Cosistency and Inconsistency Degree based on Generalized Rough Sets

Pulak Samanta

Assistant Professor
Department of Mathematics, Katwa College
Katwa, Burdwan, West Bengal, India
email : pulak_samanta06@yahoo.co.in

Abstract : Rough set theory was introduced by Professor Z. Pawlak in the year 1982 by taking an approximation space $< U, R >$ where U is a non empty set and R is an equivalence relation on U. So, the set U is partitioned. Given any subset A of U, the lower and upper approximations $\underline{A}_R$ and $\overline{A}^R$ are then defined by $\underline{A}_R = \{x| \ [x]_R \subseteq A\}$ and $\overline{A}^R = \{x| \ [x]_R \cap A \neq \phi\}$ where $[x]_R$ is the equivalence class of x with respect to R.

Replecing partition of U by covering which is a collection $\mathcal{C} = \{C_i\}$ of subsets of U such that $\cup C_i = U$, $C_i \neq \phi$, the lower and upper approximations of a subset A of U with respect to a covering are not defined in a unique way but all of them reduce to Pawlakian definition when the covering is taken as a partition.

Again instead of taking an equivalence relation on the universe U an arbitrary binary relation R is taken and gradually conditions like reflexivity, symmetry and transitivity are imposed on it. The construction is accomplished in two stages. Firstly for each element $x \in U$, the set $R_x = \{y|xRy\}$ is defined. Then for each subset A of U sets $\underline{A}_R$ and $\overline{A}^R$ are defined by
$\underline{A}_R = \{x \in U|R_x \subseteq A\}$, and $\overline{A}^R = \{x \in U|R_x \cap A \neq \phi\}$.

Partition of the Universe into classes of objects indiscernible in view of the available information about them is recogniged as Knowledge. Clearly, knowledge of two agents may differ. A consistency-measure between two knowledges is obtained in case of partition as well as covering and relation. Also inconsistency-measure between two knowledges is obtained with the help of consistency measure. Some concuding remarks will be discussed.