ON POSSIBILISTIC SYSTEMS

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Mesarović and Takahara /1/ defined the system as
a binary relation between sets. They introduced also
the morphism of systems and built up the category of
systems. Further results about the algebraic theory of
systems presented Gissin and Tsalenko in /2/, where
systems are regarded as morphisms from a given cate-
gory. Fuzzy categories and fuzzy systems were studied
in detail by Negoiţa /3/.

The system approach, e.g. the general theory of
systems, considers deterministic and stochastic aspects
of real and ideal systems. Less attention was oriented
on possibilistic aspects of complex objects in nature
and society.

Already Kant /4/ explained the relation "reality-
-necessity-possibility". Nowadays, the study of possi-
bility and potential in real and artificial systems is
stimulated by the theory of fuzzy sets and systems.
The possibility as "realizability" event. quantitatively
as a "degree of realizability" can be modelled in de-
terministic or stochastic sense (e.g. a physical law
represents an expected tendency), but fuzzy models and
methods appear to be more suitable.

The Possibilistic System (PS) is a complex object,
where possibility is transformed into reality. Thus,
we concentrate our interest on qualitative changes,

breakpoints or desirable states in an object. An example
of the possibilistic system is a building company con-
verting projects into new houses.

The notion of "possibility" is systematically studied
in possibility theory , i.e. on philosophical, scienti-
fic and methodological level /5/.

Important is, that a practical meaning of possibility
is interpreted either as "seeking" for realizable states,
processes and attributes, or as "creation" of potentials.

In the first direction, Possibility Seeking Systems
(PSS) are a simple form of possibilistic systems. They
reflect a higher level of a subject, as self-conscious-
ness and autocontrol. Their applications are different
expert and knowledge systems with new ways of reasoning,
logics and labour /6/.

On the second level, Possibility Creating Systems
(PCS) are a more developped type of possibilistic sys-
tems. Their characteristic attribute is the capability
to design (to project, to plan, to program). So, the
application of PCS can be connected with efforts in tech-
nological and social design.

Projects in technical, technological or social
context face a great complexity and diversity of the real
world. Therefore they have to be constructed as know-
ledge systems with hierarchical arrangement of meta-
knowledge, knowledge, information and data. An instant-
aneous snap of such a knowledge system can be taken as
one proposal for a desired state of the controlled
system.

A workable form of knowledge systems are existing
expert systems. Fuzzy expert systems can handle possi-
bilities and potentials in a more flexible manner. They
are a further step in direction to the artificial inte-
lligence.

Our research proposed a fuzzy expert system for social design in a town and its factories. In this way social conditions and consequences of automated productions can be constructed and evaluated. An expert system proves to be indispensable for the support of decisions about staff, schooling, remuneration, labour organization, services, housing etc. /7/

The implementation of an abstract fuzzy expert system brings many human problems and that's why we recommend an "human friendly" solution. Such approach respects the role of personality and stresses its ruling position in technical and other systems.

References

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