

Data visualization as a competitive advantage for companies

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ABSTRACT: Today, all individuals are familiar with the fact that the amount of information daily enormously increases. It can be confirmed with the everyday use of one of the greatest discoveries of mankind - the Internet. To be able for effectively management with the large amount of data are developed many programming tools that enable data visualization. Web as primary platform for modern tools for data visualization nowadays is indispensable. So today there are many tools that are available to ordinary users of the Internet with complete instructions for their use. In this research are described and compared tools and ways that can give impressive data visualization. The successful data visualization allows increasing the effectiveness and development of the business sector and helps to make the right proactive decisions that will have effect on the further development of the company.

KEYWORDS - visualization, data, competitive advantage

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I. INTRODUCTION

Today in a world of advanced web or Internet technologies we can say that the data i.e. information have a major role in the creation of the online world. Studies have shown that many people perceive visually the most of the information, therefore the visualization of the data is used in different scientific and technical areas. Also it is used in companies, institutions and organizations as an easy and very effective way to display the business and other processes and allows to the management teams to facilitate the process of making qualitative and successful business decisions. Visual data representations can be in form of charts, diagrams or graphs, all depending on the need and purpose for which will be applied such visualized data. They have been created as a result of problems for data compression in a visual whole that people can easily understand. The received information are used in support of making decisions, researches and better understanding the phenomenon of generating data. The fast and effective conversion of data into understandable information for people provides a good opportunity for making the right business decisions that will have effect on the success of the company. In order to survive in the modern way of doing business, companies must try to maintain a good position in the market and to achieve better business results. This research shows how visualization leads to competitive advantage, with previously implemented actions.

II. METHODS AND MATERIAL

The analyzed data in this research were obtained from a company from Republic of Macedonia. The company in its database has a financial data from physical clients. The company owns a grocery store. The store has about 900 products, which we have divided into 4 categories: food, drinks, hygiene products and other. All data used in the analysis were obtained from the database in the company, but for the purposes of the analysis was prepared a questionnaire, and were processed the fiscal bills of customers. In reviewing the data of the company it is determined that the same has increased in the recent years, but during the conversation with the manager of the company was determined that the market competition is growing, in the environment in which the company operates appeared competing companies and it is necessary to make and support the right business decisions in the fight with the competition. During the research was applied testing method by using a structured questionnaire which included open and closed type of questions. The survey was conducted for 10 days in order to include different types of customers.

III. DATA VISUALIZATION

The various techniques and computer software including Weka software have advanced so much that have transformed from scientific tools to simulate the complex physical phenomena into engineering tools for analysis, design and data visualization. One of the reasons why it is chosen this software is that the software

packet includes the most known algorithms for machine learning that enables the whole process of data mining, which includes preparation of input data, statistical evaluation of the learning process and visualization of input data and results of the machine learning. The data that are subject of the research are relating on how to gain competitive advantage, with previously surveys and researches.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	RedenBr	Voзраст	m.prihod	b.sostojba	br.deca	prasanje.1	prasanje.2	prasanje.3	prasanje.4	prasanje.5	prasanje.6	prasanje.7	prasanje.8	prasanje.9	prasanje.10	Smetka	
2	1	30-40	5000	ozenet/a	1	retko	visoki	preh.	.	da	da	da	da	da	higiiena	0-500 den	
3	2	20-30	5000	samec	0	cesto	isti	pijaloci	.	ne	da	ne	da	da	prehranb	0-500 den	
4	3	>50	5000	samec	0	cesto	isti	preh.	Agroplod	da	da	da	da	ne	higiiena	0-500 den	
5	4	30-40	5000	samec	0	retko	isti	preh.	Agroplod	da	da	da	da	ne	higiiena	0-500 den	
6	5	30-40	15000	ozenet/a	2	retko	isti	preh.	Agroplod	da	ne	da	da	retko	higiiena	500-1000 den	
7	6	40-50	30000	ozenet/a	3	retko	isti	preh.	Agroplod	da	ne	da	da	retko	higiiena	500-1000 den	
8	7	>50	20000	ozenet/a	1	retko	visoki	pijaloci	sinalko	da	ne	da	ne	retko	pijaloci	0-500 den	
9	8	30-40	10000	ozenet/a	2	cesto	visoki	preh.	stojcev	da	ne	da	ne	retko	pijaloci	0-500 den	
10	9	40-50	25000	ozenet/a	2	mnoгу ce	visoki	pijaloci	bitolska	ne	ne	da	ne	da	pijaloci	0-500 den	
11	10	20-30	5000	samec	0	retko	visoki	pijaloci	skopska	ne	ne	da	ne	da	prehranb	0-500 den	
12	11	30-40	5000	samec	0	retko	isti	pijaloci	prilepska	da	da	da	ne	ne	prehranb	0-500 den	
13	12	30-40	5000	samec	0	cesto	isti	preh.	cermat	ne	da	da	da	retko	prehranb	>3000 den	
14	13	20-30	5000	samec	0	cesto	isti	preh.	cermat	ne	ne	da	da	retko	higiiena	0-500 den	
15	14	>50	5000	ozenet/a	1	cesto	isti	preh.	Agroplod	ne	da	da	ne	ne	higiiena	0-500 den	
16	15	20-30	5000	ozenet/a	1	cesto	isti	pijaloci	prilepska	da	da	da	ne	ne	higiiena	0-500 den	
17	16	30-40	15000	samec	0	retko	isti	pijaloci	prilepska	da	da	da	ne	ne	higiiena	500-1000 den	

Figure No. 1 - Implementation of data in electronic form.

