An Evaluation of Optimum Automated Scheme Framework for Requirement Prioritization with Amplified Quantity of Requirements and Stakeholders

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ABSTRACT

Requirement Engineering is indeed a substantial phase in development life cycle of software. Creation of software and the role it has to perform in the actual environment is entirely grounded on the requirements elicited for the project [6]. In this paper, we evaluate the proposed framework with large number of requirements and stakeholders to prioritize the requirements. The proposed framework OAS(Optimum Automated Scheme) uses only AHP(Analytical Hierarchical Process), bearing in mind only the exactness of result for Large Size Application. Hence this work principally focused on applying AHP for grander projects. The proposed framework has been assessed through an experimental case study that has fixed number of requirements and it produces the status of the module and the requirements in the priority list. Hence this work is to identify the certainty of the designed framework with large number of requirements and stakeholders.

Key Words: AHP, Module, Prioritization, Stakeholders, comparisons, priority.

1. INTRODUCTION

SDLC (Software Development Life Cycle) has six stages which contains requirement phase, system description, system strategy, programming and coding, testing and maintenance. Among these phases of software progress, requirement engineering i.e. the first phase is considered as most vital phase because the victorious completion of the software system with productivity, usability, consistency, aptness and maintainability mainly rest on this phase [1].

The key intention of any software firm is to satisfy the stakeholder's demand. Only then, they can be able to survive in the competition. Hence, the requirement phase is measured as primary and the important phase in SDLC and it is complex too [2].

Since all the collected requirements cannot be developed and delivered in a sole delivery, prioritizing the requirements to find out the requirement that has to be developed for each and every release of the software system is very important. After prioritization process, the developers are able to know, which requirement is vital for the users that has to be established and distributed for the next iteration.

Also, from the review, it is found out that requirement prioritization shortens the development cost of the software system and duration of development by forty percentage [5]. This prioritization process which also includes the module prioritization increases the excellence of a software. Hence this requirement prioritization is very important process in SDLC.

In developing the software which has very less requirement and one or few modules, it is very simple to frame the priority list of the requirements and the module. But when the software has large number of requirements, then it is very complex to prepare the priority list. Selecting the module having high importance is imperative to gain satisfied and successful performance of the company [4]. Hence, the frame work to make the priority list grounded on stakeholder's view is created only with AHP.

In this work, the proposed framework OAS (designed with AHP) and another notable method Simple Ranking (SR) were selected for the study and the result obtained by both the methods were compared to find the

reliability of the proposed framework. Number of comparisons required to prepare the priority list in OAS is also compared with AHP to find the convenience of using the framework OAS in requirement prioritization.

2. RELATED WORK

1. AHP gives better result but limited to scalability [6]. Because every couple of requirement has to be compared.
2. Allocating requirement for a group is one of the main objectives [7]. Tool support is required. Framework has to be developed to report scalability problem.
3. Assorted views of stakeholders make it very problematic to recognize the priority of the requirement [5]. If the resources are inadequate, again it will be a difficulty. AHP is consistent. But it is not possible with huge number of requirements.
4. Upgrading is required in the existing method [8]. Some of the limits that has to be considered is scalability, ease of use, number of modules and reliability of results. Computerized requirement prioritization system should be implemented for effectual prioritization procedure.
5. More number of comparisons has to be performed with the method [9]. AHP can handle both qualitative and measurable statistics.
6. With Simple ranking by Bernades & Halton and Andrews [3], all the n requirements are simply graded from 1 to n. Most chief requirement starts with 1 and stops with the least requirement with n. This effortless method is based on ordinal measure.

