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Job satisfaction: An evaluation using a fuzzy approach

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Abstract

Complexity in organizations and their environments, and the rapid development of globalization has generated new interest in developing an understanding of how working individuals are satisfied with their jobs. Job satisfaction, which is a complicated multi-dimensional concept, has been a popular topic of research for many decades. The interest in this topic has been embraced by psychologists, management scholars, and more recently even economists. Unfortunately, in existing studies job satisfaction is investigated using only exact data not taking into account uncertainty and vagueness of obtained initial information. In this paper we suggest a fuzzy logic approach to the evaluation of job satisfaction taking into account that it is not always possible to deal with exact data or data with sharply defined boundaries. More specifically, we propose a fuzzy rule-based approach to evaluate the job satisfaction in an organization. The factors/facets of job satisfaction were collected through interviews. Due to the qualitative aspect of job satisfaction, we used linguistic choices in the questionnaires. The results are used to compose fuzzy rules as a model of the relationship between job satisfaction levels and the affecting factors/facets. A real-world job satisfaction evaluation problem is used to illustrate the suggested approach.

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Keywords: job satisfaction; fuzzy rule base; fuzzy IF…THEN model; interpolative reasoning.

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1. Introduction

Job satisfaction is probably one of the most widely discussed issues in organizational behavior, human resource management and organizational management (Giannikis et al., 2011; Markovits et al., 2014; Mohr et al., 2007). The interest in this topic has been embraced by psychologists, management scholars, and more recently even economists. This is due to the fact that most individuals spend a considerable part of their lives at work and a thorough understanding of job satisfaction is the key to improving the well-being of working individuals. It is therefore appropriate to say that managers, supervisors, human resource specialists, and employees, are all concerned with ways of improving job satisfaction.

Job satisfaction has been defined in a variety of ways. The definition provided by Locke (1976) is "a pleasurable or positive emotional state resulting from the appraisal of one's job experiences", is probably one of the most widely used definitions found in the job satisfaction literature. In general, however, it can be said that job satisfaction is an affective reaction to a job that results from the person's comparison of actual outcomes with those that are desired, anticipated, or deserved (Oshagbemi, 2000).

The application of fuzzy logic to the evaluation of job satisfaction in an organization was considered by Mahdavi et al. (2011). The authors attempted to use STRATA technique, fuzzy rules and a job satisfaction matrix in their evaluation of job satisfaction. However no concrete rule base, reasoning method, or computing procedures were used in the study. Rasmani et al. (2007) proposed the use of fuzzy sets to represent linguistic terms for a Likert-type scale and employed the technique using fuzzy conjoint method in the evaluation of job satisfaction. An application of fuzzy logic to job satisfaction problems were also considered by Gupta et al. (1998). The academic performance of students was evaluated and investigated using fuzzy IF…Then rules by Rasmani et al. (2006). Yuzainee et al. (2013) recommended the use of fuzzy sets to represent linguistic terms in Likert scale. In order to evaluate employers' satisfaction levels towards graduates' performance the fuzzy conjoint method was applied by Crocetta et al. (2007). The authors proposed a fuzzy approach to measure the degree of satisfaction felt by graduates in regards to the suitability of their university education for working purposes. In the study conducted by De Battisti et al. (2013) the fuzzy set theory was applied to define a measure of subject satisfaction relating to every social aspect (quality of life, job, a service, etc.). Souza-Poza et al. (2003) examined how individuals determine their job satisfaction based on changes in situational factors. A simulation model, using Fuzzy Set Theory and System Dynamics, was used.

Unfortunately, existing studies regarding job satisfaction is investigated only through the use of exact data and do not take into account the uncertainty and the vagueness of obtained the initial information (Aliev et al., 1993; Aliev et al., 2010). Indeed, job satisfaction and its affecting factors are of qualitative nature. As a result, a job satisfaction evaluation problem is characterized by perception-based information rather than measurement-based information. Such information often has a linguistic representation for which fuzzy logic-based formalization is more adequate. Also, the structure of the relationship between job satisfaction and its affecting factors (the number of which is high) is complex and not exactly known in order to utilize a classical precise formalization. In this respect, fuzzy IF-THEN rules can be a more adequate and computationally effective basis. Although numerous studies have utilized fuzzy logic, there are unfortunately no studies that describe in detail how to compute job satisfaction in the fuzzy environment. In this study we, for the first time, propose fuzzy IF…THEN rules model to compute job satisfaction in an organization taking into account its affecting factors. This fuzzy model provides an intuitive description of the relationship between linguistic values of job satisfaction index and its fuzzy valued effective factors.

