CHAOTIC MOTION VIDEO MODELING BASED ON NONLINEAR AUTOREGRESSIVE NEURAL NETWORK

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Nowadays chaotic signals widely used in many fields. Chaotic signals can be expressed in form of a nonlinear equation, such as Fuzzy model, ANN, Volterra Series or Wiener-Hammer- stein model[1-3]. This study aims to obtain same behaviour by using AI methods to model chaotic motion by using the data obtained from the motion video of an object that cannot be modelled mathematically. The behaviour of proposed modified chaotic Lorenz system in phase space will be established [4]. Tracking of any object on the video is provided by determining the position of the object in the image. In this study, template matching method is used. Matching can be done in RGB format as well as operations in grey form when the image is taken in the video; the image is converted to binary level and converted from color to grey.

Single-layer ANN is not enough to model a chaotic system. Multi-layer ANN will be used. Each input value that reaches the input layer can be multiplied by a weight in the hidden layer to reach the neuron in the hidden layer. The value of each neuron reaching hidden layer is the input of the next output layer through a specific process. NAR structure is preferred because inputs are the unit delayed inputs of the outputs directly. To train chaotic behaviour of the object on the video, first the position information was taken from the video as described in the second part of the object. This location information was then given to ANN in the NAR structure. Levenberg-Marquardt was chosen as the back propagation algorithm for training this network. As a result, chaotic behaviour modelled by ANN can be used interchangeably as it can display the same characteristics and expected behavior as the actual chaotic system.

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