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A Design and Application of Android Mobile Based Smart Business Accounting Software

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Abstract

In this study, an Android based mobile accounting software has been designed and implemented. The developed system obtains information from the databases (such as MsSQL, MySQL and Postgre SQL) of softwares (such as ETA and NETSİS). Many local and global companies have been utilizing ETA and NETSİS for preaccountancy. In this study, presented Android based mobile accounting software provides useful information to the end users using mobile phones or tablets with Andoid and cloud technology. In addition, the presented system has an artificial intelligence module. The artificial intelligence based module utilizes genetic algorithms to provide useful suggestions and recommendations, such as financial budget estimation, finding an appropriate marketing zone for a particular sales representative, etc. Regarding the forecasting the sales characteristics of the sales representatives, genetic algorithm based scheme achieves a classification accuracy of 88.33%.

Keywords: *mobile application; artificial intelligence; business accounting*

1. Introduction

The development of commercial life, the increase of the company's product range, the increase of the income and expense items in the enterprises, the minimization of the financial losses of the companies and the necessity of determining the current status of the company necessitated the companies to operate a high number of high cost personnel. Also, as the size of the company increases, the amount of data increases and the processing of the data become more difficult. With the development and expansion of computer technology and the acceleration of its development, it has been possible to provide fast and improved accounting programs under the name of pre-accounting for the daily sales of companies, bank and cash accounts, billing transactions, checks and cash transactions. These programs have become a must for companies with logical algorithms, rapid and serial database creation and querying systems, they have provided and continue to provide significant gains. In Turkey, there are 1.7 million businesses, according to data of 2016.

These businesses are integrated with accounting programs directly or indirectly. This means that a very large amount of data and transactions available. The collection of company data on the basis of accounting computer programs, mathematical calculations or functional processes, this data and reporting of this data plays an important role. Today, commercial accounting software that has been named in the field is based on MsSQL Server database management systems using SQL language in general. Thus, MsSQL with the power of the SQL language of the database management systems associated with stability and speed, efficient and optimized software is turned off. Nowadays, this accounting software uses artificial intelligence algorithms to provide information or suggestions specific to the company and its fields of activity to the company or its partners. The use of numerical data in genetic algorithms gave better results in the use of artificial intelligence algorithms in accounting. In addition, mobile applications for the Android operating system have been implemented. Android is an operating system that uses the Linux kernel. The android operating system is developed

by Google, the open Handset Alliance and free software communities. This system designed for the touch screen, which has Android operating system. These products are popular with users looking for high-tech, low-cost and customizable devices. Initially, this includes tablets and smartphones, but nowadays, it is also used in devices such as televisions, cars, game consoles, digital cameras and clocks applications. Android Software Development Kit (Sofware Development Kit - SDK) has been implemented in the Java language. This platform consists of ancillary tools such as debugger, software libraries and emulator (Kuzara et al., 1995; Strasser and Stamer, 2008). Android offers some techniques and methods to use memory more effective. Applications that are not used for a certain period of time, for example, they are taken in standby mode or turned off. Android SDK tools include the mobile tool emulator, which works on the computer, offers the possibility of using a virtual tool for testing the application. Thus, the application can be tested successfully without the need for a physical device.

In the developed system, Android studio was used in the front-end. In the back end programming section, the Keel program, which has powerful libraries for data processing, comes to the forefront. The basic classification algorithms and the evolutionary classification algorithms used in experiment analysis are performed in the Keel (Alcale et al., 2009). Keel is an open source Java based data mining environment. The design and proposal of this study is discussed in our previously published paper (Okyay et al., 2017). This study is the improved and completed version of (Okyay et al., 2017).

2. Related Works

Recently, computer science is in close relationship with other fields, such as banking, finance and accounting. The main areas of computer science can be listed as software engineering, computer networks, Internet security, image processing, virtual reality, artificial intelligence and mobile systems. The first interaction with the financial sector is focused around the computer science research tools. While working with accounting programs, researchers have developed interactive and intelligent software, using data and account processing techniques and have opened them to server systems and remote accesses (Ayan, 2015). Computer science offers many opportunities for artificial intelligence. Techniques such as soft computing, swarm intelligence, and genetic algorithm have been used to solve many real-world problems and successful results can obtained. With the use of artificial intelligence based systems, more efficient recommendations can be provided.

Business and accountancy have become easier than ever before thanks to the remarkable progress in fields, such as machine learning and artificial intelligence. With the progress in these fields, it becomes easier to maintain and verify immense quantity of information that could be valuable to the accountants. Though recent progress on the use of artificial intelligence techniques for implementing accounting systems, there are still much work that can be developed (Feynman, 1959).

Machine learning is an integral part of artificial intelligence. In fact, artifial intelligence, which is a field with over 60 years' progress, has become an essential part of almost all aspects of everyday life. We encounter artificial intelligence in fields such as banking, investment transactions, and insurance transactions (Taniguchi, 1974). The best examples of artificial intelligence can be summarized as follows: visual perception, voice recognition, decision making, and language translation. In fact, these operations require human intelligence and can now be done by machines (Taniguchi, 1974).

