**Survey**

| Index | Title | Author(s) | Main ideas |
| --- | --- | --- | --- |
| 1 | Neural Network Construction using Grammatical Evolution | Ioannis G. Tsoulos ,  Dimitris Gavrilis,  Euripidis Glavas. | A method which is based on genetic programming for the creation of artificial neural networks was presented in this article.  The proposed method can infer not only the architecture of a neural network but it can estimate an optimum set of nodes for a given problem. The method was tested on classification problems as well as data fitting problems.  The grammar of the proposed method can be enriched to implement artificial neural networks of higher complexity, such as neural networks with more than two processing levels or even recurrent neural networks.  The memory requirements of the proposed method depend on the product of the number of chromosomes and each chromosome’s length. The complexity of the method and thus the time required in order to complete depends only on the size of the training dataset and on the population size.  Keywords- Genetic programming, grammatical evolution, neural networks, classification, regression, evolutionary process. |
| 2 | A Grammar-based Genetic Programming Approach to Optimize Convolutional Neural Network Architectures | Jessica Barbosa Diniz,  Filipe R. Cordeiro,  Pericles B. C. Miranda,  Laura A. Tomaz da Silva | Use of Genetic Algorithm associated to Grammar-based Genetic Programming to optimize Convolution Neural Network architectures.  Test on CIFAR-10 dataset to validate the evolution of the generated architectures, using the metric of accuracy to evaluate its classification performance in the test dataset |
| 3 | Artificial Neural Networks Generation  Using Grammatical Evolution | Khabat Soltanian,  Fardin Akhlaghian,  Fardin Ahmadi Zar,  Ioannis Tsoulos. | A new method for automatic neural network  designing by means of grammatical evolution is  presented; while the BP algorithm is used for its  training.  The system is compared with 5 evolutionary  neural network methods on well known classification  datasets. In the same computational complexity, the  comparisons are performed and the method shows  superiority in most cases.  In addition, independency to  the experts and the ability of utilizing the expert  knowledge for more efficient space exploration are the  major features of the method described here. |
| 4 | Selecting and constructing features using grammatical evolution | Dimitris Gavrilis,  Ioannis G. Tsoulos,  Evangelos Dermatas | A novel method for feature selection and construction is introduced.  The method improves the classification accuracy, utilizing the well-established technique of grammatical evolution by creating non-linear mappings of the original features to artificial ones.  This improve the effectiveness of artificial intelligence tools such as multi-layer perceptron (MLP), Radial-basis-function (RBF) neural networks  and nearest neighbor (KNN) classifier.  The proposed method has been applied on a series of classification and regression problems and an experimental comparison is carried out against the accuracy obtained on the original features as well as on features created by the PCA method. |
| 5 |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |