**MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN**

International University of Information Technology

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Approved

IS Department Head,

Candidate of Technical Sciences,

Associate Professor

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (name)

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**RESEARCH PAPER**

**Social network for athletes with booking system**

**Major 5В070300 – Information Systems**

Compiled by: Y.B. Beisenbek

Research advisor Candidate of Technical Sciences,

Associate Professor

G.K. Sembina

\_\_\_\_\_\_\_\_\_\_\_\_

(signature)

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**Abstract**

The relevance of the work:

*At the moment, its own site for the enterprise is not a whim and an optional thing, but an active part of the business, its necessary attribute. Own internet representation for almost any company is a requirement of time. Proceeding from this, the development of an online store is necessary, relevant and necessary.*

*The development and creation of a social network is an excellent marketing solution not only for organizations, but also for private clients of the same company. Furthermore, the development of a social network is carried out for direct sales and reservation from a resource.*

The aim of the work:

*The creation of a convenient WEB - system that will provide the user with complete information about the area of interest; creating a convenient system that allows users to book any football field without leaving home. In addition, the individual user will have their own game statistics, winning percentage and defeat, decency and. and so forth.*

The stated goal required the solution of the following tasks:

*- comparative analysis of existing analogues and their functional characteristics;*

*- research of web design functionality aimed at accelerating and improving the perception of information in the format of web resources;*

*- design a database and social network*

Methods of research: *methods of theoretical research: analysis, synthesis, comparison.*

The role of the object of research *is the development of a social network.* The subject of the research *is the technologies of developing social networks.*

The novelty of the work and personal contribution:

*- ways of managing the process of consumer interaction with the Web page;*

*- a comparison of the functional characteristics of the five platforms;*

*- a model of the user's behavior in the formation of armor;*

Practical significance of work

*The models, methods and algorithms developed by the author can be used by enterprises and individuals engaged in leasing football fields. The received user statistics will evaluate the football field on which the match was played, and also fill in the user statistics page, which will result in motivation for the other users to win matches, and for tenants the benefits of advertising.*

The realization of the work results:

*The main results of the study will be discussed at the seminars of the Department of Information systems IITU, international and national conferences.*

**Content**

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**Designations and reductions**

In the researchwork, the following reductions were applied:

SN – social network

IE – individual entrepreneur

API – application programming interface

**Introduction**

In modern business, the need to automate various processes has become a familiar phenomenon. Already becoming difficult to imagine a warehouse or accounting without the use of specialized software, sales reps use a special application for registration and sending the order to our office directly with plus net or mobile phone, it is enough most of the orders coming from the website in the form ready for processing. But the relationship with customers, at least in the middle and small businesses, for some reason very often conducted without the introduction of automation and sufficient attention to accounting. [1]

There is no single canonical definition — and this comes from the logic of the very type of software — social network. A dedicated website or other application which enables users to communicate with each other by posting information, comments, messages, images, etc. That is what we call a social network. [2]

The social network will collect the all the statistics about athlete which will be represented as a motivation to become better and gain more than you have. [3]

How does it do this? At the most basic level, a social network system provides a central place where you can store athlete’s statistics information and share it with others.

Once this is in place you can track the history of all your interactions your matches, scores, how many assists did you make during the match. Because tracking is everything. [3]

With this system in place, every match, every score, every preference and every past contact detail about every match is at your fingertips. And that means that every contact you have with sport is always personal, relevant and up to date.

And as well as tracking statistics, you can also get some presents for your achievements, schedule follow-ups and organize the matches by this platform. That means you need never miss an opportunity to play with other users of the community. [3]

It is like some computer game statistics platform, every player will have his own profile where he can see his results, friend list, match history and other stuff like this. The SN system is a Central repository of information about customers, transactions and other impacts, which has a user interface with a set of functions. Accordingly, the SN performs the usual work: collects data, stores data, communicates them, automatized processes and classifies actions. [2,3]

There is a question: why do you need SN system?