One of the most striking application fields for articial intelligence based systems in finance are chatbots. Chatbots formed by abbreviation of chat and robot as words can be thought as the first seeds of artificial intelligence. These chatbots have been announced to be used by world-class companies such as MasterCard, Bank of America, RBS and American Express. At this point, users can be able to do very simple transactions, such as transferring money, checking their accounts, asking user questions and taking advice in the financial fields. With the use of chatbots in finance, it is not necessary to go to the bank, when doing these transactions. The most exciting side of the chatbot, the company will offer new distribution channels and this will reduce the amount spent for customer communication significantly. The advantage of chatbots is that they can perform complex operations

and calculations within seconds. If financial applications are looked at, chatbots can monitor customer balances, limit their spending, assess their spending habits, and monitor credit scores (Drexler, 1986; Roukes, 2001).

Each sector is implementing artificial intelligence in different ways. For example, insurance companies use artificial intelligence to speed up the process flow and fight against fraud. Developed artificial intelligence based systems increase customer satisfaction. In the management of active accounts and assets, artificial intelligence applications are rarely seen, but they have begun to be replaced by robot-advisors. (Taniguchi, 1974).

Artificial intelligence can help people make decisions faster, better and cheaper. But at this point, it is necessary to rely on machines and to cooperate with them.

When artificial intelligence applications are being conducted, they include the steps of collecting and preparing data, formulating analytical logic, and evaluating analytical results for accuracy. When the data are collected, they are analyzed by artificial intelligence and the correlations between the extracted data are calculated. These correlations compliance values. The main application fields of artificial intelligence in finance can be summarized as follows (Roukes, 2001):

1) Text mining, voice recognition and semantic analysis
2) Anomaly detection in pattern recognition
3) Market analysis with data mining
4) The formulation of investment strategy
5) The use of information technology in system development

The increasing interest in mobile devices in recent years has increased usability with innovations that transform them into integral parts of our lives. These developments have opened a new era in mobile technology and have introduced various functional and smart applications. Research in smartphones and tablets has also contributed to the rapid development of Android software and is attempting to meet the needs of strong platform development. Mobile phones are important for micro, small and medium sized businesses as new accounting tools because they train these businesses for various cost components and strategies. Mobile accounting tools are becoming important for business circles and for better and practical accounting. A certain number of studies have been done on mobile accounting applications and are creating new and improved technologies using the Android platform. However, the lack of especially Turkish applications is striking and this type of application makes this work worthy of a limited number and diversity (Okyay et al., 2017).

3. Methodology

This section briefly reviews the methodoloy utilized in the study.

3.1. Artificial Intelligence (AI)

Artificial intelligence can be defined as a system that exhibits high cognitive functions and autonomous behaviors, such as learning, thinking, thinking, perception, connecting multiple concepts, problem solving, decision making, deduction and communication, which are unique to human intelligence (Holland, 1992). The objective of artificial intelligence, to emulate human intelligence through the computer, in this sense is to give a certain degree of computer learning ability (Emel and Taşkın, 2002). Artificial neural networks, genetic algorithms and fuzzy logic are some application fields of artificial intelligence. In this study, genetic algorithm based prediction module is utilized (Okyay et al., 2017).

3.2. Genetic Algorithms (GA)

In this section, the basic information regarding genetic algorithms has been presented. Genetic algorithms are search and optimization algorithms inspired from the principles of natural selection. The premises were put forward by John Holland (Holland, 1992). Genetic algorithm has many successful applications in the field such as optimization, machine learning, design and planning (Emel and Taşkın, 2002). GA is an intuitive search technique based on parameter coding that looks for solutions using random search methods (Coşkun, 2006; Turgut et al., 2002).

3.3. BioHEL (Bioinformatics-oriented Hierarchical Evolutionary Learning)

The BioHEL (Bioinformatics-oriented Hierarchical Evolu-tionary Learning) system is an evolutionary learning system proposed by Bacardit *et al.* (2006) to handle large scale bioinformatic datasets. BioHEL uses iterative rule learning to generate a set of rules. The rules in the solution are evolved, one at the time, using a standard genetic algorithm. Each time the system learns a new rule, adds it to the theory and removes all covered examples from the training set. This process is repeated iteratively until all examples are covered. Moreover, BioHEL incorporates a windowing system to improve its efficiency called Incremental Learning with Alternative Strata (ILAS). This technique separates the training set into equally distributed strata. In each iteration, the GA chooses a different stratum for its fitness computations based on a simple round robin policy. The general workflow of the system is inspied in the standard separate-and-conquer rule learning process, as represented by Figures 1 and 2.

```
Seperate and conquer algorithm
Input : Examples
Theory = 0
While Examples =/ 0
    Rule = FindBestRule(Examples)
    Covered = Cover ( Rule,Examples)
    If RuleStoppingCriterion(Rule,Theory,Examples)
        Exit While
    EndIf
    Examples = Examples \ Covered
    Theory = Theory  U Rule
EndWhile
Output : Theory
```