The paper is structured as follows. Section 2 presents the necessary prerequisite material on operations over discrete fuzzy numbers. In Section 3 we outline the general framework of the evolution of the evaluation of job satisfaction using fuzzy IF…THEN rules and interpolation reasoning. In Section 4 we consider the application of the suggested approach to evaluating job satisfaction using real data. Section 5 concludes the study.

2. Preliminaries

Job satisfaction and many of its determinants are of moral, mental, and psychological nature. At the same time, they are characterized by imprecision of linguistic evaluation. In view of this the use of discrete fuzzy sets framework is more suitable for modeling purposes.

Definition 1. A discrete fuzzy number (Casasnovas et al., 2006; Voxman, 2001; Wang et al., 2005). A fuzzy subset A of the real line R with membership function $\mu_A : \mathrm{R} \to [0,1]$ is a discrete fuzzy number if its support is finite, i.e. there exist $x_1,...,x_n \in \mathrm{R}$ with $x_1 < x_2 < ... < x_n$, such that $\mathrm{supp}(A) = \{x_1,...,x_n\}$ and there exist natural numbers s,t with $1 \le s \le t \le n$ satisfying the following conditions:

(1) $\mu_A(x_i) = 1$ for any natural number i with $s \le i \le t$

(2) $\mu_A(x_i) \le \mu_A(x_j)$ for each natural numbers i, j with $1 \le i \le j \le s$

(3) $\mu_A(x_i) \ge \mu_A(x_j)$ for each natural numbers i, j with $t \le i \le j \le n$

The use of Zadeh's extension principle for operation over fuzzy discrete numbers may result in a fuzzy subset that does not satisfy the conditions to be a fuzzy number. In order to overcome this drawback Casasnovas et al., (2006); Wang et al., (2005); Mizumoto et al., (1979) Casasnovas et al,. (2007); and Seising et al. (2012) have all proposed an approach based on the use of the α -cuts representation:

$$O(A_1, A_2)^\alpha = O(A_1^\alpha, A_2^\alpha) = \left\{O(x_1, x_2) \mid x_1 \in A_1^\alpha, x_2 \in A_2^\alpha\right\} \text{ and } \mu_{O(A_1,A_2)}(z) = \sup\left\{\alpha \in [0,1] \mid z \in O(A_1, A_2)^\alpha\right\}$$

Below we provide definitions for some main arithmetic operations which are based on this approach.

Definition 2. A scalar multiplication of a discrete fuzzy number (Aliev et al., 2015). For a discrete fuzzy number $\tilde{A}$ its scalar multiplication $\tilde{A}_1 = \lambda \tilde{A}$, $\lambda \in \mathrm{R}$, is the discrete fuzzy number whose α -cut is defined as

$$A_1^\alpha = \{x \in \lambda \cdot \mathrm{supp}(A) \mid \min(\lambda A^\alpha) \le x \le \max(\lambda A^\alpha)\}$$

where $\lambda \cdot \mathrm{supp}(\tilde{A}) = \{\lambda x \mid x \in \mathrm{supp}(\tilde{A})\}$, $\min(\lambda A^\alpha) = \min\{\lambda x \mid x \in A^\alpha\}$, $\max(\lambda A^\alpha) = \max\{\lambda x \mid x \in A^\alpha\}$

and the membership function is defined as $\mu_{\lambda A}(x) = \sup\{\alpha \in [0,1] \mid x \in (\lambda A^\alpha)\}$.

Definition 3. Addition of discrete fuzzy numbers (Casasnovas et al., 2006; Voxman, 2001; Wang et al., 2005; Casasnovas et al., 2012). For discrete fuzzy numbers A_1, A_2 their standard subtraction $A_{12} = A_1 - A_2$ is the discrete fuzzy number whose α -cut is defined as $A_{12}^\alpha = \{x \in \{\mathrm{supp}(A_1) + \mathrm{supp}(A_2)\} \mid \min\{A_1^\alpha + A_2^\alpha\} \le x \le \max\{A_1^\alpha + A_2^\alpha\}\}$, ,

where $\mathrm{supp}(A_1) + \mathrm{supp}(A_2) = \{x_1 + x_2 \mid x_j \in \mathrm{supp}(A_j), j = 1, 2\}$

$$\min\{A_1^\alpha + A_2^\alpha\} = \min\{x_1 + x_2 \mid x_j \in A_j^\alpha, j = 1,2\} , \max\{A_1^\alpha + A_2^\alpha\} = \max\{x_1 + x_2 \mid x_j \in A_j^\alpha, j = 1,2\} ,$$

and the membership function is defined as $\mu_{A_{12}}(x) = \sup\{\alpha \in [0,1] \mid x \in \{A_1^\alpha + A_2^\alpha\}\}$.

