



References

1. Кабулов В. Алгоритмизация в теории упругости и деформационной теории пластичности. Ташкент, Фан–1966. 394 стр.
2. Шилдт Г. Полный справочник по С++– М-2006. 801 стр.

Q.R. Zohirov

STATISTICAL ANALYZING INCOMING PHONE CALLS AT THE CALL-CENTRE

(Republic Uzbekistan, Qarshi Branch of the Tashkent University
of Information Technologies)

Abstract: Today receiving all incoming phone calls without loss as well as optimization of the number of operators is one of the pressing issues at the developing Call-centers. Given is the information, in this article, about analyzing incoming calls and optimization methods of the number of workers at the Call-center.

Key words: Call-center, Telecommunication System of Total Users (TSTU), Incoming calls, Electronic Digital Auto informer.

Аннотация: Сегодня получение всех входящих телефонных звонков без потерь, а также оптимизация числа операторов - одна из насущных проблем в развивающихся Call-центрах. В этой статье представлена информация об анализе входящих вызовов и методах оптимизации числа работников Call-центра.

Ключевые слова: Call-центр, телекоммуникационная система для всех пользователей (TSTU), входящие вызовы, электронный цифровой автоинформатор.

We will begin to analyze incoming calls (phone call) at the Call-centres and we will now review incoming brief calls. The Call-center, we are studying now, has working places for 50 operators and a shift work for a brigadier. The Call-center, where working time is from 00:00 to 23:00 without day off. Approximately 350-400 thousand telephone calls can be received there during a month. Calls can be accepted by both: Telecommunication System of Total Users (TSTU) and mobile phones. However, nowadays Call-centers are principally receiving calls from TSTU, that is to say TSTU is common among subscribers [1].

On the following picture regularly incoming calls at the Call-center have been analyzed. Furthermore, given is the information about the number of received (incoming phone calls) phone calls, unaccepted (rejected) calls and the average time of serving to the incoming calls.

Given is the information about the number of daily TSTU incoming calls within an hour. Weekly incoming calls are given in diagram 1.

The first picture shows data relating to daily phone calls by sequence of days of the week, that are, the first trend – Monday, the second trend – Tuesday, the third



trend – Wednesday, the fourth trend – Thursday, the fifth trend – Friday, the sixth trend – Saturday, the seventh trend – Sunday.

On Monday the Call-center receives the largest number of phone calls, on the contrary, Sunday is a day in which Centre accepts the smallest number of calls.

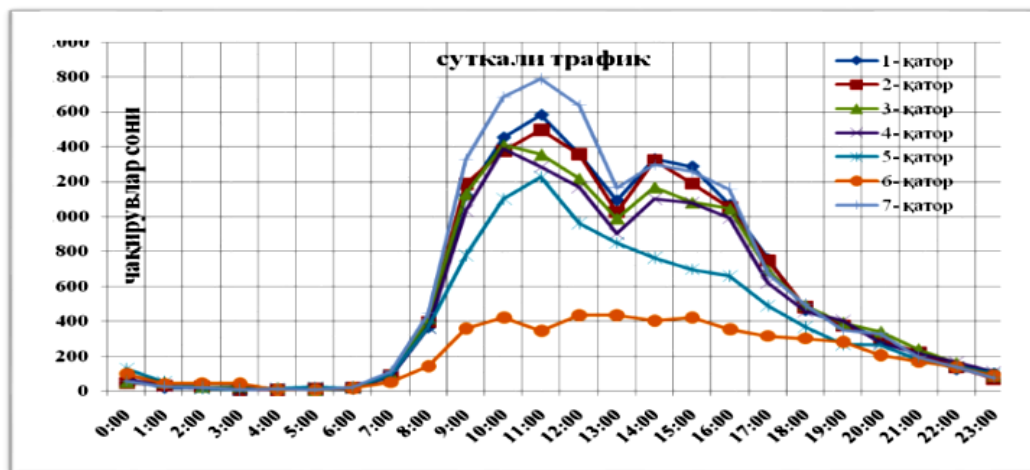


Fig. 1. Daily calls

The number of phone calls starts to increase from the beginning of working time, that is at 7 am. Since then, this active period continues over 11 hours, from 7:00 to 18:00. Specifically the busiest time for the Cal-center between 10:00 and 12:00, after that, the number of calls declines for the subsequent hour from 13:00 to 14:00, during the lunch. Furthermore, the trends go up as well by 18:00, but from that time on the number of phone calls at the Call-center diminishes sharply.

And now we will review incoming telephone calls in a week. On the table 1 the number of calls are given during the four weeks or a month [1].

Given is the information about the changes in the number of incoming calls during the all days of a month.

Table 1. Incoming phone calls

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
14304	13254	12920	12484	11805	9543	5143
14255	13280	13001	12454	12156	9532	5246
14456	13546	13556	12789	12859	9322	5255
14589	13989	13879	12256	12786	9356	5198

It is clear from the graph, the largest number of calls is received on Monday. However, this number declines up to the end of the week and actually the smallest number of calls is accepted on Sunday. Processing algorithm of the Call-center is consist of following sequences [2].

Picture 2 illustrates the average number of incoming phone calls in days of the week.