Figure 1 The standard separate-and-conquer rule learning process (Bacardit et al., 2006).

```
instanceSet * is = new instanceSet (argv [2], Train
classifier.aggregated ruleSet
classifierFactory Cf

Do {
        classifier *best = NULL
        for ( int i=0 i<tGlobals --NumRepetitionsLearning i++ {
            classifier *bestIt = RunGA()
            İf ( best ==NULL II bestIt-- CompareToIndividual(best)>0) {
                if(best) cf.deleteClassifier(best)
                best=bestIt

            }
            İf ( i<tGlobals--NumRepetitionsLearning - 1) {
                is--restart()
            }
            {
            if(isMajority(*best)){
                ruleSet.addClassifier(best)
                is--removeInstancesAndRestart(best)
        } else {
                cf.deleteClassifier(best)
                break
        }
}while (1)
```

Figure 2 General workflow for BioHEL (Bacardit et al., 2006).

4. Developed System

Nowadays, the use of information technologies is rapidly growing in the field of accounting, as it is in every field. Recording, reporting, and analyzing functions of accounting can be realized in a very short time with the help of computers. On the other hand, the distribution of information technologies brings back some problems with it such as new corruptions. In this respect, mobile Android programming, which enables faster and easier analysis and reporting of financial data with artificial intelligence that allows the modeling of human intelligence through computers, are important technologies that can be used to increase the efficiency of accounting inspection.

In this study, it is aimed to state the effect of using mobile Android programming and artificial intelligence in auditing practice in accounting inspection. Depending on this main purpose, first expert system software has been developed that brings expert systems from artificial intelligence technologies and mobile Android programming together in accordance with the scope and purpose of the study. After that, the data of the companies were evaluated with the developed expert system software, the sales and reach cycle. During this evaluation stage, the effects of the software (hence the related technologies) on the accounting audit process are separately determined and the results obtained are explained in detail. This study is the improved and completed version of (Okyay et al., 2017).

In this study, data is obtained from the database (MsSQL) of the software, which was used ETA accounting software. Our mobile application can read and write some necessary data to the databases, and this data can be used by the end user by using mobile phones or tablets carrying Android operating systems and working with internet and cloud technology. In addition, new data sets that are collected on a cloud system from the accounting data are analyzed by genetic algorithms method BIOHEL, which is one of the artificial intelligence algorithms. Then, users can be reported by the application developed to inform them about the company's sales representatives' performances. In addition, suggestions can be done, such as determining an appropriate sales field. The application runs on a local server, cloud server and it requires mobile devices having Andoid operating system. It

includes a user interface and an artificial intelligence based module at the back end. An important concern of the study is to supply the most recent software and hardware technologies to the companies.

Android programming is a piece of application code that works on the Android operating system on our mobile devices, with the help of the necessary design and software tools. For this programming, we use the Android studio program. This is a java-based language progam. We created the application interface and the code that works on the background of the application with the help of Android studio. The application database is available in our cloud server. This database is maintained on the MsSQL management system and the data of our ETA accounting program is on the cloud server. Our program connects to the necessary fields through the interface and data read and write operations are performed in this way.

The visual part of our application is built with the tools of Android Studio for mobile applications. These tools keep the visual structure, colors, and fields that linked to the database with the XML infrastructure of our Android mobile application.

