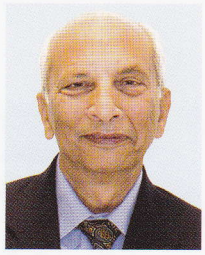
Citation

For Outstanding Contributions to Conception and Pioneering Reseach of Dynamic Scene Analysis and Multi-Sensor Fusion in Computer Vision Systems



Dr. Jagdishkumar K. Aggarwal

Position and Organization :

Cullen Trust for Higher Education Endowed Professorship in Engineering , Univ. of Texas at Austin

Doctorate :

Ph. D. (Univ. of Illinois, 1964)

Date of Birth:

November 19, 1936

Brief Biography :

1957 B.Sc., Univ. of Bombay, India
1960 B. Eng., Univ. of Liverpool, England
1961 M.S., Univ. of Illinois, Urbana, USA
1964 Ph.D., Univ. of Illinois, Urbana
1964 Assistant Prof. of Electrical Engineering, Univ. of Texas at Austin
1968 Visiting Assistant Prof., Center for Dynamical Systems, Brown Univ.
1968 Associate Prof. of Electrical Engineering, Univ. of Texas at Austin
1969 Visiting Associate Prof. of Electrical Engineering and Computer Science,UC Berkeley
1972 Prof. of Electrical and Computer Engineering, Univ. of Texas at Austin
1981 John J. McKetta Energy Prof. of Electrical and Computer Engineering, Univ. of Texas at Austin
1985 Prof., Computer Sciences, Univ. of Texas at Austin
1990 Cullen Trust for Higher Education Endowed Professorship in Engineering, Univ. of Texas at Austin
1995 Visiting Prof., MIT Media Lab.

Main Awards and Honors :

1985 100 Top Innovations of the Year by Science Digest
1987 College of Engineering, Univ. of Illinois, Alumni Medal
1992 Senior Research Award, American Society of Engineering Education
1996 Technical Achievement Award, IEEE Computer Society
2004 King-Sun Fu Prize, International Association for Pattern Recognition
2005 Leon K. Kirchmayer Graduate Teaching Award, IEEE

Fellow, Institute of Electrical and Electronics Engineers (IEEE)
Fellow, International Association for Pattern Recognition
Golden Core Member, IEEE Computer Society
Fellow, American Association for Advancement of Science
Life Fellow, IEEE

Main Achievements

J. K. Aggarwal, on receiving his bachelors' degrees from the University of Bombay and the University of Liverpool, went on to acquire Masters and Doctorate degrees in Electrical Engineering at the University of Illinois. He has been on the faculty of the University of Texas at Austin since 1964. Currently he is Cullen Professor of Electrical and Computer Engineering.

Professor J. K. Aggarwal has made fundamental and lasting contributions to the theory and practice of information processing in a number of areas, including digital signal processing, object recognition and tracking, dynamic scene analysis, robot navigation, range images and multi-sensor fusion. More recently, he has contributed to the application of computer vision to human motion analysis and surveillance. In addition to contributing to the development of theory, he has led to the development of numerous products and applications. Further, his contributions have led to the development of software for seismic data processing, modeling of real objects by computing structure from multiple views, and dynamic scene analysis.

Professor Aggarwal's 1976 election to the rank of IEEE Fellow, recognized his contributions to digital signal processing and system theory. He applied digital signal processing expertise to the solution of important problems in seismic data processing, including the processing of time-variant signals (signals that change in frequency as a function of time) and the deconvolution of seismic data, namely, the analysis of seismic data to isolate favorable geologic structures that may contain oil or gas. Many of these algorithms are still in use in the oil industry.

In his ground breaking work on object recognition, Professor Aggarwal developed an algorithm to determine the edges of curved or planar three dimensional objects leading to the identification of object boundaries. This work received the Pattern Recognition Society's 1975 Best Paper Award. The methodology presented for segmenting scenes, together with the method of analysis based on the curvature of boundaries of objects in the scene, led to a system to recognize objects from partial views. This algorithm has since been employed in the recognition of industrial parts.

Professor Aggarwal introduced the seminal concept of analyzing sequences of images to obtain information on tracking and on the structure of moving objects. He was among the first to use motion in computer vision for recognition and tracking and to develop a system for computing object description and motion. The computation of structure from multiple views proposed in this paper later became a product. Further, he was the first to propose the computation of structure of non-rigid objects from a sequence of images.

From these pioneering research contributions arose a new research area known as dynamic scene analysis. He received the IEEE Computer Society Technical Achievement award and the Phillip Award of IEEE Robotics and Automation Society for robot navigation at the International Conference on Robotics and Automation.

As one of the first computer vision researchers to recognize the usefulness of obtaining data from multiple sensors to provide additional information for object recognition, Professor Aggarwal coined the term "Multi-Sensor Fusion", now a fast-growing area of computer vision research. In June 1989, leading researchers from the United States and Europe gathered in Grenoble, France in a workshop on Multi-sensor Fusion for Computer Vision, organized and directed by Professor Aggarwal. Through his contribution to this area, he received the IEEE Computer Society Award at the 1991 Conference on Artificial Intelligence Applications.

In 2004, Professor Aggarwal received the K.S. Fu Prize of the International Association for Pattern Recognition. The K.S. Fu Prize is the IAPR's highest award, bestowed every two years for lasting contributions to pattern recognition. The citation reads, "For pioneering contributions towards establishing the fundamentals of structure and motion from image sequences and their application to robot vision and human motion".

In 2005, Professor Aggarwal received the IEEE Kirchmayer Graduate Teaching Award. This is the most esteemed award given by IEEE for graduate teaching. The citation reads, "For inspiring graduate students to achieve excellence through mentoring, teaching, and guidance of research in computer vision and signal processing".

Professor Aggarwal is a Life Fellow of IEEE, Golden Core member of the IEEE Computer Society, Fellow of IAPR, and Fellow of AAAS.

For seminal and pioneering contributions to signal processing, object recognition, dynamic scene analysis, multi-sensor fusion and pattern recognition, Professor J. K. Aggarwal is hereby awarded the Okawa Prize.