Concluding remarks and suggestions for further study

In this work we extended the notion of semigroup action on sets to semigroup action on fuzzy subsets and studied some categorical properties of $S - FSET$. More studies can be carried out in this direction. We also introduced the concept of inverse fuzzy automata and studied the algebraic properties associated with its transition matrices. Further we studied the algebraic properties of the family of inverse fuzzy languages and proved that the collection of all inverse fuzzy languages does not form a variety. We defined a family of fuzzy languages which form a variety such that the associated pseudovariety is the set of all finite monoids with commuting idempotents. We can study more on this fuzzy language. Further studies can be carried out for the topological properties of inverse fuzzy languages and for many other fuzzy languages.