This Week's Citation Classic

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Nagy G. State of the art in pattern recognition.
Proc. IEEE **56**:836-62, 1968.

Statistical, adaptive, and heuristic techniques used in laboratory investigations of pattern recognition are reviewed and compared. The discussion includes correlation methods, discriminant analysis, maximum likelihood decisions, minimax techniques, perceptron-like algorithms, features extraction, preprocessing, clustering, nonsupervised learning, and prospective applications. [The *SCI*® indicates that this paper was cited 105 times in the period 1968-1977.]

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"During the summer of 1966 I was chopping rats at Cornell University. Frank Rosenblatt, who had been my thesis advisor five years before and whose interests had in the meantime shifted from "perceptron" models of cognition to neurochemical experimentation, was attempting to understand and confirm the recently reported transfer of learning through brain extracts in worms and rats. Frank had invited me to perform the statistical evaluation of his work, but since results were slow in coming, I was assisting in the extraction of synaptic end-bulb substance from the cortex of rats trained to run a maze.

"In Frank's absence, I also frequently showed visitors through the lab. One visitor interested in seeing the old Mark I perceptron and the more ambitious Tobermory (named after Saki's talking cat) was Don Nelson, director of the computing center of the University of Nebraska. After some discussion of brain models and my work at IBM on pattern recognition, he invited me to give two or three weeks of lectures to his staff –before the rise of computer science departments, many computing centers had a strong research orientation Impressed by Don's enthusiasm and wide knowledge, and believing that Lincoln was quite close to the mountains of Colorado, I set to work in the fall to prepare the material for the lectures

"Already aware that most of the basic algorithms in pattern recognition and image processing were being continuously reinvented by workers approaching the subject with training in statistics, linear algebra, switching theory, combinatorics, control theory, and psychology, I decided to illustrate each algorithm with the same two-dimensional example which I programmed during the winter at the IBM image processing laboratory. I also read eclectically, and collected experimental applications. Then, as now, the only commercially important application was optical character recognition. My prediction that isolated word recognition would be next to reach commercial maturity was subsequently borne out.

"The lectures were well received; I was able to interpolate a three-day hike in the Rocky Mountain National Park and immediately after my return I compiled my notes and submitted the material to the *Proceedings of the IEEE.* In the meantime, I also circulated my notes in the form of an IBM report to colleagues who, along with the *IEEE* reviewers, provided many valuable suggestions. The next year, while on leave with the departments of *informatique* and of neurophysiology at the Universite de Montreal, my notes passed the trial by fire in a graduate course.

"After the article appeared, I received numerous invitations to lecture, which provided opportunities for observations useful in subsequent research projects. I attribute the success of the article partly to a breezy tone and a simple sentence structure forced upon me by my wife, then a journalist. If my style subsequently became more ponderous and heavy-handed, it is because Jill became an attorney and now reads my drafts only to forestall libel and malpractice suits.

"I may add that the first visit led to another invitation to Lincoln five years later. On the basis of that first agreeable experience I eagerly accepted and have since been the chairman of the University of Nebraska Department of Computer Science, where pattern recognition now plays the modest role befitting a not so young, but still promising, discipline."