3. ANALYTICAL HIERARCHICAL PROCESS

In AHP, comparison of all the probable pairs of requirements to derive well-organized list of the requirements according to their value. Usually, the values one, three, five, seven and nine is used, where 1 signifies alike importance and 9 denotes greatly high importance. The result will be a set of requirements ranked along a measure. During the progress, if t number of requirements are gathered, $t\times(t-1)/2$ comparisons has to be done, which for the application with enormous number of requirements results in scuffle. The AHP associates multidimensional rulers of measurement into a one-dimensional scale of significances. AHP is highly honest, since the great level of redundancy in the pair wise comparisons makes the progression resistant to assessment errors. Another advantage is the fact that the values assigned in the pair wise comparisons are based on awareness, observation and actual data. Thus, AHP can handle both the qualitative and the quantitative sides of a decision problem. Finally, the section that the resulting priorities are related and based on a scale, records useful valuation of the requirements. The produced value f_{ij} is inserted in the equivalent cell of the matrix (f_i,f_j), while the cell (f_j,f_i) is occupied with the reciprocal of the value i.e. $f_{ji}= 1/f_{ij}$

Hence AHP method is acceptable with multi conditions decision making. The process of AHP are as follows:

a. Listing of the criteria
b. Pair wise calculation of criteria for relative importance
c. Construction of normalized evaluation matrix
d. Computation of AHP score (priority) for all criteria

The ratters are allowed to fill only the cells in the right half above the diagonal in the matrix. If the module/requirement in row are important than column, then the integer value has to be given. Otherwise, decimal value has to be given as given in the Table (1).

Table 1 Values to fill the cells in the AHP sheet

Criteria	**Row wise important**	**Column wise important**
Equally used	1	1

Moderately Frequent	3	0.33
Strongly Frequent	5	0.2
Very Strongly Frequent	7	0.14
Extremely Frequent	9	0.11

The stakeholders are allowed to fill the cells only in the right half above the diagonal. The cells below the diagonal will be automatically filled based on the value given for the respective cells.

4. SIMPLE RANKING METHOD

All the criteria are simply ranked without any assessments. When there are i number of criteria, then most important criteria starts with 1 and ends with the least criteria with i. This effortless technique is grounded on ordinal scale. This technique is very easy to make prioritized list. This method will also be very convenient if the number of requirements are minimum. Because the stakeholders have to analyse all the requirements before ranking it. If it is a quite large in number, then it will be difficult to the stakeholders to rate the requirements.

5. PROPOSED FRAMEWORK

The framework is proposed in the previous work to find the priority of the requirements. This new framework implements only AHP in all its phases to find the priority among the requirements. Because of the exactness of the result produced the method, the AHP charms more in prioritization. Accuracy is a vital parameter that has to be considered first. Others stand in the following. So, with this AHP, the framework is planned and designed to prepare the prioritized list of requirements. In this work, the parameters considered are number of modules, number of requirements, number of comparisons and the priority of the module and the requirements.

In the evaluation of the proposed framework [10], stakeholders that includes clients and users are included to find the priority list of modules and requirements based on importance and urgency. If the module ‘a’ is important than the other modules, in this case module ‘a’ will be given higher importance. Similarly, the priority of the modules will be calculated and then the requirements too. The framework proposed are given in the Fig (1).

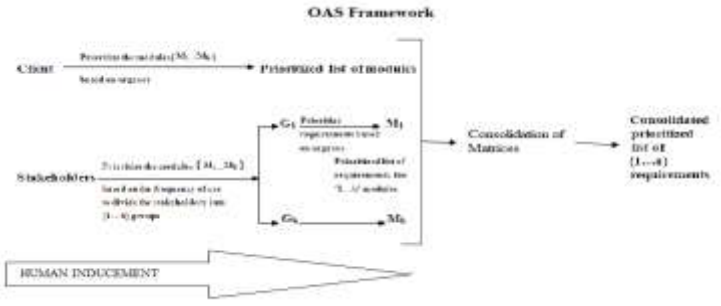


Figure 1 OAS Framework

6. EXPERIEMENT

A) Priority List and the Performance of OAS

In this study, the software taken has 7 modules. 124 stakeholders which includes clients and users were selected. Short training was provided to make the stakeholders familiar with the method.

In this evaluative work, the software taken is to design a website for a manufacturing company which has 7 modules and 51 requirements. 120 users were selected randomly which excludes 4 clients.