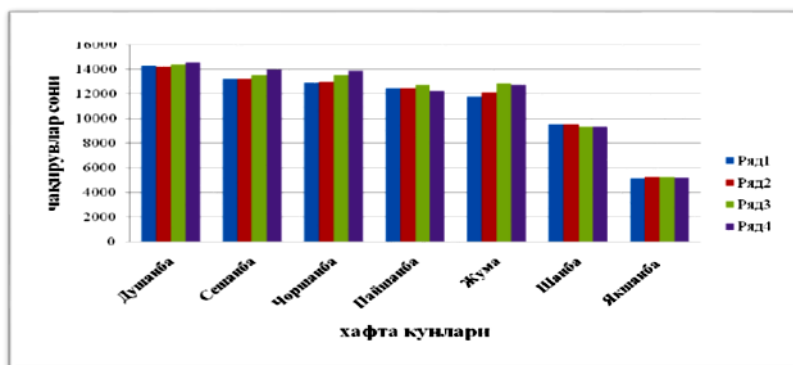


Fig. 2

Subscribers dial one of the numbers of the Centre. If all incoming system lines are busy, the caller will take rejection for serving (calls will be blocked), and then following one of two stages will be implemented: subscriber either can dial a number once again repeatedly or can not do it at all. At that time request is regarded as rejected or lost [3]. If any incoming system line is free, the phone call will be connected to the Centre and subscriber, who is phoning, usually hears electronic digital auto informer answer. During an interactive conversation with auto informer, user can get complete information and send from Call-center.

Now we will analyze the changes in the number of accepted incoming calls or unaccepted (rejected) incoming calls within a day. For this we will use the graph which reveals the number of received calls and rejected phone calls in any day of the week. It is clear from the picture, the number of rejected calls principally changes from 8:00 to 13:00 and accounts for the largest number at 11:00.

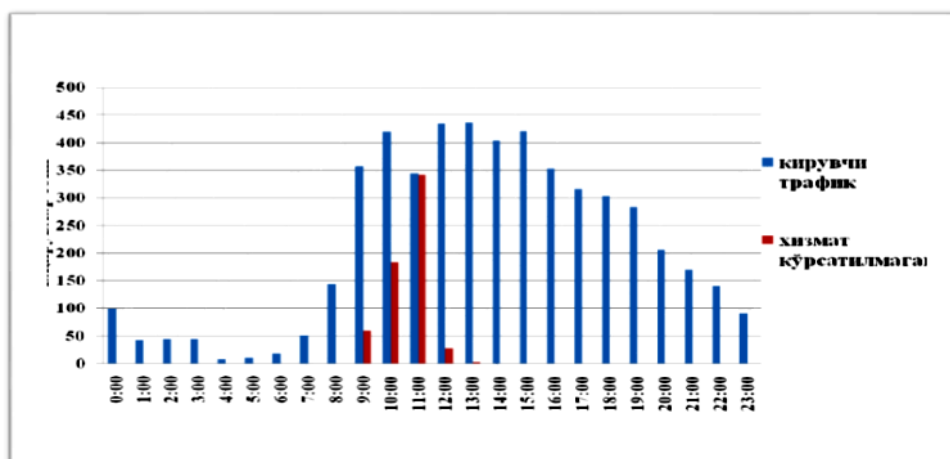


Fig. 3. The average number of rejected calls in a day of the week

Conclusion. Serving to the weekly and daily incoming calls at the Call-center was analyzed. The largest number of calls is principally received on Monday, but at the end of the week, that is on Sunday, the Call-center accepts the smallest number of phone calls. There are many calls at the Centre between 10:00 and 12:00, but after 18:00 the number of requests starts to decline. During a day number of rejected calls



makes up 12% of accepted phone calls. Thus, it is necessary to increase the number of operators who work during an hour in a shift for ensuring expectation possibility, in queue, which is not more than 10% and the length of the line, that is not more than 10. For this it should decrease the number of operators taking into consideration of the small number of calls on Sunday and Saturday, then those operators need to be involved into workforce between 10:00 and 12:00 on Monday. Furthermore, if predictions are implemented in hours of a day, it would be more effective

References

1. Turgunov A.M, Zoxirov K.R., «Analysis of architecture and functioning model web contact-centres», “International scientific review” international scientific and practical conference, February 24-25, Boston, USA.

2. Zoxirov K.R., “Call-sentrlarning rivojlanish bosqichlari” - «Axborot va telekommunikatsiya texnologiyalari muommolari» , Respublika ilmiy-texnik konfrensiyasi – Toshkent, 2016. – 68 b.

3. Zoxirov K.R., “Call-sentrlarning rivojlanish bosqichlari” - “Fan, ta’lim va ishlab chiqarish integratsiyasini axborot telekommunikatsiya texnologiyalari asosida rivojlantirish istiqbollari” nomli Toshkent axborot texnologiyalari universiteti Qarshi filialida Respublika ilmiy-amaliy anjumani. – Qarshi, 2016. – 120 b.

Ю.А. Анিকেва, Е.И. Чигарина

ИССЛЕДОВАНИЕ ИСПОЛЬЗОВАНИЯ ФУНКЦИЙ ПРИНАДЛЕЖНОСТИ В БАЗАХ ДАННЫХ С НЕЧЕТКОЙ ЛОГИКОЙ

(Самарский университет)

В настоящее время базы данных являются неотъемлемой частью функционирования различных организаций и предприятий. Самая распространённая задача, которую решают приложения, работающие с базами данных – это поиск необходимых записей по заданному критерию. Зачастую, при выборке строк из базы данных, пользователь не всегда может точно указать параметры этой выборки. К примеру, при поиске товара в интернет-магазине бывает нелегко указать диапазон допустимых цен товара, ведь незначительное повышение цены вне указанных изначально значений может оказаться неважным, если качество товара существенно лучше предложений с более низкой ценой. Необходимость указания точных критериев при поиске в данном случае может привести к «утрате» товаров, потенциально подходящих покупателю.

Таким образом, возникает необходимость использования нечеткой логики при обращении к базе данных, что позволяет вести поиск по параметрам, имеющим нечеткие требования. Запросы в данном случае будут выглядеть как «компьютер с низкой ценой и средним объемом оперативной памяти», «внедо-