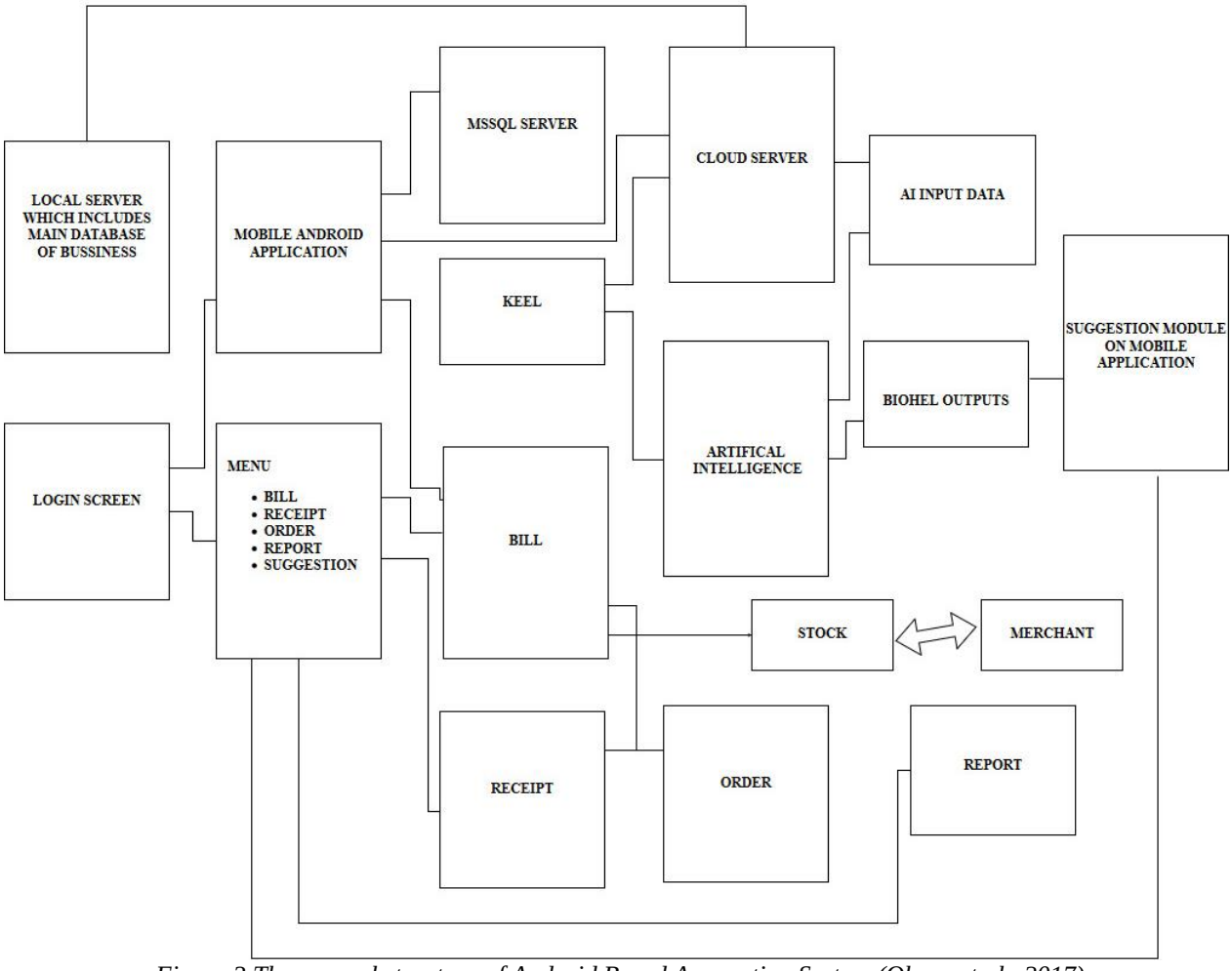

Figure 3 The general structure of Android Based Accounting System (Okyay et al., 2017).

The data of our application contains company information. The local server is running in both the commercial and accounting programs. In the front end of our mobile application, the Android studio program was used and a user interface was designed with is compatible to mobile phones and tablets.

The interface can be viewed in a separate resolution for the screen sizes of mobile phones, and a separate resolution for tablets. End users can able to use contents based on their authority specificiations. In general, there are two authority specifications, as company owners and employees.

Based on this specification, company owners, for instance, can see the amount of cash in the owner's bank, whereas employees can not be able to access this information. This information, which can be used by our employees to enter orders, can be written to the relevant fields in the database of the main accounting program on the local server. This interface performs reading and writing from the databases on the local server of the main accounting program and reporting them to the user.

The software's artificial intelligence algorithms part of Keel (Knowledge Extraction based on Evolutionary Learning) made in the media and execution was carried out in the cloud server. The reason for using cloud server is to alleviate the workload of mobile device and local server and to connect to local server and copy specified areas of database and keep it in the cloud server for a predetermined period before business demands are reached. The most important reason for this process is to speed up the application during the interrogation and reporting phases and not to slow down the operation of the commercial accounting program. We use artificial intelligence (AI) algorithms with the help of Keel libraries, and the results and operations are executed on the cloud server, and the processor and RAM capacities of the Android device and the local server are used at minimum levels. Feedback and query turnaround time are shortened by the user.

We utilized it from artificial intelligence algorithms, because genetic algorithm methods can process thousands and can limit the local server to CPU and RAM according to the size of the database of the company, so we can run this process only for data processing and we can run on our cloud server and eliminate unnecessary error and resource usage.

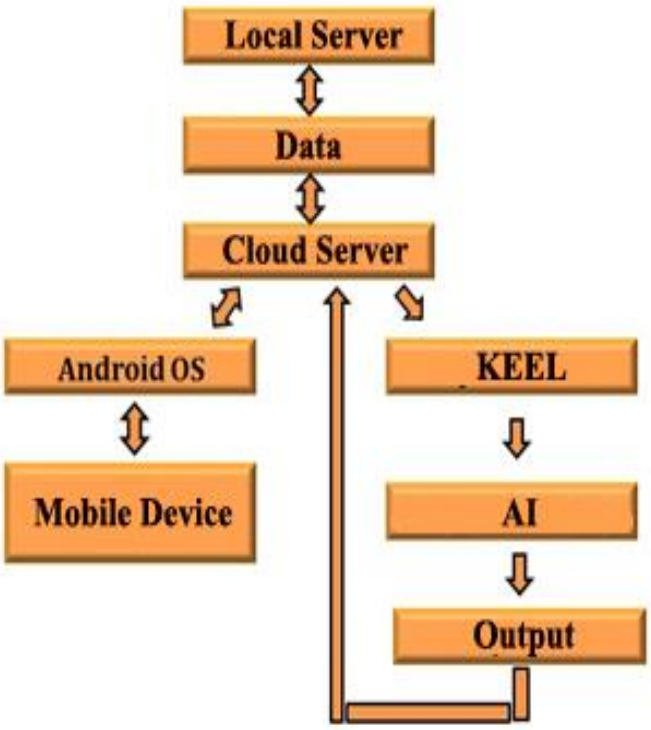

Figure 4 The pathway used in this study (Okyay et al., 2017).

