

Design and Implemented a Novel Method for the Freelancer Bids Ranking

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Abstract—Freelancer is open new opportunity nowadays and it's growing fast. Millions of peoples work in freelancer as part-time jobs with online platforms. When customers post a project in online sites, worldwide thousand of freelancer employers bid that project and project owner should select the best employer to their project. Freelancer online sites are basing the completed number of projects and reviews for bids ranking their employers. Some sites are using a built ranking system to rank their employers. The ranking system based on several parameters, but users can't see this ranking system and ranking parameters in online freelancer platforms. In this research is a suggested new effective and efficient bid ranking an algorithm for selecting the most suitable employer for the project among the bidders. The questionnaires are conducted to identify the suitable parameters to build bids ranking algorithm. A questionnaire collected 220 real freelancers' data and got result most of the users work in fiverr.com (122), freelancer.com (108) and upwork.com (52). After analysing the data selected the most suitable four parameters for the ranking algorithm. There were on time, number of completed projects, on budget and skills parameters...

The algorithm validated by using sample freelancer site with posted 100 of sample projects and checked accuracy of the novel bids ranking. As a result, a novel algorithm was performed 90% of success the bids ranking in with sample testing time. The freelancer customers always focus on time and budget in the project and better ranking system helps to select the best employers to projects among millions of workers.

Keywords— Freelancer Ranking, Online Labour, Bids Ranking

I. INTRODUCTION

A freelancer or freelance employee may be a term commonly used for an individual who is freelance and isn't essentially committed to a selected employer long-term. These marketplaces are growing fast and the freelancer annual earnings are expected to grow from \$1 billion in 2012 to \$10 billion by 2020 [5]. The hounded of the online platform are a facility to build a relationship between customers and project owners. The number of U.S. freelancers hit 57.3 million in 2017 and the thousands of

businesses around the world looking for new and creative ways to empower their extended workforce.

These are famous online freelancer platforms.

- Upwork.com as of March 2017, it reported 14 million users and 10.2 regular users in 180 countries with \$1B in annual freelancer billings.
- Freelancer.com (2009) is the largest markets with 33.2 million members (as of 2013) around the world.
- Fiverr.com

These sites registered millions of worldwide employers and customers. Even in developed countries, the numbers of workers in the online labour market have been increasing, in part because they are looking for the new opportunities for an additional salary or for being an independent contractor by quitting a regular job.

Consider Freelancer.com it registered millions of users worldwide. These site guideline guides to users to about rank system. Freelancer.com day to day manage millions of bids with each project contain bids list. The ranking algorithm consistency deliveries of high quality of work with 4 factors are used to rank their uses in bid ranking stage. The 4 factors are reviews and feedback, use of milestones, responsiveness, and quality of user profile. The reviews and feedback factor divided into 5 sub-parts. These five categories are quality, communication, expertise, professionalism and hire again.

A. Motivation

In freelancing for freelancer ranking there are use several algorithms to ranking. Users don't know the parameters that use to rank them. Form these algorithms newcomers not easy to come for the best ranking because of these ranking based on the user reviews, so in this research, it suggests to create new algorithm and base on the parameters user can come to increase their ranking following the parameters.

B. Research Objectives and Goals

- Use different parameters to ranking.
- Find the most suitable employees for a project and hire expert freelancers for any job, online.
- To get effective and efficient freelancer market.

II. METHODOLOGY

A. Identify the parameters to ranking

The primary objective of this study is identifying the suitable parameters for ranking. Some parameters are very important to select employers. Worldwide freelancer sites are using a different algorithm to rank their employers. They do not provide details to others for their ranking algorithm. This study first step is creating the questionnaire to identify to parameters to build a new algorithm. This questionnaire helps to collect data among real freelancing employers and projects owners. The most sites are a rank system based on the completed number of projects in the user.

B. Analyse the data set for identity to parameters

The project's successes are import to various kinds of parameters to fulfil. The first step is to collect data using a questionnaire. Thesis study uses Matlab to analyse to data set in the questionnaire and Matlab was a help to identify parameters important ordering.

III. RESULTS

This study is suggested new parameters to develop a new freelancer ranking algorithm. There are match skills point (MSP), completed project percentage (P), on budget and time value. This study selected 5 parameters to freelancers ranking.

A. Number of completed projects (n)

This study identifies the first parameters like a number of completed projects in the freelancer user.

The n represents the total completed projects value. New users have low n value and expert users can gain high value. This measurable is giving a numeric value for every user who is completed minimum one project.

Table 1. Completed number of projects example

User	n value	\sqrt{n} value
A	1	1.0000
B	5	2.2360
C	14	3.7417
D	267	16.3401
E	1640	40.4969
F	10000	100.0000

One project completed user the value of this parameter is 1.00 and some expert users finished thousand of projects.

The expert users get high value in these parameters. Ex: F user completed 10000 projects and he completed projects value is 100.00.

