

Awareness and penetration on buying cell phones according to customer needs and statistics using neural networks

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Abstract—One of the important techniques of data mining is Classification. Mobile selling and buying is one of the major businesses in the world. Here with the help of neural networks implementing data mining method will help to classify mobiles of different companies according to their attribute level which will be a great ease to an individual when it comes to buy a cellular phone which entirely depends upon their needs. Data mining technique will help in extracting data through neural network whereas neural network technique will make our classification and research efficient enough to develop a selection model.

Keywords—Case Base Reasoning, ANN, Selection and Classification, Mobile Phone, Data Mining

I. Introduction

This paper intends to bring together the most recent advances and applications of data mining and neural networks research in the mobile communication. As we see with the increasing time the data is increasing in vast amount. Data mining is technique through which we extract useful information through abundant data and dataset. In data mining knowledge discovery is the most important part in data mining.

Sonalkadu, Prof. Sheetal Dhande [4], concluded that Data mining tools forecast the trends and activities to support people's decision. Neural network is a type of parallel processing network which simulates the working of neurons in the brain (biological neurons). Besides the disadvantages that neural network of being complex structure and long training time it gives a big advantage that it is highly affordable for noisy data and gives a low error rate.

M. RaviSankar, and P. PremChand [5], concluded that neural network and data mining together can greatly improve the efficiency of data mining methods, and will be used widely in the future for any kind of application. It is very suitable for solving the problems related to data mining as the characteristics of neural networks are self-organizing, support parallel processing and the main important factor is high degree of fault tolerance.

Neural network is a mathematical structure which simulates the working of brain i.e. how artificial neurons work with respect to biological neurons. Neural network training helps neuron to learn. With the help of supervised and unsupervised learning we can get our desired and experimental output.

When we apply general data mining technique the extraction of data is not much efficient. Here we will incorporate neural network techniques to do data mining which will help us to extract rules and assess them. Combination of neural network and data mining will help in increasing the efficiency of the data mining methods.

When it comes to buying a cellular phones an individual is that perplexed that deciding a cell phone which suite his needs is a difficult task to so. Nowadays we have the criteria that we can compare cell phones which belong to same vendor but comparing different companies and vendors' products we don't have any technique to compare. The selection model which we are going to develop will help users to invest their money in proper manner and the positive part is that their needs will be satisfied and they will get good product amongst all.

II. Cellular Phones

A. The Money Matter

Nowadays there are so many choices for a person to buy a cellular phone. Every company is producing the models with state of the art technology and features every day. Price is the main thing that makes a difference in these different models. An expensive phone is likely to have more features, reliability and a better technology than a cheap one. Everyone wants a best phone in the market for him but high price of the cell phones comes in the way therefore price is a big thing that needs to be kept in mind while buying a cellular phone. But expensive and sophisticated phones are not everyone's choice; there are people who just want a simple cell phone which is not much expensive but does its job well only as a cell phone. Also the extra features provided in the expensive phones are not everyone's need. Therefore the price is a main thing to keep in mind whenever you to buy a cell phone. Do not buy a cell phone just because it is expensive; buy the one that suits your needs.

B. Choices in Different Vendors and their Mobiles

Nowadays every vendor has their own thousand types of models which launch every day in the market. Every vendor

holds

Because of this there is a lot of competition in the market which is very good for phone companies. Also this competition results in the reduction of the price which is beneficial for the end user. Some people have liking for a certain brand but they still have a lot of choice in the models offered by the same brand and most of the time it depends upon the cognitive parameters. Every other day a new model is launched by a company, this is a strategy of companies to keep a customer stick to their brand and attract more.

C. Research is Always Better

Before buying cell phones research is always better this means that we should surf the internet for those cell phones buying guides sites but actually they are of partial help to you because you can't compare the phones which are of different companies. This way is still incomplete.

III. Data Mining and Neural Networks

Using neural network as a tool it is being used for extracting data out of data sets which we call as data mining. The difference between general data mining and data mining with neural networks is explained below with the help of a diagram.

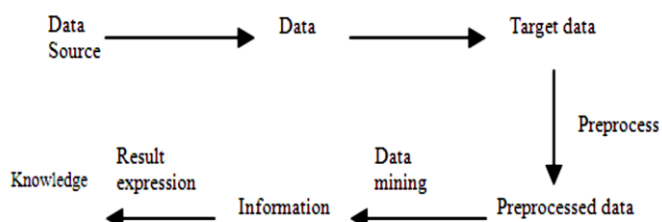


Fig 2: Data mining without neural networks [5]

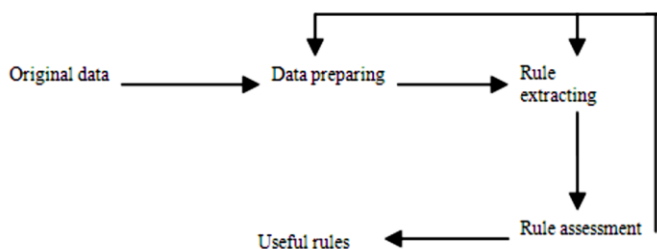


Fig 3: Data mining with neural networks [5]

phases i.e. Data Preparation, Rules Extraction, and Rules Assessment.