It will do:

* SN system will motivate people to stay healthy by promoting the active lifestyle. [5]
* Promotion of football fields by placing them into website, the clients who book the fields and play in a selected time will enjoy with this kind of opportunities. [5]
* The platform will motivate players to play better and train harder to be on top list where professional teams will choose the candidates to the team which in consequence will increase the level of sport into a new level. [5]

Of course, not all the basic functionality also stands aside: reports, KPIs, tasks and planning,

etc. [6,7]

**1 Analysis of different CRM systems’ characteristics**

A SN will help you to book the fields without calling to the field managers, which will save your time.

Comparative analysis - establishing similarities and differences of objects and phenomena.

Table 1 - Technical characteristics of CRM systems

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Search panel** | **Online booking** | **Registration** | **Adding field by users** | **Android & iOS application** | **Online payments** | **Integration of maps (GoogleMaps,YandexMaps)** |
| Myfootball.kz | + | - | - | + | + | - | - |
| Sportmap.kz | + | - | + | + | - | - | + |
| Findsport.ru | + | + | + | + | - | + | + |
| Sportarenda.com | + | - | - | + | - | - | - |
| Chocolife.me | + | - | + | + | + | + | + |

In this study, there are 5 platforms that pursue the following goal: to find the most suitable place for the game (football, volleyball, etc.). The comparison was made on 7 characteristics, which resulted in the following data: despite the fact that the goal of chocolife.me is slightly different from all others, the platforms findsport.ru and chocolife.me correspond to most of the above characteristics and are leading in this list. Also, it was noticed that the presence of such functions as: the search bar and the addition of their seats by the user is present in all of the sites.

The analog of SN as a match statistic, player records does not exist, that is why there is no need to make a table for this.

**2 Experimental verification of the effectiveness of the developed software**

**2.1 Evaluation of effectiveness of automation (on time)**

After the development of the SN, an experiment can be carried out, the essence of which is that the control group of N people is divided into 2 subgroups equally. During the week, each participant of the first subgroup must process the documents manually, on paper for each indicator. Time must be fixed for each subject for each operation. For the second subgroup, measure the time for those operations using the developed system and also record the time for each operation. The averaged values of the experimental results are presented in Table 2.

Table 2 - The result of the application of the system

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Indicators of the experiment | T1 –-the total value of the mean time to use the SOFTWARE, min | T2 - the total value of the mean time using the SOFTWARE, the minimum | Deviation  +, -  min. | Time efficiency, N |
| Looking for field | 20 | 4 | -16 min. | 5 times |
| Booking the field | 5 | 1 | -4 min. | 5 times |
| Looking for teammates | 250 | 60 | -190 min. | 4 times |
| Promoting the field | 60 | 20 | - 40 min. | 3 times |
| Billing | 5 | 5 | 0 | 0 |
| **Total** | **340 min.** | **90 min.** | **-250 min.** | **3.7 times** |

Conclusion: the developed SN allows to reduce the time for data processing and filling in the necessary protocols and documents by 3,7 times.

To calculate the percentage of the developed program allows you to reduce the time of day-to-day operations, you must use the following formula:

, (1)

where T1 is the sum of the mean time before the SN is used;

T2 is the sum of the mean time using the SN system.

**2.2 Assessment of economic efficiency of use of a SN**

The experiment involved a group of individual entrepreneurs, consisting of 10 people. These entrepreneurs analyzed their economic activities by some indicators. It was found that entrepreneurs themselves are not engaged in the analysis and forecasting of the main performance indicators. These issues are conducted by hired employees or involved professionals. The purpose of the experiment is to calculate the possibility of financial savings for individual entrepreneurs using the developed software.

The results of the experiment are summarized in Table 3.