*Definition 4.*Distance between n-dimensional fuzzy vectors (Zhang et al., 2015). Let $a = (A_1, A_2, ..., A_m)$ and $b = (B_1, B_2, ..., B_m)$ be two *m*-dimensional fuzzy vectors, $\phi \in \{0 \le \alpha_0 < \alpha_1 < ... < \alpha_l \le 1\}$ be a division of $[0,1]$, the distance between a and b under ϕ is defined as

$$D(a,b) = \frac{1}{l+1} \sum_{j=1}^{m} \sum_{k=0}^{l} \left(\left| A_{j1}^{\alpha_k} - B_{j1}^{\alpha_k} \right| + \left| A_{j2}^{\alpha_k} - B_{j2}^{\alpha_k} \right| \right),$$

where $A_{j1}^{\alpha_k}$, $A_{j2}^{\alpha_k}$ denote endpoints of an α_k -cut $A_j^{\alpha_k} = [A_{j1}^{\alpha_k}, A_{j2}^{\alpha_k}]$ of a fuzzy number A_j ($B_{j1}^{\alpha_k}$, $B_{j2}^{\alpha_k}$ are analogous notations).

3. Problem statement and solution method

According to the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, et al., 1967) the following facets / factors are the main facets used for the evaluation of job satisfaction:

Activity (X_1), Independence (X_2), Variety (X_3), Social status(X_4), Supervision-human relations (X_5), Supervision–technical (X_6), Moral values (X_7), Security (X_8), Social service (X_9), Authority (X_{10}), Ability (X_{11}), Company policies and practices (X_{12}), Compensation (X_{13}), Advancement (X_{14}), Responsibility (X_{15}), Creativity (X_{16}), Working conditions (X_{17}), Co-workers (X_{18}), Recognition (X_{19}), Achievement (X_{20}).

In general, the measurement of job satisfaction is done so based on human interpretations which are vague and uncertain. An application of the concept of a fuzzy logic would provide a more adequate basis to generate a model for the evaluation process. In this study, the linguistic variables are represented by "very satisfied", "satisfied", "quite satisfied", "less satisfied", and "unsatisfied" rather than quantitative variables. The main purpose of the present study is to find the model of job satisfaction with affecting attributes and feelings. This model will enable us to predict job satisfaction levels given current linguistic information.

The linguistic terms of facets are given in Table 1.

Table 1.The encoded linguistic terms for values of job satisfaction facets

Scale	Level of Satisfaction	Linguistic value
1.	Unsatisfied (U)	$\left\{ 1/1, 0.5/1.5, 0/2 \right\}$
2.	Less Satisfied (LS)	$\left\{ 0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3 \right\}$
3.	Quite Satisfied (QS)	$\left\{ 0/2.5, 0.5/2.75, 1/3, 1/3.5, 0.5/3.75, 0/4 \right\}$
4.	Satisfied (S)	$\left\{ 0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5 \right\}$
5.	Very Satisfied (VS)	$\left\{ 0/4.5, 0.5/4.75, 1/5 \right\}$

Linguistic labels of facets are shown in Table 2.

Table 2. Linguistic label

Job Factors/Facets	Linguistic label
Activity	Very satisfied, Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Independence	Satisfied, Quite satisfied, Less satisfied
Variety	Very satisfied, Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Social Status	Very satisfied, Satisfied, Quite satisfied, Less satisfied
Supervision-human relations	Very satisfied, Satisfied, Quite satisfied, Unsatisfied
Supervision-technical	Very satisfied, Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Moral Values	Very satisfied, Satisfied, Quite satisfied
Security	Very satisfied, Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Social Service	Very satisfied, Satisfied, Less satisfied
Authority	Very satisfied, Satisfied, Quite satisfied
Ability	Very satisfied, Satisfied, Quite satisfied
Company Policies and Practices	Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Compensation	Very satisfied, Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Advancement	Very satisfied, Satisfied, Quite satisfied, Less satisfied, Unsatisfied
Responsibility	Very satisfied, Satisfied, Quite satisfied, Less satisfied
Creativity	Very satisfied, Satisfied
Working conditions	Satisfied, Quite satisfied, Less satisfied
Co-workers	Very satisfied, Satisfied, Quite satisfied
Recognition	Very satisfied, Satisfied, Less satisfied, Unsatisfied
Achievement	Very satisfied, Satisfied, Quite satisfied

