Encryption, data hiding and watermarking

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Terrorists might use it to mask their messages: it's called data hiding - the subject of a new book by Ali Akansu, PhD, professor of electrical and computer engineering at New Jersey Institute of Technology (NJIT). Akansu's book, Data Hiding Fundamentals and Applications: Content Security in Digital Multimedia, (Elsevier-Academic Press 2004), develops a theoretical framework for data hiding techniques, including watermarking. Encryption and data hiding are two technologies that play major roles in information security and assurance, Akansu says. A key issue in content-security solutions is the imperceptible insertion of content and information into multimedia data.

"It's a sophisticated research book that has applications for many readers, not just engineers and researchers," Akansu says. "Our government thinks terrorists might use data hiding to pass information to each other by images posted on the public Internet. The book will help information-security engineers learn to decode hidden information in a cover image and retrieve the secret messages."

The book is the first to place data hiding techniques within a framework that tells readers how to calculate the payloads – the allowable hidden bits of information – and crack the code of data hiding. It details, for instance, a Hollywood company whose films were illegally copied onto pirated videos and sold on the street. Using techniques presented in the book, Akansu shows how the pirated video was traced back to its source.

"These emerging data hiding applications include not only watermarking but also fingerprinting, broadcast monitoring and others," says Akansu.

"The book provides performance comparisons of popular data hiding techniques."

"The Internet revolution offered efficient and open solutions for information delivery, Akansu adds. "But this development brought with it concerns about security, monitoring and the use of information by qualified end users. Hence, information security is already a household term that will stay with us forever."

Akansu wrote the book with two of his former doctoral students, Husrev T. Sencar, now a research professor at Polytechnic University, N.Y., and Mahalingam Ramkumar, now an assistant professor at Mississippi State University.

Akansu has always blended his theoretical research work with industrial applications. He was the vice president of research and development at the IDT Corporation, Newark, from 2000-2001. He was also the president and CEO of PixWave, Newark, a subsidiary of the IDT Corp., where he led the development of the first software product for a secure peer-to-peer (P2P) video distribution system over the Internet; the system included a real-time video watermarking and fingerprinting system for content authentication and tracing.

Akansu received his bachelor's degree from the Technical University of Istanbul in 1980, and his master's (1983) and doctorate (1987) from Polytechnic University, Brooklyn. He joined NJIT in 1987 as a professor of electrical and computer engineering.

Source: New Jersey Institute of Technology

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