FUZZY LOGIC WITH DECISION TREES APPROACH
FOR SELECTING IN SOFTWARE CANDIDATES

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ABSTRACT

This paper deals about decision trees approach for ranking candidates is to develop a recommendation of using a Bayesian method, building basing on it a fuzzy logic and decision tree to finding a skills level of specialist and defining a specialist role in a project.

Keywords: Decision trees, Fuzzy logic, Bayesian rules.

INTRODUCTION

Modern IT companies are developing in parallel a huge quantity of projects using different Business process models and development models. The most popular models are scrum [1], agile [2, 3], waterfall model [4].

Agile software development describes a set of principles for software development and which requirements and solutions evolve through the collaborative effort of self-organizing cross-functional teams [3]. IT advocates adaptive planning, evolutionary development, early delivery and continuous improvement and it encourage rapid and flexible response to change.

Scrum is an iterative and incremental agile software development framework for, managing product development [1], [6]. It defines a flexible holistic product development strategy where development team work as a unit to reach a common goal [1].

The presents of any skill means possession of competence by the person on a basic level, that does not ensure the effectiveness of the specified indicators of functioning (quality of performance) of multi project team. There are a lot of methods of building classification rules-from heuristic rules of top management to using intellectual data analysis methods, like fuzzy logic, decision trees [8], Bayesian rules [9], and neural networks.

1. GRAPHIC DESIGN AND DESIGNER

Graphic design is the process of visual communication and problem solving using one or more of typography photography and illustration .The field is considered a subset of visual communication and communication design but sometimes the term 'graphic design' is used synonymously .Graphic designers create and combine symbols, images, and text to form visual representations of ideas and messages [11]. They use typography, visual arts and page. Lay out techniques to create visual compositions. Common uses of graphic design include corporate design (logos and branding), editorial design (magazine, newspapers and books) way finding or environmental design, advertising, web design, communication design, product packaging and signage.
- ❖ Knowing Adobe photo shop: yes/no
- ❖ Knowing the most popular screens resolutions for all modern devices: yes/no
- ❖ Experience of creating a mock ups and graphics for cross-browse solutions(Desktop, Mobile): yes/no

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2. FRONT-END DEVELOPMENT AND DEVELOPER

Front-end development is the practice of producing Hypertext mark-up language (HTML), Cascading Style Sheets (CSS) and JavaScript for a website or web application [10]. So that a user can see and interact with them directly. The challenge associated with front-end development is that the tools and techniques used to create the front end of a website change constantly be aware of how the field is developing.
- ❖ High experience in HTML 5,CSS3, Bootstrap: yes/no
- ❖ Knowing PHP, Java script: yes/no
- ❖ Knowing Adobe Photoshop: yes/no
- ❖ Knowing MOO Tools, j Query: yes/no
- ❖ Experience in front-end coding as" Pixel-Perfect" standard, cross browse coding: yes/no
- ❖ Knowing English (reading documentation): yes/no

3. BACK-END DEVELOPER

A back-end developer is a type of programmer who creates the logical back-end and core computational logic of a website, software or information system [10]. The developer creates components and features that are indirectly accessed by a user through a front-end application or system.
- ❖ Work experience: number of years
- ❖ Web-source development using Drupal CMS: yes/no
- ❖ Web-sources development using any other CMS: yes/no
- ❖ Good knowing PHP: yes/no
- ❖ Experience in working with My SQL Database: yes/no
- ❖ Knowing of JavaScript: yes/no
- ❖ Knowing English(reading documentation): yes/no

4. ASSESSMENT OF COMPETENCE BASED ON FUZZY RELATIONSHIPS

To provide an assessment based of competence candidates should pass a tests. The answers on test questions should be formed as table (fuzzy relations).

Names/Questions	Q_1	Q_2	Q_3	Q_4
PITES	0.4	1	0	0.5
PRADAP	1	0.6	0.5	0.6
RAJESWARI	0.3	0	0.9	0.4
SIVA	1	0.5	0.9	0.4

Table-4.1: Results of quiz.

The relations between questions and verifying skills should be formed as table (Table-2) the fuzzy relations, where:
- ❖ Q-questions that verify
- ❖ S-skills

Q/S	PHP development	Base solutions developing on CMS	HTML Front-end development	JAVA development	MySQL development
Q_1	1	0.2	0	0	0
Q_2	0	0.4	0.8	1	0
Q_3	0.5	1	0.3	0.4	0
Q_4	0.8	0.5	0.1	0	1

Table-4.2: Fuzzy relations table

On next step using max-min fuzzy relations, according to provided data about experience and subjective binary assessments let's create an overall table with relations of candidates and verifying skills (Table4.3).

Names/Skills	PHP development	Base solutions developing on CMS	HTML front-end development	JAVA development	My SQL development
PITES	0.5	0.5	0.8	1	0.5
PRADAP	1	0.5	0.6	0.6	0.6
RAJESWARI	0.5	0.9	0.3	0.4	0.4
SIVA	1	0.9	0.5	0.5	0.4

Table-4.3: General table-Fuzzy relations of verifying skills.

C= [For example, for candidate pites the value 0.5(PHP development) defines in the further way: [12]
0.5 0.5 0.8 1 0.5
1 0.5 0.6 0.6 0.6
0.5 0.9 0.3 0.4 0.4
1 0.9 0.5 0.5 0.4
];
F=cell (4, 1);
F= {'Pites''Pradap''Rajeswari''Siva'};
t=classregtree (C,F,'names',{'PHP''CMS''HTML''JAVA''MYSQL'},'minparent',1};

Names/Skills Development	PHP developing on	Base solutions end CMS	HTML front-development	JAVA	MYSQL
PITES	0.5	0.5	0.8	1	0.5
PRADAP	1	0.5	0.6	0.6	0.6
RAJESWARI	0.5	0.9	0.3	0.4	0.4
SIVA	1	0.9	0.5	0.5	0.4

Table-4.4: Source data to building a decision tree

The constructed Decision tree has the form.

Decision tree for regression
1. if HTML <0.4 then node 2 else if HTML >=0.4 then node 3 else Pites
2. class= Rajeswari
3. if PHP<0.75 then node 4 else if PHP>=0.75 then node 5 else Pites
4. class= Pites
5. if CMS<0.7 then node 6 else if CMS>=0.7 then node 7 else Pradap
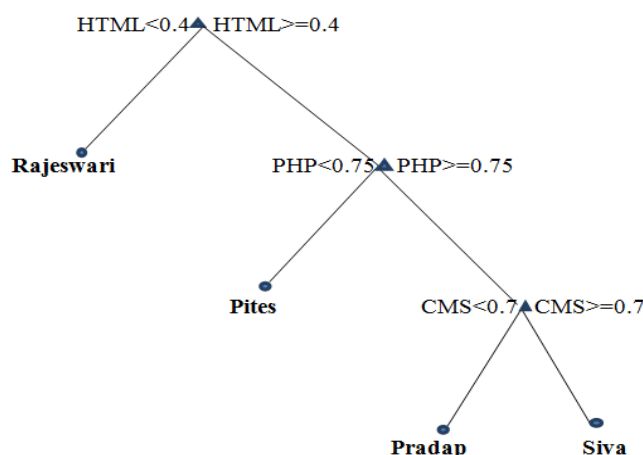6. class= Pradap
7. Class= Siva

Figure-4.1: The Decision Tree

As a result of the analysis of the decision tree, is determined that in order to implement takes only on CMS Drupal, we should hire **Siva** candidate.

CONCLUSION

This method helps management of skilled candidates by using fuzzy logic with decision tree approach.

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