The problem of overall job satisfaction index evaluation proceeds as follows;

The input of raw data is derived from the Minnesota Satisfaction Questionnaire (MSQ) (activity, independence, variety, social status, etc.) completed by experts. This data is imprecise and involves uncertainty related to the process of completing the questionnaires. The results of measuring are processed as fuzzy variables. The relationships between overall job satisfaction and affecting facets/factors are presented as fuzzy IF…Then rules (Table 3).

Table 3. Fuzzy IF…Then rules

		JOB FACTORS/ FACETS																			JOB SATISIFACTION
		Activity	Independence	Variety	Social status	Supervision-Humanrelations	Supervision-technical	Moralvalues	Security	Socialservice	Authority	Ability	Company policies and practices	Compensation	Advancement	Responsibility	Creativity	Working conditions	Co-workers	Recognition	Achievement	Overall Job Satisfaction
Fuzzy rule #	**1**	VS	VS	QS	U	QS	QS	VS	S	VS	QS	VS	S	VS	VS	VS	VS	VS	QS	S	VS	S
	2	VS	S	VS	VS	VS	S	QS	QS	VS	S	VS	QS	S	VS	VS	VS	S	QS	VS	VS	S
	3	S	S	S	S	QS	QS	QS	QS	S	S	S	LS	LS	QS	S	S	LS	S	QS	QS	QS
	4	LS	S	LS	QS	VS	S	S	S	S	S	VS	S	LS	S	S	QS	S	S	S	VS	S
	5	S	QS	LS	S	S	S	LS	LS	S	S	S	S	LS	QS	S	S	QS	S	S	S	S
	6	QS	S	S	QS	S	S	S	QS	S	QS	S	QS	QS	QS	QS	S	QS	QS	S	QS	QS
	7	S	S	LS	S	US	US	US	S	QS	US	LS	LS	QS	S	LS	LS	QS	S	VS	S	LS
	8	S	S	S	QS	S	S	QS	QS	QS	QS	S	QS	LS	QS	QS	S	LS	S	QS	QS	S
	9.	S	S	S	QS	S	S	QS	QS	QS	QS	S	QS	LS	LS	QS	QS	QS	S	QS	QS	QS
	10	QS	QS	QS	QS	S	S	QS	QS	QS	QS	QS	LS	LS	QS	S	QS	LS	S	QS	QS	QS

The idea of how to perform approximate reasoning to determine Y (overall job satisfaction) is as follows. Fuzzy rule base concept plays a pivotal role in economics, decision making, forecasting, and other human centric systems functioning in fuzzy -information environment (Aliev et al., 2010; Aliev et al., 2012; Aliev, 1994; Aliev, 2013). The fuzzy rule base is complete when for all the possible observations at least one rule exists whose fuzzy-antecedent part overlaps the current antecedent fuzzy-valuation, at least partially. Otherwise, the fuzzy-rule base is incomplete. In the case where there is incomplete (scarce) fuzzy-rule base, the classical reasoning methods based on compositional rule of inference by Aliev et al., (2011); Zadeh (1965); Mamdani (1977); Aliev et al., (2001) and Takagi et al.,1985) adapting a reasoning approach is not so effective in generating an output for the observation covered by none of the rules. Consequently, we will use inference techniques which in the lack of matching rules can perform an approximate reasoning, namely, interpolation methods by Zadeh (2011) ; Kóczy et al., (1993). More specifically, we will follow the idea suggested by Kóczy et al. (1993) (KH interpolation approach).

Given the following fuzzy-rules

$$If\ X_1\ is\ A_{11}\ and\ so\ on\ and\ X_m\ is\ A_{1m}\ then\ Y\ is\ C_1,$$

$$If\ X_1\ is\ A_{21}\ and\ so\ on\ and\ X_m\ is\ A_{2m}\ then\ Y\ is\ C_2,$$

.

.

.

$$If\ X_1\ is\ A_{n1}\ and\ so\ on\ and\ X_m\ is\ A_{nm}\ then\ Y\ is\ C_n$$

and the fact that

$$X_1\ is\ A_1'\ and\ so\ on\ and\ X_m\ is\ A_m',$$

find the fuzzy value C' of *Y*.