Table 3 - Research results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Participants  experiment's | Who conducts analysis and forecast | The sum of expenses in a month without use (KZT) | The sum of the costs per month using (KZT) | Result:  – saving  + overrun  (KZT) | | |
| Per month | Per quarter | Per year |
| IE «Mamirkhan K.M.» | Specialist | 100 000 | 84 000 | -16 000 | -48 000 | -192 000 |

continuation of the table 3

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE «Aisynov Z.T.» | Specialist | 210 000 | 175 000 | -35 000 | - 105 000 | -420 000 |
| IE «Sarsenbek I.A.» | Specialist | 55 000 | 45 000 | -10 000 | -30 000 | -120 000 |
| IE «Akpan T.К.» | Specialist | 160 000 | 140 000 | -20 000 | -60 000 | -240 000 |
| IE «Kim A.A» | Specialist | 120 000 | 115 000 | -5 000 | -15 000 | -60 000 |
| IE «Tsoi В.» | Specialist | 300 000 | 250 000 | -50 000 | -150 000 | -600 000 |
| IE «Belov А.S.» | Specialist | 260 000 | 224 000 | -36 000 | -108 000 | -432 000 |
| IE «Ahmetov N.N.» | Specialist | 185 000 | 160 000 | -25 000 | -75 000 | -300 000 |
| IE «Ivanov P.N.» | Specialist | 150 000 | 140 000 | -10 000 | -30 000 | -120 000 |
| IE «Petrov К.S.» | Specialist | 148 000 | 126 000 | -22 000 | -66 000 | -264 000 |

The results of the first stage of the experiment clearly show that all participants, using the developed program, save on costs associated with the extra payment for administrators. Saving of monthly, quarterly and annual Fund of procurement of materials brings additional significant amounts to the income of sole traders.

Table 4 - Research results

|  |  |  |  |
| --- | --- | --- | --- |
| Individual Entrepreneurs | Annual cost without the use of the software product (KZT) | Annual cost with the use of the software product (KZT) | Efficiency  (as a percentage) |
| IE «Mamirkhan K.M.» | 1 200 000 | 1 008 000 | 16% |
| IE «Aisynov Z.T.» | 2 520 000 | 2 100 000 | 17% |
| IE «Sarsenbek I.A.» | 660 000 | 540 000 | 18% |
| IE «Akpan T.К.» | 1 920 000 | 1 680 000 | 12,5% |
| IE «Kim A.A» | 1 440 000 | 1 380 000 | 4% |
| IE «Tsoi В.» | 3 600 000 | 3 000 000 | 17% |
| IE «Belov А.S.» | 3 120 000 | 2 688 000 | 14% |
| IE «Ahmetov N.N.» | 2 220 000 | 1 920 000 | 13,5% |
| IE «Ivanov P.N.» | 1 800 000 | 1 680 000 | 7% |
| IE «Petrov К.S.» | 1 776 000 | 1 512 000 | 15% |
| **Average** | **2 025 600** | **1 750 800** | **14%** |

Table 4 shows the data that determine the efficiency of the developed software product. Calculations were made of the annual cost of purchasing materials using the software product, and without it. Then the efficiency was calculated for each individual entrepreneur, and the efficiency was determined as a whole for the whole group of participants of the experiment

The experiment proves that the work with this system allows individual entrepreneurs to save money by 14%, i.e. to reduce expenses and increase income. Sole traders can register in SN because clearly observed economic profitability.

**2.3 Simulation of dynamics of production processes on the basis of experiment**

The operation of any system can be characterized by the results of its work. Moreover, almost any production indicator can be selected as the evaluation criterion. By monitoring the change of the parameter selected for monitoring, you can make an overall assessment of the system development trend. Furthermore, by establishing a relationship between the observation times and the change dynamics of the selected parameter, you can predict the future state of the system.

Elucidation of the General tendency (trend) of system development assumes construction of mathematical model on the basis of observations of the chosen production indicator. The set of observations (levels), depending on the time received the name of the time series. Observations should be made at equal intervals of time.