Clients: The modules matrix will be given to the clients to rate the modules based on urgency. Since 7 modules are in the project, 7*(7-1)/2=21 comparisons have to be made by each client. Here, 4 clients were considered. So, 4 (clients)* 21 (entries that has to be made by each client) =84 entries has to be made by the clients totally. The matrix given to the clients to rate the modules is given in the Table (2).

Table 2 Modules Rated by Clients

Modules	Basic informations-M1	Activities and Achievements-M2	Functions-M3	Dealers-M4	Students Support-M5	Contact-M6	Online sales-M7
BasicInformations-M1	1.00	9.00	9.00	9.00	9.00	9.00	9.00
Activities and Achievements-M2	0.11	1.00	7.00	0.33	7.00	0.11	9.00
Functions-M3	0.11	0.14	1.00	0.33	7.00	0.11	7.00
Dealers-M4	0.11	3.03	3.03	1.00	9.00	9.00	9.00
Students Support-M5	0.11	0.14	0.14	0.11	1.00	0.33	5.00
Contact-M6	0.11	9.09	9.09	0.11	3.03	1.00	9.00
Online sales-M7	0.11	0.11	0.14	0.11	0.20	0.11	1.00
Total	**1.67**	**22.52**	**29.41**	**10.99**	**36.23**	**19.66**	**49.00**

Then the matrix has to be normalized i.e. the value of cell 11 has to be divided by total value of column 1. Similarly, for all the cells as given in the table 3. Then the average column has to be calculated.

Table 3 Normalized form

Modules	M1	M2	M3	M4	M5	M6	M7	Total	Average
M1	0.60	0.40	0.31	0.82	0.25	0.46	0.18	3.01	**0.43**
M2	0.07	0.04	0.24	0.03	0.19	0.01	0.18	0.76	**0.11**
M3	0.07	0.01	0.03	0.03	0.19	0.01	0.14	0.48	**0.07**
M4	0.07	0.13	0.10	0.09	0.25	0.46	0.18	1.29	**0.18**
M5	0.07	0.01	0.00	0.01	0.03	0.02	0.10	0.23	**0.03**
M6	0.07	0.40	0.31	0.01	0.08	0.05	0.18	1.11	**0.16**
M7	0.07	0.00	0.00	0.01	0.01	0.01	0.02	0.12	**0.02**
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**7.00**	**1.00**

The matrix received from all the clients were normalized and the average column was selected as given in Table (4). This average column from all the clients were considered and the Priority column was derived as in Table (4).

Table 4 Consolidation of client's value – Priority of modules by clients

Module	Client1	Client2	Client3	Client4	Total	Priority
M1	0.431	0.415	0.434	0.410	1.690	0.422
M2	0.109	0.104	0.118	0.118	0.448	0.112
M3	0.068	0.070	0.071	0.072	0.281	0.070
M4	0.184	0.185	0.180	0.196	0.745	0.186

M5	0.033	0.031	0.031	0.031	0.126	0.031
M6	0.158	0.179	0.149	0.157	0.644	0.161
M7	0.017	0.017	0.017	0.017	0.067	0.017

Users: First all the 120 users were asked to fill the AHP sheet to rate the modules based on the frequency of usage. Since 7 modules were selected for this evaluative work, each user has to make x*(x-1)/2 entries i.e. 7*6/2=21 entries. The total comparisons made by the users to rate the module were y 120 * 21 = 2520. Sample AHP sheet with the values to rate the modules by the user is given in Table (5)

Table 5 Prioritization of modules by users

Modules	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**
M1	1.00	5.00	7.00	7.00	3.00	0.33	0.11
M2	0.20	1.00	7.00	0.33	7.00	0.11	0.11
M3	0.14	0.14	1.00	0.33	7.00	0.11	0.11
M4	0.14	3.03	3.03	1.00	9.00	9.00	0.33
M5	0.33	0.14	0.14	0.11	1.00	0.33	0.11
M6	3.03	9.09	9.09	0.11	3.03	1.00	0.20
M7	9.09	9.09	9.09	3.03	9.09	5.00	1.00
Total	**13.94**	**27.50**	**36.35**	**11.91**	**39.12**	**15.88**	**1.97**

After receiving the quantitative data by the user, the table is normalized (Table (6)).