The database server of the accounting program uses the MsSQL database management system. Developed by Microsoft, this software provides us with a robust and secure database management system infrastructure to run our application with stability and strengths. Forming queries and databases were performed using the SQL language and API. Functional power and speed of the SQL language accelerated the coding of our application in query processing. The working road trace including these operations is summarized in Figure 4.

5. Experimental Analysis for Prediction Module

In this section, the dataset, evaluation criteria and the experimental results of the study are presented.

5.1. Data Set

In order to implement the prediction module, the database of a company has been imported to our cloud server. The database contains tables, where ETA accounting software is used on MsSQL platform. The database contains information regarding different years, which is mentioned as AB_2016 and AB_2017. In order to remove confidential information, we have not utilized information regarding, the name of sellers, product specific information and product name in the analysis. When extracting data from the database, the SQL language is used and the query result is merged with the resulting data on excel. Data for the year 2016 and 2017 are filtered for 6 vendors, 10 products, and 6 regions by product-based turnover and total area-based sells were calculated. These calculations (turnovers) resulting figures are denominated in Turkish lira. The information available indicates the vendor's sales performance. This information provides opportunity to make inferences based on the performance. In the prediction module, the performance characteristics of sales representatives is modelled as a classification problem. In this classification problem, different regions, product information and sales characteristics of representatives are taken into consideration. In this way, we have built two different datasets. The first data set (5-graded classification) contains five basic label values for vendors: "verylow", "low", "medium", "high" and "very high". These second dataset (3-grade classification) is divided into three levels of sellers' sales ratios, "low", "medium" and "high".

5.2. Evaluation Criteria

In evaluating the performance of the classification algorithms, the correct classification ratios (ACC), F-measure and area under under the ROC curve were used. Accurate classification rate (ACC) is a statistical measure of how well a certain binary classification method correctly identifies a condition. The correct classification rate is calculated according to Eq.1:

$$ACC = \frac{TN + TP}{TP + FP + FN + TN} \tag{1}$$

Here, TN, TP, FP, and FN represent true negative, true positive, false positive, and false negative numbers, respectively.

F-measure is an important evaluation measure in Information theory. The F-measure is calculated according to Eq.4 based on recall (REC) and sensitivity (PRE) criteria:

$$PRE = \frac{TP}{TP + FP} \tag{2}$$

$$REC = \frac{TP}{TP + FN} \tag{3}$$

$$F - measure = \frac{2 \times PRE \times REC}{PRE + REC} \tag{4}$$

It is expected that the F-measure have a value in the range [0-1], and a good classification algorithm will obtain an F-measure value close to 1.

The area under the ROC curve (AUC) is another measure that can be used in the performance of classification algorithms. ROC can be defined as positive positives, false positives. The AUC criterion value takes a value in therange 0-1. A good classification algorithm is expected to achieve an F-measure value close to 1.

Table 1 Parameter values for classification algorithms.

The algorithm name	**Abbreviation**	**Parameter list**
Bojarczuk Genetic programming method	Bojarczuk_GP	Population size: 200, maximum generations: 200, maximum derivate size: 20, recombination probability: 0.8, copy probability: 0.01
Bioinformatics-oriented hierarchical evolutionary learning	BioHEL	Population size: 500, selection algorithm: tournament, tournament size: 4, crossover probability: 0.6, mutation probability: 0.6, elitism: True, number of iterations: 100, number of repetitions in learning: 2, generalization probability: 0.1, specialization probability: 0.1, winning method: ilas, number of strate windowing: 2, number of stages: 2, initial theory length ratio: 0.01, coverage breakpoint: 0.1, coverage ratio: 0.9
Real Encoding - Particle Swarm Optimization	REPSO	Number of iterations: 500
Particle Swarm Optimization - Linear Discriminant Analysis	PSOLDA	Number of iterations: 500
Genetic Algorithm with Neural Network	GANN	Hidden layers: 2, Hidden nodes: 15, Transfer: Htan, Eta: 0.15, Alpha: 0.10, Lambda: 0.0, number of BP cycles: 10000, Improve: 0.01, Elitism ratio: 0.1, Individuals: 100, range of W: 5.0, Connectivity: 0.5, maximum generations: 100
Falco Genetic programming method	FALCO	Population size: 200, maximum generations: 200, maximum derivate size: 20, recombination probability: 0.8, mutation probability: 0.1, copy probability: 0.01, alpha: 0.9
Fuzzy AdaBoost	GFS-AdaBoost	Number of labels: 3, Number of rules: 8
Tan Genetic programming method	Tan_GP	Population size: 150, maximum generations: 100, maximum derivate size: 20, recombination probability: 0.8, mutation probability: 0.1, copy probability: 0.01, w1: 0.7, w2: 0.8, elitisim probability: 0.06, support: 0.3
Genetic Algorithm based Classifier System with Intervalar Rules	GAssist-Intervalar	Number of minimum deletion rules: 12, size penalty for minimum rules: 4, number of iterations: 500, number of strata: 2, initialization method: cw-init
Genetic Algorithm based Classifier System with Adaptive Discretization Intervals	GAssist	Number of minimum deletion rules: 12, size penalty for minimum rules: 4, number of iterations: 500, number of strata: 2, initialization method: cw-init
Memetic Pittsburgh Learning Classifier System	MPLCS	Number of iterations: 750, size penalty for minimum rules: 4, Number of minimum deletion rules: 12, number of strata: 2, initialization method: cw-init, probability of local search: 0.05, probability of RSW crossover: 0.1, number of parents for RSW crossover: 10, filter for smart crossover: 0.05
Pittsburgh Genetic Interval Rule Learning Algorithm	PGIRLA	Number of generations: 5000, Population size: 61, crossover probability: 0.7, mutation probability: 0.5, number of rules: 20