The desired mathematical model is described by the formula of the parabolic trend in the second degree:

*Y=a0+a1⋅t+a2⋅t2*  (2)

Numerical values of coefficients *a0*, *a1*, *a2* should be obtained as a result of solving the problem. The modeling process is based on the time series obtained from observations.

After this mathematical model is constructed, there is a possibility of mathematical prediction of the condition of the studied parameter a few steps forward.

An example of a mathematical model can be used for any real process that has a tendency. It is clear that the modeling of an absolutely random process is impossible.

Collection of baseline information

Assume that the clinic treats Y users per month. On the basis of observations within ten months, monthly recording the number of users, table 5 was formed.

Table 5 - Data

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **t, month** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| Y | 500 | 570 | 630 | 800 | 1200 | 1500 | 2100 | 2800 | 3500 | 4500 |

Obtaining a system of normal equations

In order to find the unknown coefficients of the trend formula a0, a1, a2, you need to create and solve a system of equations of the formula:

 (3)

where n is the number of observations (in this case n = 10).

In order to make the necessary calculations, we have to calculate , , , , ,

The calculations are shown in Table 6 and Table 7.

Table 6 – Calculation of all t

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Sum |
| t | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 55 |
| t2 | 1 | 4 | 9 | 16 | 25 | 36 | 49 | 64 | 81 | 100 | 385 |
| t3 | 1 | 8 | 27 | 64 | 125 | 216 | 343 | 512 | 729 | 1000 | 3025 |
| t4 | 1 | 16 | 81 | 256 | 625 | 1296 | 2401 | 4096 | 6561 | 10000 | 25333 |

Table 7 – Calculation of all Y

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  | Sum |
| Y | 500 | 570 | 630 | 800 | 1200 | 1500 | 2100 | 2800 | 3500 | 4500 | 18 100 |
| Y⋅t | 500 | 1140 | 1890 | 3200 | 6000 | 9000 | 14700 | 22400 | 31500 | 45000 | 135330 |
| Y⋅t2 | 500 | 2280 | 5670 | 12800 | 30000 | 54000 | 102900 | 179200 | 283500 | 450000 | 1120850 |

Having made the necessary calculations, we obtain the final form of the system of equations:

Solving a system of normal equations

The system of equations can be solved by any method (substitution, Jordan-Gauss method, etc.). Each of the methods has its advantages and disadvantages, which are either excessive bulkiness or loss of accuracy. When using computers, when the complexity of calculations does not play a significant role, the system can be solved by the method of "inverse matrix". When calculating "manually", you can use a fairly simple, but not very accurate method of "excluding variables".

So, solving the system of equations, we find the desired trend coefficients

*a0=692.17*; *a1=-200.05*; *a2=57.62*

Taking into account the received coefficient values, the trend equation will look like:

*Y=692.17-200.05⋅t+57.62⋅t2*

Definition of modeling errors

Using the dispersion analysis method (from lat. Dispersus-scattered, scattered) should find out the suitability of the resulting model.

As criteria for assessing the quality of the model, we use four indicators: absolute error (*SОст*), coefficient of determination (*D*), correlation index (I), Fisher criterion (*FРасч*).

We will find the average actually made production:

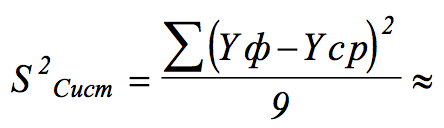
; *Yavg= 1810*;

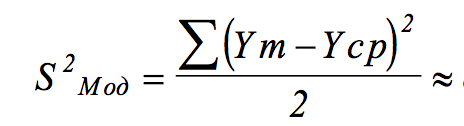
For the convenience of further calculations, fill in table 8.

