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## U N I V E R S I T Y

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DATE:    December 27, 1994

SUBJECT:  Grant No. N00014-94-1-0263; quarterly report No. 4
           (October 1 - December 31, 1994)

During the last quarter of 1994, we solved most of the theoretical problems associated with strategy I (representing fuzzy measures by fuzzy integrals), which were not solved in the third quarter of 1994. Namely, we investigated monotone set functions defined by the Choquet integral and proved that they preserve majority of desirable structural properties of the original monotone set functions: continuity, subadditivity, superadditivity, null-additivity, converse-null-additivity, autocontinuity, converse-autocontinuity, uniform autocontinuity, and fuzzy multiplicativity; they do not, generally, preserve fuzzy additivity. We wrote a paper entitled "Monotone set functions defined by Choquet integral," which presents the above results. The paper was submitted to the journal *Fuzzy Sets and Systems*.

During this period we also investigated a possible generalization of fuzzy integral. The results are summarized in the paper "A generalization of Sugeno integrals" presented by George Klir at the conference NAFIPS'94 in San Antonio, Texas (December 18 - 20, 1994). The paper is also included in the conference proceedings.

We also started to explore problems connected with strategy III (determining fuzzy measures by statistical inference) and we investigated feasibility of a new strategy for obtaining belief measures using the principle of maximum uncertainty. One of the main problems connected with this strategy is to find well justified measure of uncertainty for belief measures. We made some progress toward this goal. We found eight plausible requirements, which any reasonable measure of uncertainty for belief measures should satisfy, and we proved that earlier proposed measure (denoted AU) is minimal among all uncertainty measures satisfying our requirements. The open problem is whether it is also the only one satisfying those requirements. Our results are covered in a working paper "Toward a characterization of uncertainty measure for the Dempster-Shafer theory."

During the period of this report, George Klir participated at the Third Annual Conference on Fuzzy Theory and Technology in Pinehurst, North Carolina, November 14 - 16, where he gave an invited plenary lecture entitled "From Classical Sets to Fuzzy Sets: A Ground

Paradigm Shift." The lecture will be published in *Advances in Fuzzy Theory and Technology*, vol. III, 1995, ed. by P. P. Wang (Duke University).

The paper "The preservation of structural characteristics of monotone set functions defined by fuzzy integral" was accepted for publication in the *Journal of Fuzzy Mathematics.*

Currently we focus on strategy III of determining fuzzy measures by statistical inference and on the new strategy utilizing the principle of maximum uncertainty.

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