We will follow KH interpolation approach to implement approximate reasoning within the considered fuzzy rules. The assumption of this approach is that the ratio of distances between the conclusion and the consequent parts is identical to ones between the observation and the antecedent parts. Kóczy et al., (1993) used the Euclidean distance between the fuzzy vector of the antecedents of fuzzy rules and an observation. We will use α -cuts based distance between fuzzy vectors suggested by Zhang et al., (2015) (Definition 4). However, an original KH interpolation approach based on the Euclidean distance can also be used.

The used fuzzy interpolation approach based reasoning consists of two main stages.

(1) For each rule compute distance D between the current input m-dimensional fuzzy vector $a' = (A_1', A_2', ..., A_m')$ and m-dimensional fuzzy vector of the antecedents of i-th fuzzy rule $a_i = (A_{i1}, A_{i2}, ..., A_{im})$, $i = 1, ..., n$, by using Definition 4.

(2) Computation of the aggregated output C' of Y for fuzzy rules base by using linear fuzzy interpolation are as follows:

$$C' = \sum_{i=1}^{n} w_i C_i,\ w_i = \frac{D(a', a_i)}{\sum_{k=1}^{n} D(a', a_k)} \tag{1}$$

Thus, we need to compute convex combination of outputs C_i of the rules base. Computational system for approximate reasoning on base of the fuzzy rules for determination of job satisfaction index $Y\ is\ C'$ (output) is described in Fig.1

According to the Fig. 1, a fuzzy-rule based computational system operates as follows. Linguistic input information is entered to the system by a user. Based on one of predefined linguistic codebooks, an encoder transforms this information into fuzzy valued inputs. The obtained fuzzy inputs are considered as current inputs for an inference mechanism to compute a resulting output by using formula (1). At the first step, an inference mechanism computes distances between the current input fuzzy vector and fuzzy vector of antecedents of each fuzzy rule by using distance measure (Definition 4). A fuzzy-rule base consists of a set of rules with fuzzy valued antecedents and fuzzy valued consequents and describes domain-specific knowledge. This knowledge may be obtained from an expert or a group of experts and may also contain deep knowledge including facts, principles etc.

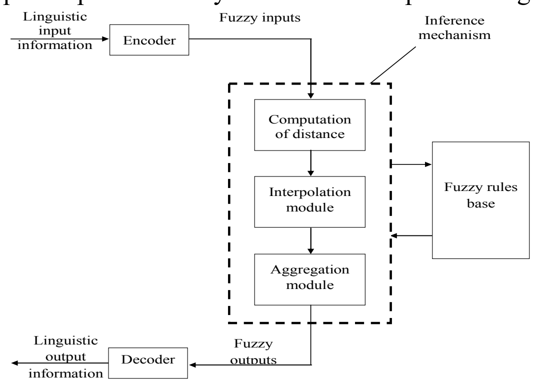

Fig. 1 Fuzzy-rule based computational system

At the second step, given computed distances, an interpolation module determines a resulting fuzzy input by using interpolation coefficients, see (1). At the third step, an aggregation module computes resulting aggregated output as follows. At first, fuzzy valued consequents are weighted by interpolation coefficients on the base of scalar multiplication of fuzzy numbers. Next, the results of scalar multiplication are summed up on the base of addition of fuzzy numbers to generate desired resulting aggregated output.

4. Application

Let the knowledge base of 10 fuzzy rules of the following form be given:

If $X_1\ is\ A_{i1}$ *and so on and* $X_{20}\ is\ A_{i20}$ *then* $Y\ is\ C_i$, $i = 1, ..., 10$

Consider a problem of reasoning within the given fuzzy rules base by using fuzzy interpolation approach. Let the current information is given as A_1' - unsatisfied, A_2' -less satisfied, A_3' -unsatisfied, A_4' -less satisfied, A_5' -less satisfied, A_6' -very satisfied, A_7' -less satisfied, A_8' - unsatisfied, A_9' -less satisfied, A_{10}' -less satisfied, A_{11}' - unsatisfied, A_{12}' -very satisfied, A_{13}' - unsatisfied, A_{14}' -less satisfied, A_{15}' - unsatisfied, A_{16}' - unsatisfied, A_{17}' - unsatisfied, A_{18}' -less satisfied, A_{19}' -less satisfied, A_{20}' -less satisfied. Then current input information is described by the following fuzzy numbers:

$X_1 = A_1' = \left\{ 1/1, 0.5/1.5, 0/2 \right\}$, $X_2 = A_2' = \left\{ 0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3 \right\}$, $X_3 = A_3' = \left\{ 1/1, 0.5/1.5, 0/2 \right\}$,