Table 6 Normalised form

Modules	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**Total**	**Average**
M1	0.07	0.18	0.19	0.59	0.08	0.02	0.06	1.19	**0.17**
M2	0.01	0.04	0.19	0.03	0.18	0.01	0.06	0.51	**0.07**
M3	0.01	0.01	0.03	0.03	0.18	0.01	0.06	0.31	**0.04**
M4	0.01	0.11	0.08	0.08	0.23	0.57	0.17	1.25	**0.18**
M5	0.02	0.01	0.00	0.01	0.03	0.02	0.06	0.14	**0.02**
M6	0.22	0.33	0.25	0.01	0.08	0.06	0.10	1.05	**0.15**
M7	0.65	0.33	0.25	0.25	0.23	0.31	0.51	2.54	**0.36**
Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**7.00**	**1.00**

In the same way, data were received from all 120 users. And all 120 matrices are normalized and average column for all 120 matrices were derived. After this step, the 'average' attribute for the rows M1, M2, M3, M4, M5, M6 and M7 were selected from all 120 matrices (Table (7))

Table 7 Average Attribute from the matrices done by users for the modules

Module/User	1	2	3	4	5	6	…	120
1	0.430607	0.385493	0.4308	0.43209	0.429578	0.415979		0.169576
2	0.108801	0.114913	0.109566	0.104177	0.101907	0.099333		0.073237
3	0.068385	0.072266	0.068535	0.069599	0.067329	0.064755		0.044621
4	0.183584	0.149375	0.183777	0.185121	0.175824	0.179991		0.178866
5	0.033486	0.019304	0.019687	0.019735	0.017706	0.016468		0.020649
6	0.158258	0.166783	0.160157	0.161446	0.18073	0.180831		0.149903

7	0.016878	0.091866	0.027479	0.027832	0.026927	0.042642		0.363147
Total	1	1	1	1	1	1		1

Users those who marked with M1 higher is clustered in to one group. Similarly, from M2 to M7. Then for each clustered group, the differences between the module which is having higher value with the other modules are found (Table (8)). For e.g. The first cluster has M1 value higher. In the next step, the difference between M1 and M2 was found, then M1 and M3, till M1 and M7. The differences denote how regular the user is using the first module than the another one. More difference denotes, higher the usage of first module.

Table 8 Clustering of Users

	M1	…	M7	M1,M2	…	M1,M7
U1	0.430607		0.016878	0.321806		0.413729
U2	0.385493		0.091866	0.27058		0.293627
U3	0.4308		0.027479	0.321234		0.40332
U4	0.43209		0.027832	0.327912		0.404258
U5	0.429578		0.026927	0.327671		0.402651
…						
U24	0.415979		0.042642	0.316645		0.373337
TOTAL				7.543397		9.16369

Then the difference column with the higher value is carefully chosen. The selected column along with the user column is created as a separate table. The records are sorted based on the difference value from higher to lower. This sorts from the more frequent users to less frequent users. The median for the difference column (m1, m7) was derived. Then the users from the first quartile above the median from that cluster is nominated to rate the requirements of the respective module. In this case, for the first module, 12 users were above the median, hence 3 users were selected to rate the requirements of the module. For all the other modules, 16 users for m2, 15 users for m3, 16 users for m4, 14 users for m5, 16 users for m6 and 16 users for m7 were clustered. 2 users were selected for all those modules respectively based on the criteria first quartile above the median. Then those users were allotted with the requirements of the respective modules. They have to rate them through AHP. Again, the matrices received from those selected users were normalized and the average column will be considered.

Priority list through OAS

To obtain the final priority value of the requirements, the average column obtained from user's rating for requirements were multiplied with the priority column rated by clients for modules (Table (9)). The result obtained is the priority value of the requirements obtained through the framework OAS.

