

Climate Change and the Evolution of Animal Species: Fuzzy Logic Modeling

Bouharati SADDEK^{1,2}, Allag FATEH¹, Khenchouche ABDELHALIM¹.

¹. Faculty of Natural Science and Life, University Ferhat Abbas, Setif1, Algeria.

². Intelligent Systems Laboratory, University Ferhat Abbas, Setif1, Algeria.

vicedoyenpedagogie@outlook.com

Aim of the study: The emergence and disappearance of some habitats is dependent on climate change. This is accompanied by the migration of animal species from one area to another. Other species are subject to extinction. Some species are spared by human intervention through the organization of assisted migration. Climate change can also affect the cycles of migratory birds that follow the photoperiod and thus affect the proliferation of certain infected insects. These factors are very difficult to model mathematically because they are characterized by complexity and imprecision. In this study, we propose an intelligent tool with fuzzy logic in their analysis.

Material and Methods: The specificity of the fuzzy logic that deals with linguistic variables gives a more precise result from the uncertain. A fuzzy inference system is established with three factors (climatic conditions, habitat change, and introduction of other species) that constitute the input variables. The species is considered as the output variable of the system. A basis of rules is established. The rule base contains all possible combinations between the input variables and the output variables. The basis of the rules is established according to the real data of the environment. The output result is calculated taking into account all the uncertainties and inaccuracies inherent to the nature of the data using defuzzification.

Results: Once the system is established, it will be possible to predict the evolution of species in a given environment from the random introduction of values at the input of the system. It is enough to set parameters at the input to instantly read the species that evolves in this environment and its rate of expansion or extinction.

Keywords: Animal species, climatic change, intelligent systems, fuzzy logic.