FUZZY LOGIC INTO CONTROL SYSTEM CHALLENGES

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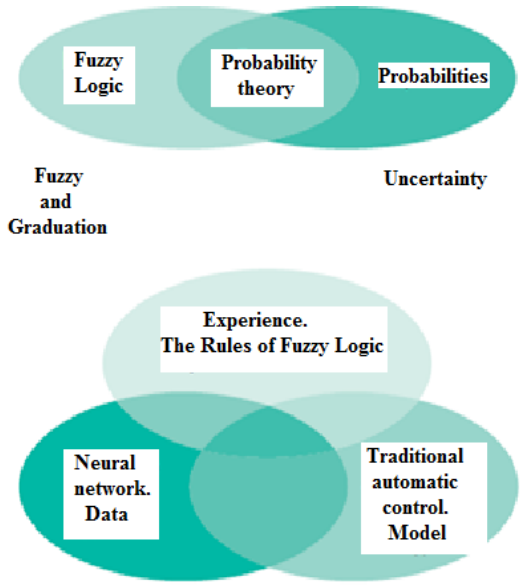
Initially it was just a theory, and at the present time fuzzy logic has turned into a full-fledged management technique. Fuzzy logic does not completely replace the traditional methods of management, but on the contrary it is used in conjunction with traditional methods and makes it easier to create and expand the possibilities of traditional methods.



Comparison of Fuzzy Logic with other control technologies.

Fuzzy logic is based on the following observations:

- knowledge and skills that a person often uses to solve a problem are not perfect, in particular, they can be questionable (people may not be sure of their effectiveness) or not tested;

- a person often solves complex problems on the basis of rough initial data (the accuracy of the initial data is not required), for example, in order to choose an apartment for living, a person can consider different initial data, among which there may be an area, proximity to shops, distance to work and rent price. For that, however, the accuracy of all parameters of the initial information is not required;

- in industry, operators very often solve complex problems with ease, without first studying the possible problem and modeling the system. Just as for driving a car, preliminary modeling of the trip is not required, despite the fact that the car is a very complex system and the trip may not be easy. The more complex the system, the more difficult it is to model and predict its behavior during work.

From all that has been said above, we can draw the following conclusions:

- It is often easier and more useful to model the behavior of a control system operator than to simulate the operation of the system itself;

- instead of using precise mathematical calculations and equations, it is more effective to use qualitative assessments of the situation and apply appropriate processing measures.

Fuzzy logic is well known to engineers as programmers of control systems, as a convenient tool for programming and monitoring process control applications.

By analogy with traditional process controls, fuzzy logic systems can be used to describe the control loops and participate in the calculation of the control action in accordance with one or more reference points for one or more measurements.

Fuzzy logic rules allow to provide:

- application of existing management experience;

- use flexible rules if it is impossible to accurately model the system using traditional means;

- improvement of management quality through self-regulation of the management system and proactive change in the output impact, based on events that cannot be taken into account in the case of traditional management methods.

Fuzzy rules will allow to make control in a case when there is no possibility of control in manual mode or according to known rules. When there is accumulated experience and / or know-how, they can be transformed into rules of fuzzy logic and provide management in the simplest way. Fuzzy logic, besides this, allows you to get the maximum benefit from practical experience and to ensure the absence of losses.

Applications of Artificial Intelligence Techniques (AITs) took place in many areas including medicine such as diagnosis, treatment of illness, patient pursuit, prediction of disease risk and etc. As result AITs allow designing systems that let you build intelligent models for both predicting patients' response in treatment process and determining prediction of illness risk. Since these fields have very high complexity and especially uncertainty, the use of AITs such as fuzzy logic, artificial neural networks, genetic algorithms, artificial immune systems and others have been developed by many researchers.

Fuzzy logic approach, rather than a certain or binary logic, uses a logic and decision mechanism which does not have certain boundaries like human logic. With this concept coined, one of its most common implementation was

in fuzzy logic-based control mechanisms. Fuzzy logic control systems do not require complete model knowledge as in the other known control systems like proportional integral. For this purpose, many design methods have been derived.

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