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FACULTY OF EGINEERING AND TECHNOLOGY

Soft Computing

LECTURE -16

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OUTLINE

- Neuro Fuzzy System
- Neuro Fuzzy Model
- Adaptive Network
- Adaptive networks based Fuzzy interface systems
- Adaptive networks based Fuzzy interface systems Training
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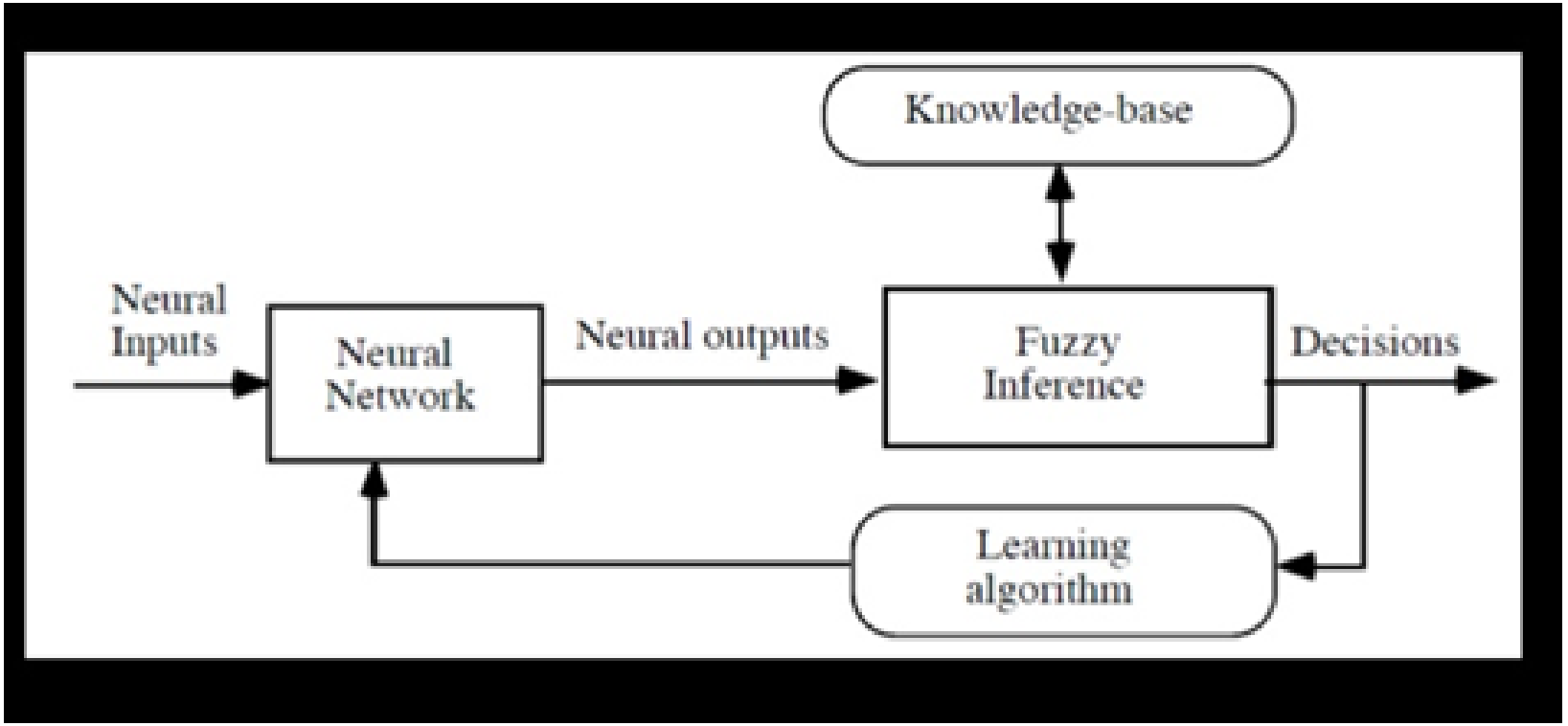
Neuro Fuzzy System

❑A neuro-fuzzy system is based on a fuzzy system which is trained by a learning algorithm derived from neural network theory. The (heuristical) learning procedure operates on local information, and causes only local modifications in the underlying fuzzy system.

❑A neuro-fuzzy system can be viewed as a 3-layer feed forward neural network. The first layer represents input variables, the middle (hidden) layer represents fuzzy rules and the third layer represents output variables. Fuzzy sets are encoded as (fuzzy) connection weights.

❑It is not necessary to represent a fuzzy system like this to apply a learning algorithm to it. However, it can be convenient, because it represents the data flow of input processing and learning within the model.

