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FedEx Institute of Technology, The University of Memphis

GENERALIZED IMAGE PROCESSOR CAPABLE OF LEARNING, PIXEL AND GEOMETRIC TRANSFORMATION, USEFUL IN PATTERN RECOGNITION

The University of Memphis seeks a partner to commercialize this novel generalized image processing software. The technology is a significant advance in image processing capability. It is capable of operating on both binary and grey scale images, can learn via supervized learning, and can perform a wide array of image processing tasks that are not feasible with current technology. This technology can have significant value as a core component for many imaging, surveillance, and machine vision applications among others.

APPLICATIONS

» Machine vision

» Industrial automation and control

» Biomedical imaging device applications

CAPABILITIES

» Image-based feature extraction

» Image registration

» Pattern recognition

ADVANTAGES

» Capable of learning

» Very fast processing times once training is complete

» Scalable for a wide variety of image processing tasks and the flexibility to choose antimicrobials at the point of care.

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ADVANTAGES (continued)

- The application of CSRNs to image processing to produce a generalized image processor which can be scaled to learn and perform a wide variety of image processing tasks
- The use of sub-image processing with neural networks to lower processing times and increase image size
- Solution of complex image processing tasks involving topological relationships such as affine transforms and image registration

THE TECHNOLOGY

The need still exists for a general image processor capable of learning to perform basic IP tasks, as well as more complicated tasks posed by geometric transformations.

The inventors have pioneered a novel image processor using cellular simultaneous recurrent network (CSRN). The CSRN-based generalized image processor avoids intricate handcrafting of features otherwise necessary for such image processing tasks. It is capable of learning (via supervized learning) to perform a wide array of image processing tasks, which include pixel transformation, filtering, and geometric transformation. It is capable of operating on both binary and grey scale images. To date, they have demonstrated the processor's ability to learn and perform grey scale to binary conversion, low-pass filtering, affine transformation, and image registration under rigid-body constraints. Such a generalized image processor may be used for image-based feature extraction, image registration and, consequently, pattern recognition.

For more information concerning licensing this patent-pending technology, please contact Hai Trieu, AVP of Technology Transfer. 901-678-1712, hhtrieu@memphis.edu

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THE INVENTORS

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Dr. Iftekharuddin is currently the professor in the Department of Electrical and Computer Engineering and the Vision Lab Director at Old Dominion University. He was an associate professor of Electrical and Computer engineering at the University of Memphis and assistant professor of Computer Science and Electrical and Computer Engineering at North Dakota State University (NDSU). Dr. Iftekharuddin was a principal research engineer at Timken Research, Canton, Ohio before joining NDSU. There he was involved in research in signal and image processing, neural networks applications, time-frequency analysis, sensors and embedded system design. He obtained his B.Sc. degree from Bangladesh Institute of Technology in 1989. He received an M.S. and a Ph.D. both in Electrical Engineering from the University of Dayton in 1991 and 1995, respectively.

John Keith Anderson, Ph.D.
Dr. Keith Anderson received his BSEE with an emphasis in Digital and Computer Systems from Tennessee Technological University in Cookeville, Tennessee, before earning his MSEE in Intelligent Control Systems and his Ph.D. in Electrical Engineering from the University of Memphis. He has a total of 17 years of industrial experience in automation and controls. His research involves the application of cellular simultaneous recurrent networks to image processing and intelligent control systems.

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