In this case are shown as an example 17 entries from the total 65 entries.

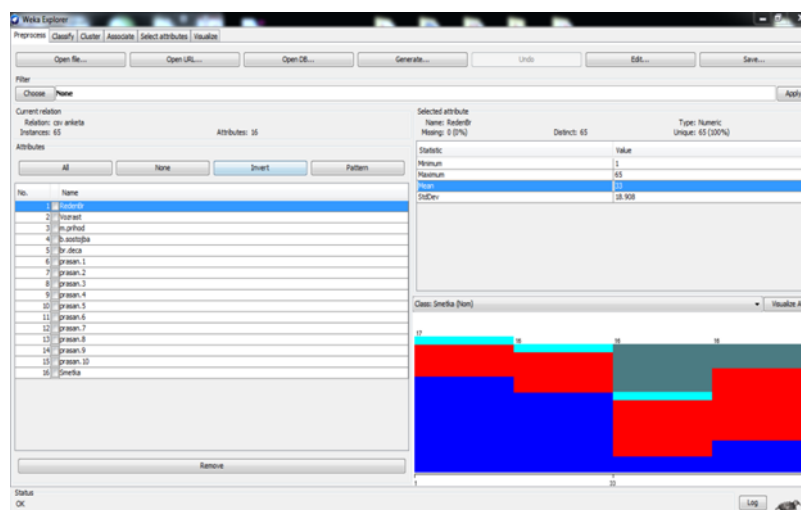


Figure No. 2 - Implementation of .csv file.

Figure 2 shows the implementation of the .csv file in Weka package for data visualization. As we can see there are total 65 entries of which 17 are shown. The blue color shows the total number of entries, the red color indicates that some of the questions depending on whether they are open or closed type show the extent of their execution. Light blue indicates the accuracy of the execution of the questions, and gray color indicates the speed of execution.

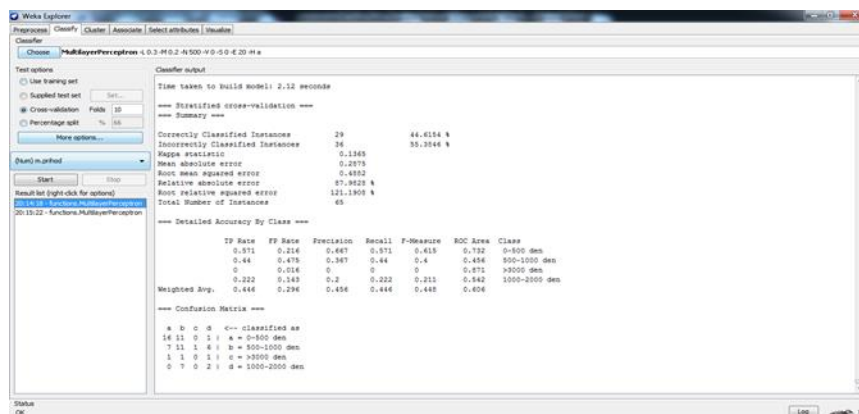


Figure No. 3 - Analysis by neural network.

In the picture it is presented data visualization using neural network that is part of the WEKA software. Visualization refers to the answer to one of the questions of the survey.

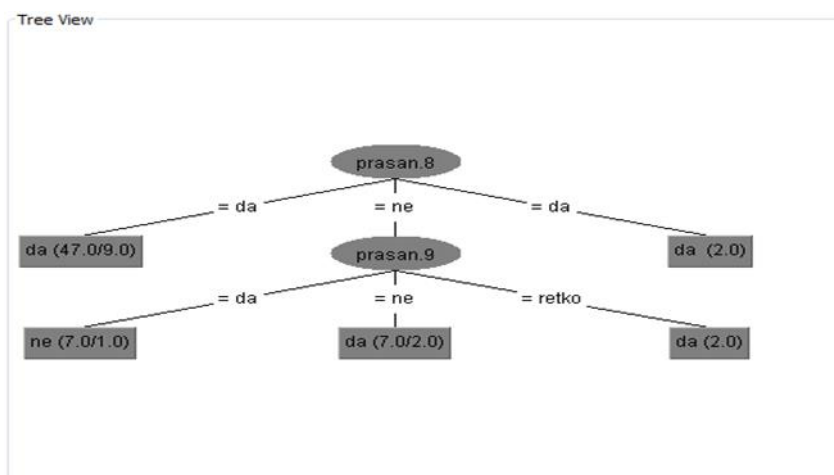


Figure No. 4 - Analysis made by decision tree.

On the picture with number 4 is presented the data visualization where with the tool decision tree is given visual representation of the responses of a particular question obtained from the survey.

IV. CONCLUSION

All analyzes in this research are about how to gain competitive advantage through processing and data visualization. The results from the research prove that the techniques of data visualization in a very effective way help to make certain business decisions, which will have effect on the future of the company. Some analyzes it is possible to be made in other branches, not only in sales but also in manufacturing, industry, banking, health, education. Data visualization is a new force that can help companies to make the right business decisions. Of course, should not be neglected the fact that the man is the main player in the decision making process, and information technology is a tool by which we come to quality information that have effect on the decision making process.

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