5.3. Experimental Process

In the evaluation of the classification algorithms utilized in the experimental analyzes, 10-fold cross validation method was used. In the 10-fold cross-validation method, the initial dataset is randomly divided into 10 equal parts, one of which is used as test data to test the model; the remaining parts are used for training purposes. The specified operation is performed ten times, with each piece being a test data, and average results are obtained. Basic classification algorithms and default parameter values found on the platform for evolutionary classification algorithms are used.

5.4. Experimental Results

In this section, the correct classification rate, F-measure and AUC criterion values for the forecasting model of sales characteristics are presented for 3 and 5 degree data set, based on the present data of the sellers. Table 2 presents values for the 5-grade classification problem, and Table 3 presents the performance criteria used for evaluation for the 3-grade classification problem. When the experimental results presented in Table 2 are examined, it can be seen that the highest classification achievement is achieved by the Bioinformatics-oriented hierarchical evolutionary learning (BioHEL) algorithm and the second best performance is obtained by the MPLCS (Membrane Pittsburgh Learning Classifier System) algorithm. Among the 20 classification algorithms used in the experimental analyzes, there are basic classification algorithms, such as K-nearest neighbor algorithm, C4.5, logistic regression, support vector machines and evolutionary classification algorithms, such as REPSO, BioHEL, PSOLDA. When the results of the basic classification algorithms are examined, it can be observed that the C4.5 algorithm gives higher values for all three evaluation criteria than the other classification algorithms.

Table 2 Performance criterion values for a 5-graded classification problem.

Classifier	**Accuracy Rate**	**F-measure**	**AUC Measure**
KNN	41,67	0,43	0,43
C4.5	79,16	0,80	0,82
LDA	67,86	0,71	0,69
Logistic	42,50	0,44	0,43
C_SVM	69,64	0,71	0,73
NB	50,00	0,53	0,51
MLP	40,00	0,42	0,41
Decr-RBFN	76,92	0,79	0,78
Bojarczuk_GP	66,67	0,67	0,67
BioHEL	**88,33**	**0,93**	**0,91**
REPSO	76,92	0,79	0,79
PSOLDA	81,67	0,85	0,85
GANN	72,22	0,73	0,75
FALCO	68,15	0,70	0,71
GFS-AdaBoost	46,67	0,47	0,49
Tan_GP	56,67	0,58	0,58
GAssist-Intervalar	65,00	0,67	0,68
GAssist	60,83	0,61	0,63
MPLCS	***83,33***	***0,88***	***0,86***
PGIRLA	65,74	0,67	0,68

Table 3 Performance criterion values for a 3-graded classification problem.

Classifier	**Accuracy Rate**	**F-measure**	**AUC Measure**
KNN	50,60	0,46	0,46
C4.5	84,51	0,87	0,91
LDA	74,16	0,75	0,75
Logistic	46,45	0,47	0,46
C_SVM	84,57	0,77	0,80
NB	60,71	0,55	0,54
MLP	53,43	0,44	0,44
Decr-RBFN	84,07	0,85	0,85
Bojarczuk_GP	86,05	0,73	0,75
BioHEL	**88,99**	**0,92**	**0,92**
REPSO	84,07	0,85	0,86
PSOLDA	84,17	0,84	0,82
GANN	87,70	0,79	0,84
FALCO	82,75	0,75	0,77
GFS-AdaBoost	51,00	0,51	0,54
Tan_GP	75,69	0,62	0,63
GAssist-Intervalar	78,93	0,72	0,74
GAssist	81,26	0,67	0,70
MPLCS	*84,19*	*0,91*	*0,91*
PGIRLA	79,83	0,72	0,75

The experimental results presented in Table 3 are similar to the experimental results presented in Table 2. For the 3-grade classification problem, the highest classification performance is obtained by Bioinformatics-oriented hierarchical evolutionary learning (BioHEL) algorithm. The second best result is obtained by the MPLCS (Memestic Pittsburgh Learning Classifier System) algorithm.