Table 8 – Results

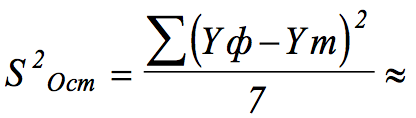
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| *t* | *Yф* | *Yт* | *(Yф - Yavg)2* | *(Yт - Yavg)2* | *(Yф - Yт)* | *(Yф - Yт)2* |
| 1 | 500 | 549.72 | 1716100 | 1588287.347 | -49.72 | 2472.80 |
| 2 | 570 | 522.51 | 1537600 | 1657617.235 | 47.48 | 2254.81 |
| 3 | 630 | 610.54 | 1392400 | 1438727.553 | 19.46 | 379.069 |
| 4 | 800 | 813.78 | 1020100 | 992468.778 | -13.77 | 189.68 |
| 5 | 1200 | 1132.24 | 372100 | 459355.331 | 67.75 | 4591.08 |
| 6 | 1500 | 1565.94 | 96100 | 59565.579 | -65.93 | 4348.00 |
| 7 | 2100 | 2114.87 | 84100 | 92941.836 | -14.86 | 220.92 |
| 8 | 2800 | 2779.015 | 980100 | 938990.363 | 20.98 | 440.36 |
| 9 | 3500 | 3558.40 | 2856100 | 3056881.367 | -58.3 | 3409.85 |
| 10 | 4500 | 4453 | 7236100 | 6985449.0 | 47.0 | 2209.0 |
|  |  | **Sum** | **17290800** | **17274671** | **0** | **20515** |

The set of initial data UF has 10 degrees of freedom (*n=10*) - according to the number of observations; the set of calculated data *Yт* has 3 degrees of freedom (*v=3*) — by the number of coefficients in the model formula; set of calculated data *Yavg* has 1 degree of freedom. Hence, the set of (*Yф - Yavg*) has 9 degrees of freedom, (*Yт - Yavg*) has 2 degrees of freedom, ,(*Yф - Yт*) has 7 degrees of freedom. Now we can determine dispersion:

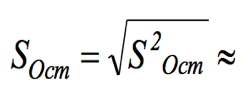
** 1921200



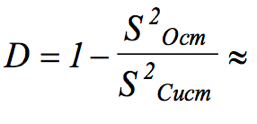
8635142



2930



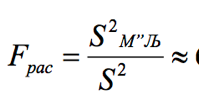
Absolute error: 54.1



Coefficient of determination: 0.998



The index of correlation: 0.993



Fisher Criterion: 301,4

**Conclusion**

With the introduction of new technologies, the way in which we work, manage contacts and connect with clients continues to become more advanced. This means that we have to look further and develop this kind of applications. Cloud based booking system with social network is the new reality as they are much more agile than their desktop and server counterparts and can be updated as new technology becomes the standard. The rise of the smartphone and social media are just two such examples.

Mobile-capable

Your customer (field manager) information needs to be as up to date and as convenient to access as possible. That's why it is also needed to present the mobile version of the application. This lets clients to access key information wherever they are, and update that information straight after a meeting while they are still in the field, so his friends can follow up with the very latest information before the competition.

With mobile booking application you can run your whole business from your phone – closing deals, servicing customers and even delivering 1:1 marketing campaigns without being tied to a desk.

Social-media aware

Social media is having a huge impact on many businesses and the way they interact with their customers: they have to respond as never before to Tweets, Facebook postings, LinkedIn discussions and more.

Sound familiar? If so then you'll need a platform that helps you to make the most of social media as a source of new leads, intelligence on prospects and information for customer service agents.

The booking system helps to see gaps in the game, then you can follow some tips and minimize them. You can even create an internal training center based on it — for example, to select the best deals and calls, so that you can easily adapt newcomers and form the best practices. And you can form a call center and provide outsourcing services. There are a lot of possibilities and of course, the main thing is safety. [7]

Solution of getting more money is automation and standardization of customer relationship management, i.e. implementation of booking system. [4]

This solution will help:

* Make more efficient the booking process;
* Motivate people to stay healthy; [5]
* Get statistics and analytics of each player during the matches; [7]
* Promote the business of field managers by placing in the platform; [7]

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