B. Match Skills Point (MSP)

Employers should fulfil the suitable skills for the success of projects. The various kinds of employers work as freelancers in the world and theirs as a verity of skills and knowledge. Match Skills Point (MSP) is a new introducing parameter in this research by using skills.

$$MSP = \frac{\text{Number of the employer has skills}}{\text{Number of skills need to the project}}$$

The MSP represents the users suitable or not for projects.

C. Completed Projects Percentage (P)

$$P = \frac{\text{Number of completed projects}}{\text{number of Bid won the project}}$$

Employers win many of projects with bids. P-value is representing the completed number of projects percentage. The project owners consider the percentage of the completed project before select employers to their project. Highly completed project percentage represents the user success in the projects.

D. On Budget (O_{bud})

This study considered some freelancer employer is finishing some projects within the budget or not. Some project finish under minimum budget than allocated budget. Its benefits go to the customers.

$$B_{dif} = B_{min} - B_{max}$$

$$B_{min} = \frac{\text{Completed projects under minimum budget}}{\text{number of total completed projects}} \times 100\%$$

$$B_{max} = \frac{\text{Completed projects under maximum budget}}{\text{number of total completed projects}} \times 100\%$$

When $B_{dif} \leq 0$; B_{dif} must be similar to 0

E. Time Value (tv)

Time is the most important facts among other facts. The time value is represented who have completed the projects in the allocated time. Some project allocate time is one day and some projects are allocated a few months. The project needs to estimate the time duration and effort for each task of the project. This is considered the selected

employer is the number of projects completed in the allocated time. This study isn't considered the time duration in the projects because time is depending on the projects.

T_{min} = Completed number of projects before the allocated time

T_{max} = Completed number of projects after the allocated time

$$T_{dif} = T_{min} - T_{max}$$

T_{max} minimum value is zero because some consider employer complete all projects are before the allocated time. Such as T_{min} minimum value is zero. T_{min} is represented the before completed number of projects allocated time.

However, T_{dif} value gets different value.

T_{dif} is acquiring the positive value: It is represented consider employer is most of the projects completed under-allocated time duration.

Now, $T_{dif} = T_{dif} + 10$; (These hypotheses suggest collect 10 for all positive T_{dif} values)

T_{dif} is acquiring the zero value: It is represented consider employer is completed the similar number of projects under-allocated time and after the allocated time.

This research get as $T_{dif} = 10$ when $T_{dif} = 0$,

T_{dif} is acquiring the value of the mine: It means the selected user fails complete projects under-allocated time duration. This research proposes T_{dif} the value must be converted to another value and it names is **Time Value (tv)**.

Time Value (tv) = (+)log₁₀ T_{dif} ; If $T_{dif} > 0$ or $T_{dif} = 0$;

Time Value (tv) = (-)log₁₀ (- T_{dif}) ; If $T_{dif} < 0$

$$F_{RP} = MSP (\sqrt{n} \cdot P + \frac{1}{4} B_{dif} \cdot tv)$$

F_{RP} = Freelancer employer Ranking Point

MSP = Match Skills Point

n = Number of completed projects

P = Completed Projects Percentage

$$B_{dif} = B_{min} - B_{max}$$

tv = Time value

Enterprises, workers, and customers all benefit from a transparent system that values and promotes integrity. Today freelancer represents 35% of the US workforce and 16.1% represent the European Union

Figure 1. Final formula for ranking bids

A parameter study was how to find a new unsupervised algorithm for freelancer employee ranking by using different parameters. Also, it is selected some important parameters to rank, like as a number of completed projects, Project Match Skills, Completed Project Percentage, well on budget and time. Match Skills Point (MSP) is zero it represents the consider freelancer employees don't have suitable skills for the project. Some freelancer employer get Max Value for **MSP** (max value = 1.0). It describes an employer is 100% suitable for the project.

The project needs to estimate the time duration and effort for each task of the project. This research is considered the selected employer is the number of projects completed in the allocated time. This study isn't considered the time duration in the projects because time is depending on the projects. T_{max} minimum value is zero because some consider employer complete all projects are before the allocated time.

T_{min} is represented the before completed number of projects allocated time. Employees after bids a project this suggest novel algorithm run the site backend automatically and will select the best 50 bids in among the bids. All freelancer sites are considering the employee's skills to select the best employer for the project. The employer must have to fulfil all skills to grant the project. It helps to complete the project with success. This study proposes an unsupervised algorithm for employees ranking in freelancer sites. The proposed algorithm automatically runs in the freelancer site backend. Algorithm ranking is a technique that helps to select the best one among all dataset. In this study used training dataset and testing dataset for train novel freelancer ranking algorithm. Both training and testing study obtained more than 90% accuracy of the novel algorithm.

A. Results of the survey

This research first step has created a questionnaire to collect real freelancers' data. The questionnaire collects 220 real freelancers' data. The Research build algorithm by using this real freelancers data. Users are given to a category of parameters as importance.

This research sample randomly selects those 220 freelancers and project owners for identifying parameters by using a questionnaire.

