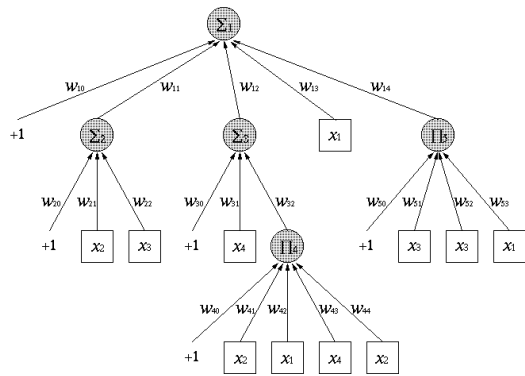


Learning and Optimization of Neural Trees Using Bayesian Evolutionary Algorithms

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가 (neural tree) (nonterminal node) (terminal node) 가 4 가 1 가 4



1.

가 N 가 D f_A A 0 $가 \sigma$ w $가$ $가$ $가$ λ (Poisson) $가$

$$P(A|D) \propto P(D|\mathbf{w}, k)P(\mathbf{w}|k)P(k)$$

$$= \left(\frac{1}{\sqrt{2\pi}\sigma}\right)^N \exp\left[-\frac{\sum_{c=1}^N (y_c - f_{(\mathbf{w}, k)}(\mathbf{x}_c))^2}{2\sigma^2}\right] \quad (1)$$

$$\times \left(\frac{1}{\sqrt{2\pi}}\right)^{k-1} \exp\left[-\frac{\sum_{j=1}^{k-1} w_j^2}{2}\right] \frac{\lambda^{k-3} \exp(-\lambda)}{(k-3)!}$$

(Bayesian Evolutionary Algorithm, BEA) [1],

- (1) M
- (2)
- (3) L
- (4) M
- (5) (2)

가 1 (GP) BEA BEA 가

1.

| | | | | | |
|-----|--------|--------|--------|------|--------|
| | | | | | 가 |
| GP | 0.1895 | 0.1267 | 0.2493 | 47.0 | 1136.1 |
| BEA | 0.1789 | 0.1637 | 0.1982 | 19.5 | 96.8 |

[1] Zhang, B.-T., A Bayesian Framework for Evolutionary Computation, *Proceedings of the 1999 Congress on Evolutionary Computation*, vol. 1, pp. 722-728, 1999.