Neuro Fuzzy Model



Adaptive Network

❑The Adaptive Network is a new approach that expands on autonomous networking concepts to transform the static network into a dynamic, programmable environment driven by analytics and intelligence.

❑The Adaptive Network allows providers to evolve their current infrastructures into more of a communications loop that relays information from network elements, instrumentation, users, and applications to a software layer for review, analysis, and action—rather than bogging down the network itself.

Adaptive Network layers

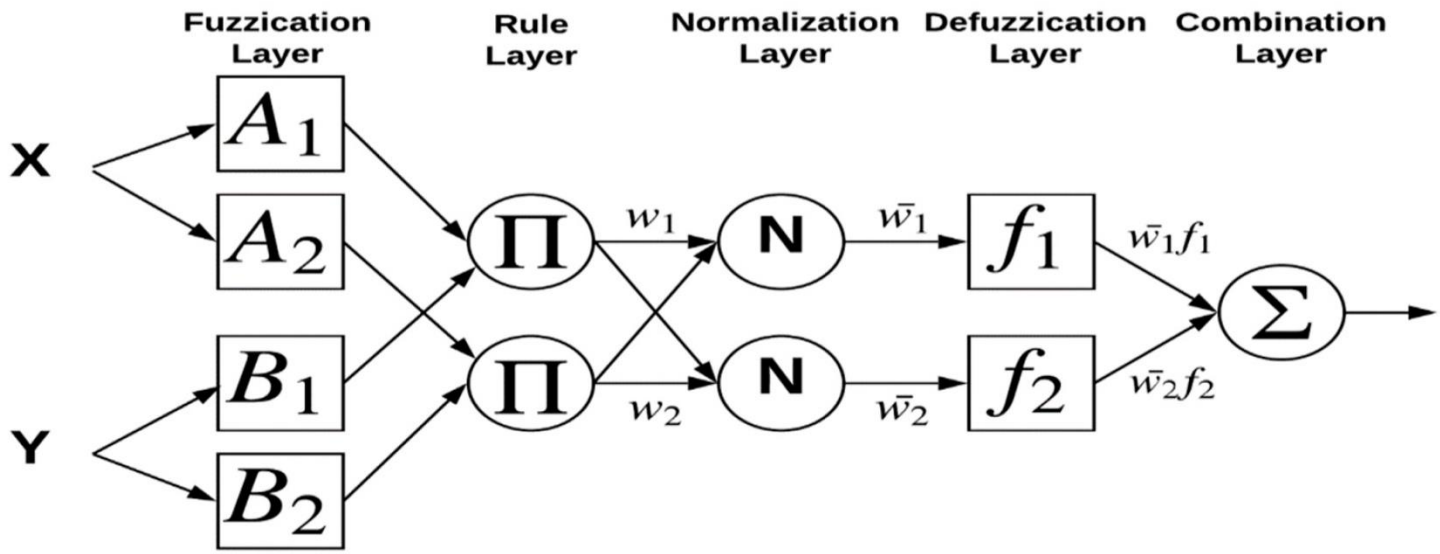
❑Adaptive network has three important layers.

1. Programmable infrastructure
2. Analytics and intelligence
3. Software control and automation

Adaptive networks based Fuzzy interface systems

❑The architecture and learning procedure underlying ANFIS (adaptive-network-based fuzzy inference system) is presented, which is a fuzzy inference system implemented in the framework of adaptive networks.

❑By using a hybrid learning procedure, the proposed ANFIS can construct an input-output mapping based on both human knowledge (in the form of fuzzy if-then rules) and stipulated input-output data pairs.



Adaptive networks based Fuzzy interface systems Training

- Training of ANFIS means determining the parameters in its structure using an optimization algorithm.
- Adaptive networks based Fuzzy interface systems Training based on three approaches.

1. Derivative based training approaches and applications
2. Heuristic based training approaches and applications
3. Derivate and heuristic based hybrid training approaches and applications

MULTIPLE CHOICE QUESTION

1. What is the intentional exchange of information brought about by production and perception?

a) Hearing

b) Communication

c) Speech

d) None of the mentioned

2. What is the complex system of structured message?

a) Languages

b) Words

c) Signs

d) Speech

3. How many things are present in conventional communication signs?

a) 3

b) 4

c) 5

d) 6

4. What is defined by a set of strings?

a) Signs

b) Formal language

c) Communication

d) None of the mentioned

5. What is a finite set of rules that specifies a language?

a) Signs

b) Communication

c) Grammar

d) Phrase

REFERENCES

- https://link.springer.com/article/10.1007/s10462-017-9610-2
- http://fuzzy.cs.ovgu.de/nfdef.html
- https://ieeexplore.ieee.org/document/256541
- https://link.springer.com/article/10.1007/s10462-017-9610-2