

رتبه اول خارجی Foreign First Winner

Project Title:
Pattern Recognition and Image
Processing in Soft Computing
Paradigm

Researcher:
Sankar Pal (Ph.D.)

Country:
India

University:
Indian Statistical Institute



عنوان طرح:
پردازش تصویر و تشخیص الگو با محاسبات نرم

محقق:
دکتر سنکار پال

کشور:
هندوستان

دانشگاه:
انستیتو آمار هند

Abstract:

The investigation comprises a balanced mixture of theory, algorithms and applications using soft computing approaches for pattern recognition and image processing problems when the pattern ambiguity is due to inherent vagueness rather than randomness. He has developed various fuzzy set theoretic tools like correlation, bound function, spectral fuzzy sets, generalized \cup, \cap, \supset operators, IOAC, fuzzy MAT, fuzzy Hough transform, hybrid and higher order entropy, and a new definition of image entropy. Connectionist and neuro-fuzzy models formulated are: fuzzy MLP, fuzzy Kohonnen's net with linguistic input/output, mixed category perception network, fuzzy feature evaluation network, evolutionary modular rough-fuzzy knowledge based network, and Hough transform network. They are efficient for neural processing and handling imprecise/incomplete or linguistic input and intractable pattern classes for recognition, rule generation/evaluation, inferencing, and noisy/occluded object extraction. Genetic algorithmic tools developed include new mutation operators, ϵ -stopping time, variable length chromosome classifiers and learning methodologies using sexual discrimination and ancestor's influence on offspring. They enable classifiers to model any kind of decision boundary automatically/efficiently without aprioriclass information, and enrich neuro-genetic computing paradigm. These theories are demonstrated rigorously for recognition of speech, biomedical images, cervical cancer, industrial objects, finger prints, satellite imagery, and for supporting unmanned space mission.