intelligence). In order to advance AI in Germany, HHN contacted the board of the British ‘Society for Artificial Intelligence and Simulation of Behavior (AISB)’ to jointly organize the first annual AISB conference outside the United Kingdom. AISB-78 thus took place 1978 in Hamburg (a kind of precursor for the current ECAI-conference series).

HHN served as Vice-Chairman of ICPR-1982 in München/Germany, as a founding member of the Program Committee for ICCV-1987 in London/UK and ECCV-1990 at Antibes/France, and as Chairman of ICCV-1993 in Berlin/Germany. He has been asked to join the editorial board of numerous scientific journals, among them International Journal of Computer Vision, IEEE-PAMI, CVGIP/CVIU, IVC, and AIJ.

In 1994, HHN was elected to be the first recipient of the ‘Preis der Arbeitsgemeinschaft der KI-Institute’ in Germany and participated as co-author in a best-paper award at the German Annual Conference on Artificial Intelligence 1997 in Freiburg/Germany. He has been elected Fellow of the IEEE in 1997, Fellow of the IAPR in 1998, and Fellow of the ECCAI (European Coordinating Committee for Artificial Intelligence) in 2001.

Hans-Hellmut Nagel has contributed enormously to the field of Computer Vision in particular in the areas of motion analysis and object tracking. His and his students’ work is characterized by a theoretical and experimental rigor which have played a prominent role in the slow process of turning our field into a science. In this process he and the groups that he has led over the years have also significantly advanced the state of the art for such difficult applications as automatic car driving and the automatic interpretation of dynamic scenes.

To honor Hans-Hellmut, a number of his former students and collaborators have accepted to submit some of their recent work to the IJCV. Their contributions have gone through the same stringent reviewing process as the regular papers and I find the result quite interesting in the sense that it reflects quite well the broad influence of Hans-Hellmut’s thinking and acting on various areas of Computer Vision and its applications.

The article by Wilfried Enkelmann (a former student of HHN) describes the application of several Computer Vision and Automatic Control techniques to the design and realization of driver assistance functions embarked on a vehicle. Some of these functions are now available on commercial vehicles.

The article by Christopher Geyer and Kostas Daniilidis (a former student of HHN) is a fascinating exploration of the projective geometric properties of catadioptric sensors whose importance in such applications as visualization, vehicle guiding and surveillance is rapidly growing.

The article by Joachim Weickert and Christoph Schnörr (a former student of HHN) unifies many of the existing methods for computing the optical flow from a sequence of images by variational methods and proves the important result that these methods are well-posed.

The last article is by John Tsotsos who spent part of this first post-PhD year at the University of Hamburg in HHN’s group. It is a stimulating exposure, based on recent biological evidence, of what the role of attention in motion understanding research could be.

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