Table 9 Priority of requirements

Module		**User1**	**User2**	**User3**	**Total**	**User's Priority (Average)**	**Client's Priority**	**Priority of Requirements**
1	1	0.291607	0.284907	0.291607	0.868121	0.289374	0.422454	0.122247
	2	0.140823	0.142096	0.140823	0.423741	0.141247	0.422454	0.05967
	3	0.180909	0.184913	0.180909	0.54673	0.182243	0.422454	0.07699
	4	0.073409	0.072884	0.073409	0.219701	0.073234	0.422454	0.030938
	5	0.019961	0.019952	0.019961	0.059873	0.019958	0.422454	0.008431
	6	0.070061	0.069539	0.070061	0.209661	0.069887	0.422454	0.029524
	7	0.053179	0.052654	0.053179	0.159011	0.053004	0.422454	0.022392
	8	0.036501	0.035995	0.036501	0.108996	0.036332	0.422454	0.015349

	9	0.019964	0.019784	0.019964	0.059712	0.019904	0.422454	0.008408
	10	0.098596	0.098069	0.098596	0.295261	0.09842	0.422454	0.041578
	11	0.014992	0.019209	0.014992	0.049194	0.016398	0.422454	0.006927
2	12	0.324178	0.320791		0.644969	0.322485	0.112	0.036118
	13	0.131275	0.132412		0.263687	0.131843	0.112	0.014767
	14	0.193664	0.194968		0.388632	0.194316	0.112	0.021763
	15	0.10129	0.102274		0.203564	0.101782	0.112	0.0114
	16	0.084031	0.085015		0.169047	0.084523	0.112	0.009467
	17	0.039943	0.040777		0.08072	0.04036	0.112	0.00452
	18	0.058473	0.055186		0.113659	0.056829	0.112	0.006365
	19	0.021501	0.021438		0.042939	0.02147	0.112	0.002405
	20	0.010112	0.010045		0.020157	0.010079	0.112	0.001129
	21	0.035532	0.037095		0.072626	0.036313	0.112	0.004067
3	22	0.416441	0.408362		0.824803	0.412402	0.070278	0.028983
	23	0.152735	0.157747		0.310482	0.155241	0.070278	0.01091
	24	0.065903	0.060595		0.126499	0.063249	0.070278	0.004445
	25	0.016794	0.016719		0.033513	0.016756	0.070278	0.001178
	26	0.222835	0.226958		0.449793	0.224897	0.070278	0.015805
	27	0.082847	0.08702		0.169867	0.084933	0.070278	0.005969
	28	0.042444	0.0426		0.085044	0.042522	0.070278	0.002988
4	29	0.518977	0.518977		1.037954	0.518977	0.186146	0.096605
	30	0.241061	0.241061		0.482123	0.241061	0.186146	0.044873
	31	0.14062	0.14062		0.28124	0.14062	0.186146	0.026176
	32	0.074454	0.074454		0.148909	0.074454	0.186146	0.013859
	33	0.024887	0.024887		0.049774	0.024887	0.186146	0.004633
5	34	0.242973	0.273425		0.516397	0.258199	0.031445	0.008119
	35	0.606118	0.574764		1.180882	0.590441	0.031445	0.018567
	36	0.116983	0.117434		0.234417	0.117208	0.031445	0.003686
	37	0.033926	0.034378		0.068304	0.034152	0.031445	0.001074
6	38	0.218977	0.226196		0.445172	0.222586	0.160916	0.035818
	39	0.148547	0.155766		0.304314	0.152157	0.160916	0.024484
	40	0.10184	0.109059		0.210899	0.105449	0.160916	0.016968
	41	0.039076	0.039878		0.078954	0.039477	0.160916	0.006352
	42	0.069761	0.039922		0.109683	0.054841	0.160916	0.008825
	43	0.015683	0.015772		0.031456	0.015728	0.160916	0.002531
	44	0.406116	0.413407		0.819523	0.409761	0.160916	0.065937
7	45	0.404821	0.4066		0.811421	0.40571	0.01676	0.0068
	46	0.220359	0.222139		0.442499	0.221249	0.01676	0.003708
	47	0.149554	0.151334		0.300887	0.150444	0.01676	0.002521
	48	0.102687	0.104467		0.207154	0.103577	0.01676	0.001736
	49	0.067502	0.069281		0.136783	0.068392	0.01676	0.001146
	50	0.039305	0.029928		0.069234	0.034617	0.01676	0.00058
	51	0.015772	0.01625		0.032022	0.016011	0.01676	0.000268

The requirement column and the priority column from the above table are selected and sorted based on the priority value from higher to lower (Table (10)).