IV. Problem Description

Mobile selling and buying is one of the major businesses in the world. Here with the help of neural networks implementing data mining method will help to classify mobiles of different companies according to their attribute level which will be a great ease to an individual when it comes to buy a cellular phone which entirely depends upon their needs. Data set will be created by collecting information of phone's different features of the respective companies. Attributes will be assigned level and an output will be generated on the basis of function defined which will rate the phone as per user's specifications given in the interface. Hypothesis of this work is the selection of a suitable mobile phone which makes customer happy by providing him/her the services of their choice.

In this work, phones will be evaluated on various parameters and the phone which satisfy these parameters with high value are expected to be better than those which satisfy these parameters with relatively low value and the phone with the average highest value of these parameters will be chosen as the best phones. For the selection, an evaluation system will be developed in this work. The interface of the application that will be developed through coding in a particular language will be an intermediate agent which will evaluate phones on the basis of certain parameters according to customer's requirements and statistics in the market.

The parameters which are taken for evaluation in mobile are Price, Battery life, Applications, Photo Camera, Video Camera, Durability, Wi-Fi, 3G, Front Camera, Form Factor, Text Entry, GPS, Multimedia, Operating System, Email, Touch, Market Share(hidden parameter) and the companies are Apple, Samsung, Nokia.

The result of the research will be more reliable than buying a phone randomly depending on cognitive parameters, psychology or any another reason. This work will help to classify and compare the available mobile phones as good, medium and bad level according to the parameters, to select the best mobile phone according to the customer's choice and its preference and to help to take the right decision for cell phone buying.

TABLE 1: FEATURE TABLE

Battery Life	Applications	Photo Camera	Video Camera	Durability	Wi-Fi	3G	Front Camera	Form Factor	GPS	Multimedia	OS	Email	Features/ Phone
H	H	L	L	H	H	H	H	H	H	M	H	L	Apple
H	H	L	H	H	H	H	L	H	H	M	H	H	Samsung
H	H	H	L	M	H	H	H	H	H	H	H	L	Nokia

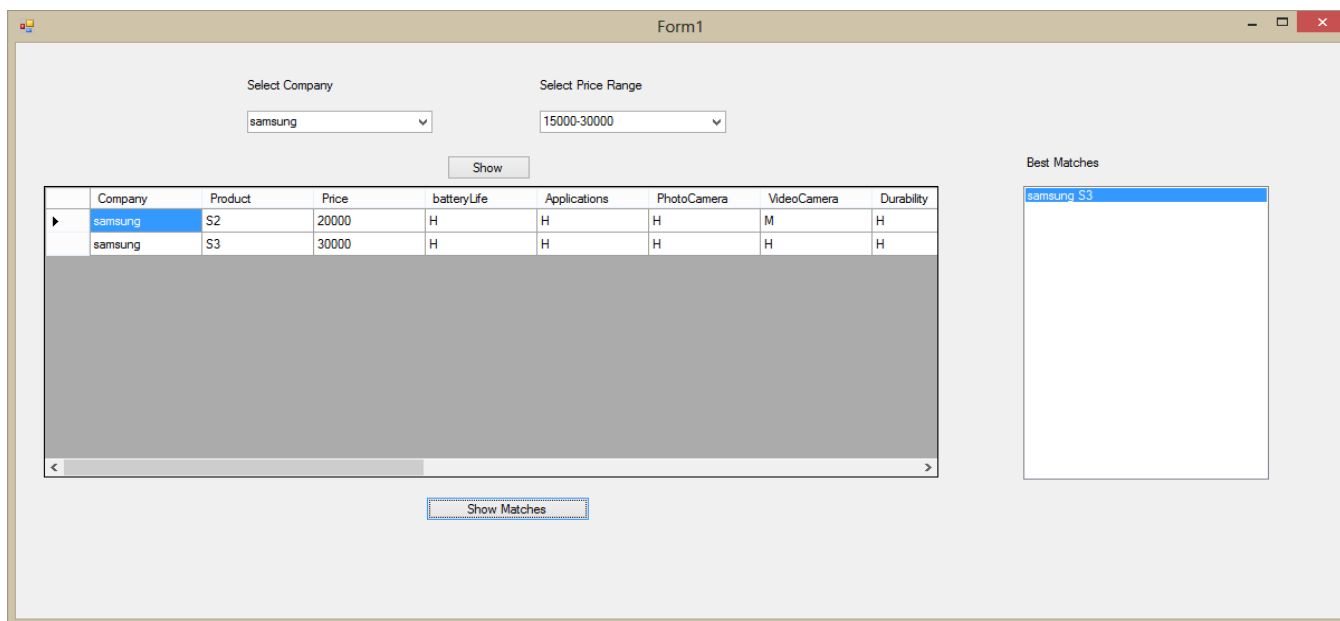


Fig 1: User Generated Output

v. Methodology

Results of the best match comes by comparing the users input with the one stored in the database. Euclidean distance(in K means Clustering) is calculated and then the best match and result is shown in the panel.

$$\text{Euclidean Distance}(X, Y) = (|X_1 - Y_1|^2 + |X_2 - Y_2|^2 + \dots + |X_{N-1} - Y_{N-1}|^2 + |X_N - Y_N|^2)^{1/2}$$

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