

OPTICAL CHARACTER RECOGNITION
BASED ON PHENOMENAL ATTRIBUTES

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A theory of character recognition has been proposed and a methodology has been developed which is expected to yield a machine algorithm that will equal human performance in the recognition of isolated, unconstrained, handprinted characters. The methodology is based on the study of ambiguous characters, characters that can be assigned two letter labels with equal probability, rather than on letter archetypes. A description of the underlying representation of each of the 26 upper case letters of the English alphabet was obtained through analysis of ambiguous characters which were generated for this purpose. The descriptions are in terms of an abstract set of invariants, called functional attributes, and their modifiers. The relationship between the physical attributes, derived from physical measurements upon a character, and the functional attributes is given by a set of rules called Physical to Functional Rules. Three different techniques for determining these rules through psychophysical experimentation have been tested, and the particular rule for the attribute LEG has been determined. The remaining rules can be obtained in a similar fashion, and the combined results are expected to provide the basis for a machine algorithm. We are currently investigating the Physical to Functional Rules for the remaining attributes and are also interested in the way in which the rules are to be combined.

As a staff member of the Research Laboratory of Electronics at M.I.T., Dr. Shillman has been involved in research on visual physiology and the perceptual processes involved in vision. His doctoral dissertation, "Character Recognition Bases on Phenomenological Attributes" (M.I.T., 1974), proposes a new methodology for optical character recognition; the proposed technique is based on the incorporation of relevant psychological features into OCR algorithms.

Dr. Shillman has published numerous papers in the field of automatic character recognition and is a member of the IEEE, AAAS, Eta Kappa Nu, Tau Beta Pi, Phi Kappa Phi and Sigma Chi.