Table 10 Sorted Priority List

Requirement	1	29	3	44	2	30	10	12	38	4	6	22
Priority by OAS	0.122	0.097	0.077	0.066	0.060	0.045	0.042	0.036	0.036	0.031	0.030	0.029

31	39	7	14	35	40	26	8	13	32	15	23
0.026	0.024	0.022	0.022	0.019	0.017	0.016	0.015	0.015	0.014	0.011	0.011

16	42	5	9	34	11	45	18	41	27	33	17
0.009	0.009	0.008	0.0008	0.008	0.007	0.007	0.006	0.006	0.006	0.005	0.005

24	21	46	36	28	43	47	19	48	25	49	20
0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.002	0.002	0.001	0.001	0.001

37	50	51
0.001	0.001	0.000

Number of comparisons required through OAS and AHP

i. OAS :

Clients : 4 clients * 21 entries =84 comparisons

Users: 120 users * 21 entries = 2520 comparisons

M1: 3 users * ((11*11-1)/2 =55

M2: 2 users * ((10*10-1)/2)=45

M3: 2 users*((7*7-1)/2)=21

M4: 2 users*((5*5-1)/2)=10

M5: 2 users*((4*4-1)/2)=6

M6: 2 users*((7*7-1)/2)=21

M7: 2 users*((7*7-1)/2)=21

Totally **2783** comparisons

ii. AHP

If it is through AHP, for 51 requirements each and every user has to make 51*(51-1)/2 comparisons i.e. 1275 comparisons, which is not possible. If one fourth of the stakeholders from 120 are selected, then 30 stakeholders has to be involved. So totally 30 * 1275= **38250** comparisons, which is enormous.

B) Priority List Through Simple Ranking

To evaluate the reality of result obtained through OAS, another well-known method, SR is selected. Since it is very difficult to deal with large number of requirements and stakeholders in the prioritization process, to prioritize through this SR method 30(one fourth of 120) which includes clients and stakeholders were randomly selected and the modules were given to them for prioritization.

The ranks were assigned by the stakeholders based on their importance. The values are collected and consolidated (Table (11)). According to the rank given by the stakeholders, the values are consolidated and the priority among the modules were derived.

Table 11 Prioritization of modules through SR

Modules\SH	1	2	3	4	5	…	30	Total
M1	1	1	1	1	1		1	30
M2	4	5	4	4	3		3	120
M3	5	4	5	5	5		5	144
M4	2	3	2	2	4		4	78
M5	6	6	7	6	6		6	186
M6	3	2	3	3	2		2	78
M7	7	7	6	7	7		7	204

To evaluate the priority list generated for requirements through OAS, since it is difficult to deal with all the requirements, the requirements from the modules which obtain first two ranks were selected i.e. module 1 and 4. The priority value given by 30 stakeholders for the requirements and its consolidated value is given in Table (12).

Table 12 Priority of requirements

		SH1	**SH2**	**SH3**	**SH4**	**….**	**SH30**	**Total**
M1	1	1	1	1	1		1	30
	2	4	4	3	4		3	108
	3	3	3	6	2		4	108
	4	7	9	10	7		7	240
	5	13	10	9	13		13	348
	6	8	11	12	8		8	282
	7	10	12	8	10		10	300
	8	11	6	13	11		11	312
	9	14	13	2	14		14	342
	10	6	7	4	6		6	174
	11	15	16	14	15		15	450
M4	29	2	2	5	3		2	84
	30	5	5	7	5		5	162
	31	9	8	11	9		9	276
	32	12	14	15	12		12	390
	33	16	15	16	16		16	474

7. COMPARISON OF THE RESULTS

I. PRIORITY LIST OF MODULES

There is 100% similarity in the priority list of modules generated through OAS and SR. The priority list by both is given in Table (14).

