Applications of Machine Learning in Ecological Modeling.

Ornella(1), Leonardo y Tapia, Elizabeth(2)

(1) CIFASIS – CONNICET Av. 27 de Febrero 210bis, Rosario, Argentina
(2) UNR, FCEIA, Department of Electronic, Riobamba 210 bis, Rosario, Argentina

ornella@cifasis-conicet.gov.ar

Sustainable development, a relatively new concept in the field of ecology, is a multifaceted approach to manage the environmental, economic, and social resources; taking into consideration long-term effects in all the decisions relevant to the society as a whole. Being embodied in a multidisciplinary environment, a suitable mathematical representation, or a measure, of sustainability is essential for the successful communication amongst various fields encompassed by the concept. Data mining, the process of extracting hidden patterns from large data sets seems to be very suitable to deal with the complexities of the natural systems and the objective: sustainability. In this work we present results of evaluating three agricultural datasets with several well known supervised learning algorithms plus multiclass classifiers derived from Low Density Parity Checks-Error Correcting Output Codes (LDPC-ECOC) of communication theory. In Error Correcting Output Coding, a multiclass classification problem is decomposed into many binary classification tasks, and the results of the subtasks are combined to produce a possible solution to the original problem. By assuming an error correcting code, ECOC classifiers aim the systematic correction of binary classifiers’ errors and, in this way, the improvement of traditional OAA (one against all) classifiers.

Keywords: Ecology, Sustainability, Data Mining, ECOC codes.

References: