Applications of Fuzzy ART Combining Overlapped Similar Categories in Consideration of Connections

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SUMMARY

Adaptive Resonance Theory (ART) is an unsupervised neural network. Fuzzy ART (FART) [1] is a variation of ART, allows both binary and continuous input patterns. FART classified input vectors into each appropriate category by creating rectangles. However, FART often makes input data of the common categories classify several categories. For this reason, FART performance is highly dependant on a vigilance parameter, which controls rectangle size. Therefore, Fuzzy ART has the category proliferation problem. Then, we have noted overlapped category and have proposed Fuzzy ART with Group Learning (FART-GL) [2] in past study. FART-GL has connections between categories as human relationship which keeps changing with time in the real world. The connection is created between similar categories, and the categories, which have connections, are learned as "group" of category. By using this method, the input data are effectively classified into each appropriate group. However, FART-GL can not reduce category proliferation problem. Furthermore, to solve this problem, we have proposed a new Fuzzy ART algorithm: Fuzzy ART Combining Overlapped Category in Consideration of Connections (C-FART) [3] in previous study. C-FART has two important features. One is to make connections between similar categories or releases connections at each step. The other is to combine overlapping categories by using created connections. In other words, C-FART combines the categories with due consideration of their similarity.

In this study, we apply C-FART to various input data. We investigate its performance in detail. The learning performance of C-FART is compared with conventional FART. We confirm that the proposed C-FART can perform more effective learning than the conventional FART.

REFERENCES

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