$X_4 = A'_4 = \{0/1, 0.5/1.5, 1/2\ \ 1/2.5\ \ 0.5/2.75\ \ 0/3\}$, $X_5 = A'_5 = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$,

$X_6 = A'_6 = \{0/4.5, 0.5/4.75, 1/5\}$, $X_7 = A'_7 = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $X_8 = A'_8 = \{1/1, 0.5/1.5, 0/2\}$,

$X_9 = A'_9 = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $X_{10} = A'_{10} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$,

$X_{11} = A'_{11} = \{1/1, 0.5/1.5, 0/2\}$, $X_{12} = A'_{12} = \{0/4.5, 0.5/4.75, 1/5\}$, $X_{13} = A'_{13} = \{1/1, 0.5/1.5, 0/2\}$,

$X_{14} = A'_{14} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $X_{15} = A'_{15} = \{1/1, 0.5/1.5, 0/2\}$, $X_{16} = A'_{16} = \{1/1, 0.5/1.5, 0/2\}$,

$X_{17} = A'_{17} = \{1/1, 0.5/1.5, 0/2\}$, $X_{18} = A'_{18} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$,

$X_{19} = A'_{19} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $X_{20} = A'_{20} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$.

For illustration, consider computation on 5th and 8th rules. Fuzzy antecedents of the 5th rule are fuzzy numbers:

$A_{5,1} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5\}$ $A_{5,2} = \{0/2.5, 0.5/2.75, 1/3, 1/3.5, 0.5/3.75, 0/4$ $A_{5,3} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$,

$A_{5,4} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5\}$ $A_{5,5} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5\}$ $A_{5,6} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$

$A_{5,7} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $A_{5,8} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $A_{5,9} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$

$A_{5,10} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$ $A_{5,11} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$ $A_{5,12} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$

$A_{5,13} = \{0/1, 0.5/1.5, 1/2, 1/2.5, 0.5/2.75, 0/3\}$, $A_{5,14} = \{0/2.5, 0.5/2.75, 1/3, 1/3.5, 0.5/3.75, 0/4$ $A_{5,15} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$

$A_{5,16} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$ $A_{5,17} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$ $A_{5,18} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$

$A_{5,19} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$ $A_{5,20} = \{0/3.5, 0.5/3.75, 1/4, 1/4.5, 0.5/4.75, 0/5$

Thus, we need to compute distance $D(a', a_5)$ between the current input and the antecedents of the 5-th rule according to Definition 4. We have obtained the result: $D(a', a_5) = 13.2$ .Analogously, we computed the distance for 8-th rule as $D(a', a_8) = 12.9$ .The distances computed for all the rules are

$D(a', a_1) = 18.1,\ D(a', a_2) = 19.27,\ D(a', a_3) = 14.77,\ D(a', a_4) = 15.01,\ D(a', a_5) = 13.2,\ D(a', a_6) = 14.07,$

$D(a', a_7) = 13.9,\ D(a', a_8) = 12.9,\ D(a', a_9) = 12.48,\ D(a', a_{10}) = 12.01,$

Finally, given the obtained values of the distance we computed overall job satisfaction by using (1) as

$$Y = 0.0787Y_1 + 0.0740Y_2 + 0.0965Y_3 + 0.0950Y_4 + 0.1080Y_5 + 0.1013Y_6 + 0.1026Y_7 + 0.1109Y_8 + 0.1143Y_9 + 0.1187Y_{10}$$

The obtained result is $Y = \{0/2.81, 0.5/3.09, 1/3.36, 1/3.86, 0.5/4.11, 0/4.36\}$. In accordance with codebook (Table 1) distance based similarity measure (Kóczy et al., 2000), we can conclude that final job satisfaction is “satisfied”.

5. Conclusion

Employee job satisfaction is important in the determination of the behavior of working individuals in organizations. Job satisfaction plays a crucial role in determining job performance. Job satisfaction is directly related to the mental health and well-being of working individuals and it cannot be directly measured. We argued that it must be represented as perception information and needs a new approach to processing and reasoning. Fuzzy logic is a more adequate tool for the identification of overall job satisfaction values. We suggested computational system for processing linguistic information on factors affecting overall job satisfaction and approximate reasoning on the basis of fuzzy rules model to determining overall job satisfaction. Computer simulation of a real world job satisfaction evaluation problem indicates effectiveness and universality of the suggested approach.

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