Figure 5 shows a graphical representation of the correct classification rate values for different classification algorithms and for a 3-grade or 5-grade classification problems. In Figure 6, the variation of F-measure values according to different classification algorithms and 3-grade or 5-grade classification problem is graphically shown. In Figure 8, the variation of AUC values according to different classification algorithms and 3-grade or 5-grade classification problem is graphically shown. As can be seen from Figures 5-7, the average performance criterion values of the classification algorithms are higher for the 3-grade classification problem than the 5-grade classification problem.

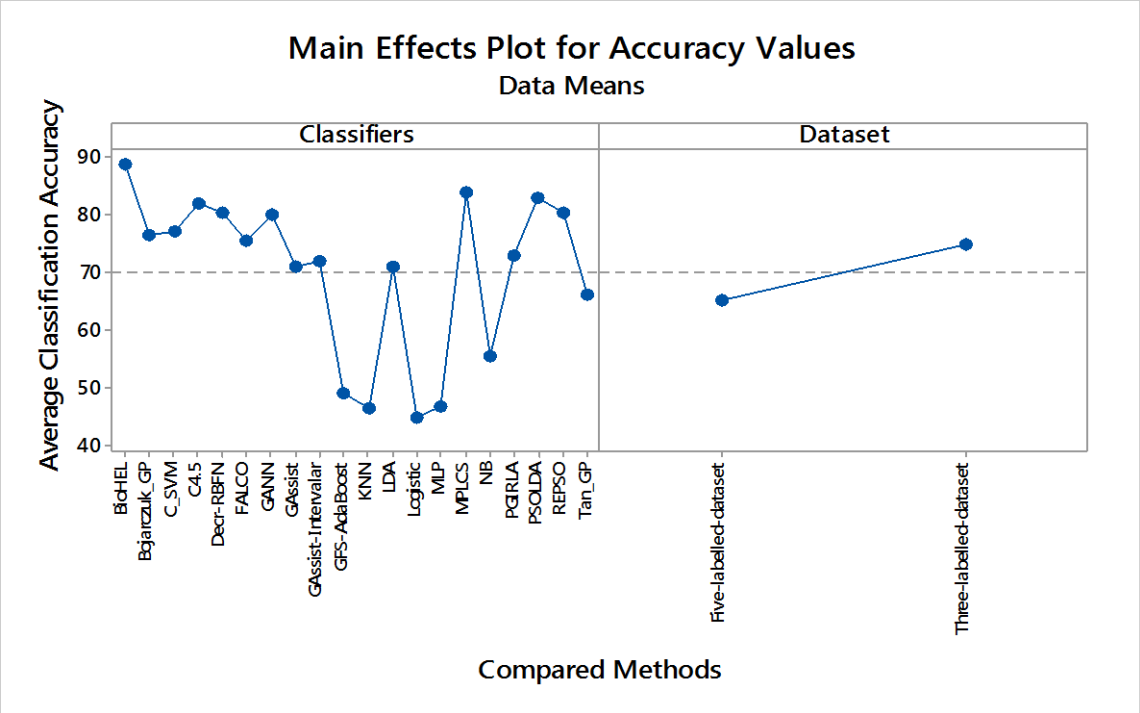

Figure 5 The basic effect diagram for the correct classification rate.

