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In supervised learning , ensemble learning is a popular approach for that .It uses multiple number of models to increase performance and reduce overfitting . A popular approach is the Mixture of Experts model that is based on the divide and conquer principle. A network sets are trained along with the gating network. The gating network chooses which expert to use for each sample . Another approach is to explicitly partition the space beforehand. They described a learning procedure for systems composed of many separate neural networks, each devoted to subsets of the training data.

The mixture-of-experts architecture, the gating network mediates the competition while the expert networks compete to learn tasks. For every input , the gating network receives information about the performance of all of the expert networks involved in solving the task, and each expert networks output is compared with the target output . The weights gating the output of each expert network are modified based on the relative performance of that expert network compared to the other experts for that input pattern. These gating weights not only determine the extent to which the output of each network contributes to the final output, but also modulate learning within each network such that more learning occurs within those expert networks that contribute more heavily to the final output.