Table 2. Users answer summary

Q.	answers summary			
	Question	Yes	No Idea	No/Don't need
1	Are you satisfied to work with a freelancer?	45.5%	40.9%	13.6%
2	Are you satisfied with the bid raking system in above online freelancer platforms?	45.5% (99)	50% (111)	4.5% (10)
3	Do you have any idea about the ranking system used on this site?	22.7% (51)	59.1% (129)	18.2% (40)
4	A Better employees ranking system is helpful for customers and employers.	72.7% (161)	4.5% (9)	22.8% (50)
5	Do you know that freelancing sites are using a number of parameters (facts) to rank their employers in the bids?	59.1% (122)	-	40.9% (98)

The freelancers and project owners work with different of an online platform that represents the questionnaire collected data summary.

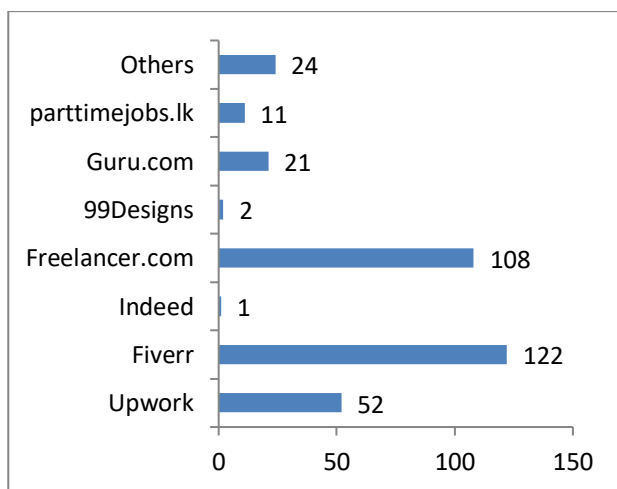


Figure 2. Freelancer online platform

Most users work with fiverr.com. The second freelancer.com as work with 108 users in all of 220 all users. They represent Fiverr 55.45%, Freelancer.com 49.09%, and Upwork.com 23.63%, Guru.com 9.54%, Parttimejobs.lk 5.0%, 99Designs.com 0.9% and others are represent 10.9%.

The questionnaire suggests parameters to the user for ordering as they are important to bids ranking. Questionnaire suggests parameters as On-Time, Number of all completed projects, On Budget, Reviews and Feedback, Skills, Exams, and Membership. Exams use for check freelancer employers skills. Users must create the order of the parameters to this question by using English letters. A most important parameter to give letter A, the next is B and next C...

Table 3. Parameters ranking in questionnaire

Parameters	A	B	C	D	E	F	G
On time	187	11	1	12	9	-	-
Number of Completed projects	10	91	83	12	2	21	1
On Budget	11	79	80	22	20	7	1
Skills	2	18	17	113	53	4	13
Reviews and Feedback	9	1	35	44	78	39	14
Exams	1	2	3	16	40	132	26
Membership	-	18	1	1	18	17	165

The responses ranked in this order,

- A = 7, B = 6, C = 5, D = 4, E = 3, F = 2 and G = 1

Table 4. Parameters ranking result summary

Parameters	Calculation	Total	Avg
On time	$(7*187)+(6*11)+(5*1)+(4*12)+(3*9)+(2*0)+(1*0)$	1455	6.61
Number of Completed projects	$(7*10)+(6*91)+(5*83)+(4*12)+(3*2)+(2*21)+(1*1)$	1128	5.13
On Budget	$(7*11)+(6*79)+(5*80)+(4*22)+(3*20)+(2*7)+(1*1)$	1114	5.07
Skills	$(7*2)+(6*18)+(5*17)+(4*113)+(3*53)+(2*4)+(1*3)$	839	3.81
Reviews and Feedback	$(7*9)+(6*1)+(5*35)+(4*44)+(3*78)+(2*39)+(1*14)$	746	3.39

Exams	$(7*1)+(6*2)+(5*3)+(4*16)+(3*40)+(2*132)+(1*26)$	508	2.29
Membership	$(7*0)+(6*18)+(5*1)+(4*1)+(3*18)+(2*17)+(1*165)$	370	1.68

appearing probability in the single document [emeraldinsight]

V. CONCLUSION

Freelancer customers lose their time, cost and quality of the products. So it must have a better bid ranking unsupervised learning algorithm to rank the employees to give better service to the customers and a good chance for the freelancer employees. Nowadays freelancer sites only consider a number of completed projects for ranking. This study helps to select the best employees to do their projects. The future work planned is to use more parameters (Communication, User reviews, and Hour rate) to rank and occurrence of the increase in the accuracy of the freelancers ranking algorithm.

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Abbreviations and specific symbols

MSP – Match Skill Point

O_{bud} - On Budget

tv - Time Value

B_{dif} - Budget difference

F_{RP} -Freelancer Ranking Point

B_{min} - Budget minimum

B_{max} - Budget maximum

T_{dif} - Time difference

T_{min} - Time minimum

T_{max} - Time maximum

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