Abstract

Designing a structure of Recurrent Neural Network (RNN) can be performed either manually or automatically using a Neural Architecture Search (NAS). Designing RNN structure manually can be a time consuming and error-prone process. Whereas NAS uses optimization algorithm such as Evolutionary Algorithm (EA) to find the optimal structure. As one of the NAS methods, a Neuro Evolution of Augmenting Topology (NEAT) searches a neural network structure constructively by adding a new neuron through mutation, which is time consuming for the RNN structures with huge neurons. Genetic Algorithm (GA) is one of the EA that is commonly used to solved optimization problem. Fix length chromosome representation dominates GA filed, this representation suitable for fix length solution. To find the structure of RNN the number of nodes and its connections cannot be determined. In this research, a Variable-Length Chromosome GA (VLC-GA) is exploited to represent a RNN structure with different number of nodes. VLCGA able to evolve the structure of RNN constructively and destructively. Therefore, processing time for more larger structure can be reduce. Evaluation for a language modeling task shows that it is capable of reaching a lower perplexity than NAS as well as reducing the processing time for a large and complex structure.