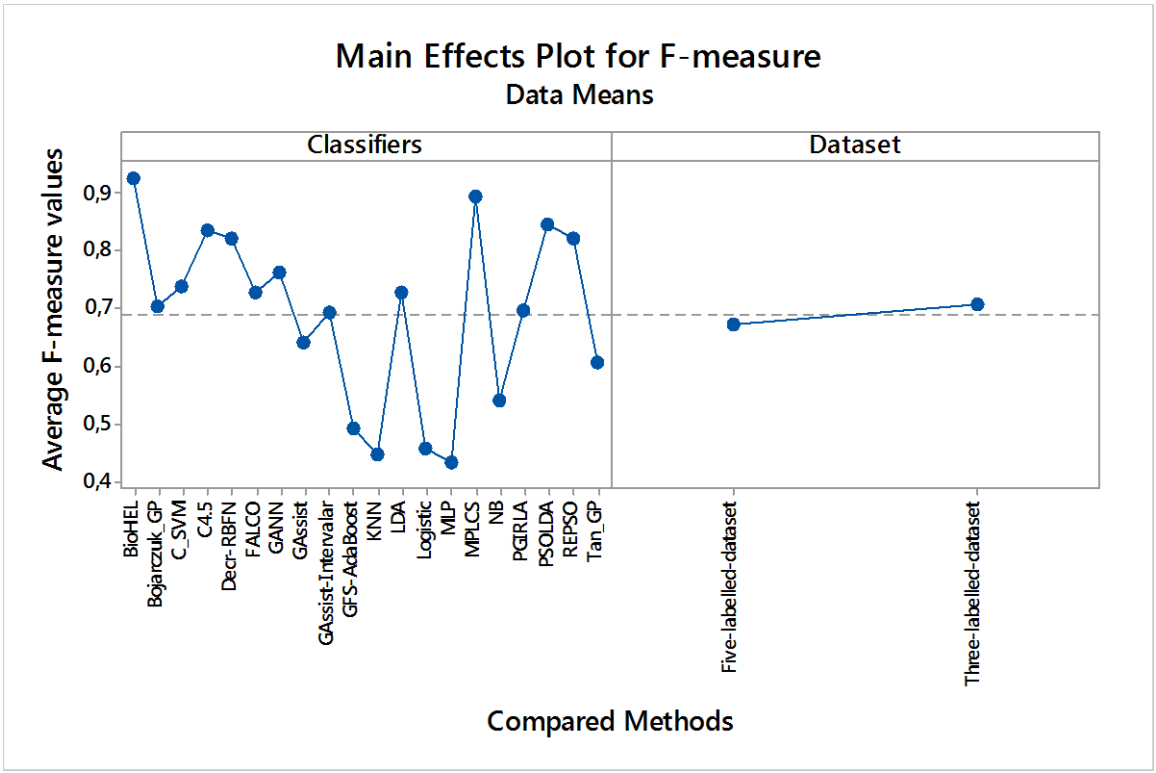

Figure 6 Diagram relating to the basic effects of F-measure.

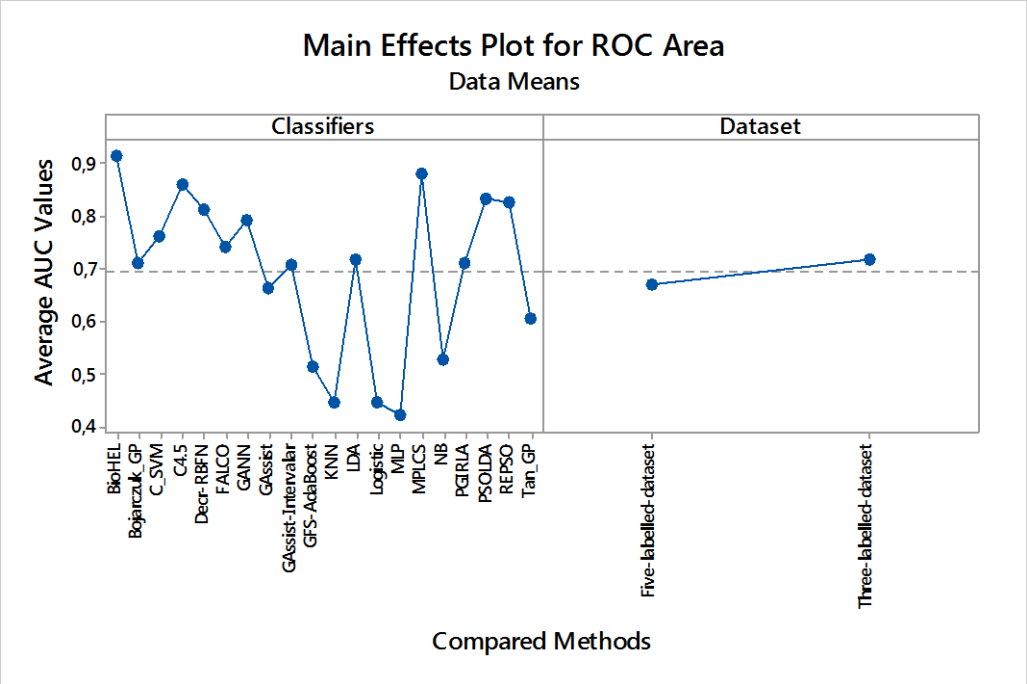

Figure 7 The main effect diagram on F-measure.

6. Conclusion

Accounting is a science that tracks transactions of all kinds of businesses, records transactions and completes transactions. Accounting is an extremely important for all organizations. Accounting is the most important part of any organization, as it follows the transactions of organizations, such as government associations, business organizations and foundations.

This work brought a new breath to commercial pre-accounting software such as ETA, which is heavily used by those who are interested in accounting business, and mobile phone integration of this software is done.

In our application, we integrated the most used accounting modules into the software. In this regard, we have built an infrastructure that is integrated into mobile access with the use of current technologies. We made our application portable. Since we are working through cloud technology, we made it available everywhere we are. Without limitation, any user can enter data and / or view information at a specified level of application. BioHEL integration with artificial intelligence algorithms enabled us to make recommendations to the firm owner. We have secured the central database because we use it on a separate platform, separating the database from the local server is our innovation.

In future versions for development of our application, we plan to add more accounting modules, artificial intelligence algorithms, and add-ons that can make inferences about the company structure and the company's income / expenditure balance. In addition, visual and more responsive sub-structure in reporting and front end will be more useful for future versions.

The work we've implemented as hardware and software was a success to realize in this mobile application. It needs better module implementation and user friendly responsive screen adaptation.

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