Table 14 Priority of modules generated through OAS and SR

Modules	OAS	SR
M1	0.42	30
M4	0.19	78
M6	0.16	78
M2	0.11	120
M3	0.07	144
M5	0.03	186
M7	0.02	204

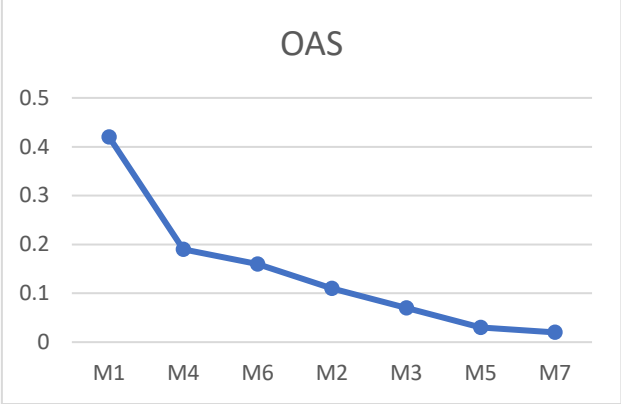


Figure 2 Graphical representation of Priority of modules through OAS

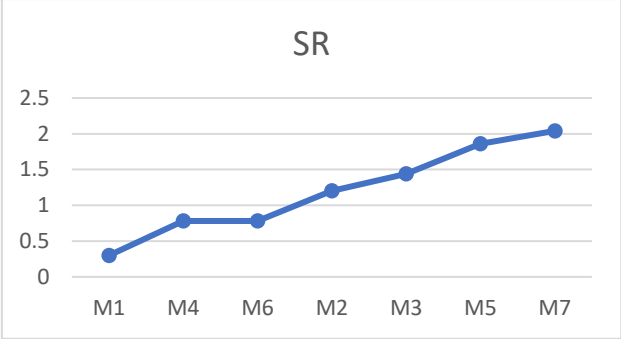


Figure 3 Graphical representation of Priority of modules through SR

II. PRIORITY LIST OF REQUIREMENTS

Since it is difficult to use even SR for large number of requirements, the requirements from first module and the fourth module is selected for the comparison. The priority list obtained through OAS and SR is given in table 15.

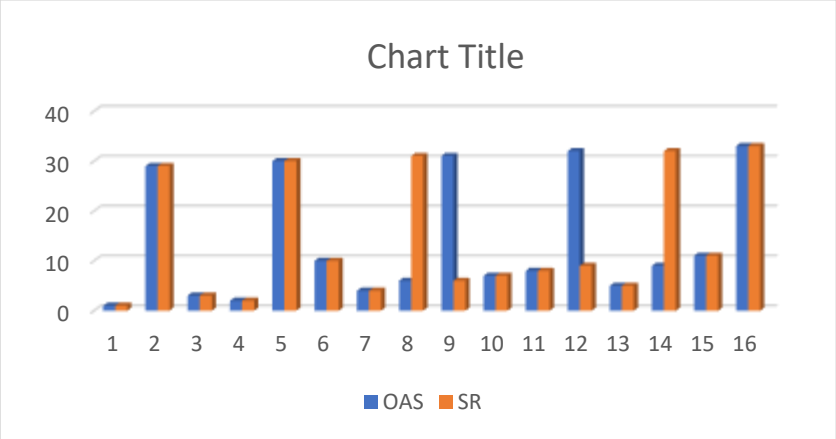
While comparing the priority list obtained through OAS and SR (Table (15)), out of 16 requirements, 12 are in the similar sequence which shows 75% of the result are same.

Table 15 Priority list

Priority	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
OAS(Req ID)	1	29	3	2	30	10	4	6	31	7	8	32	5	9	11	33
SR(Req ID)	1	29	3	2	30	10	4	31	6	7	8	9	5	32	11	33

The comparison is given in figure 4 which shows that there is a difference in 8th, 9th, 12th and 14th requirement.

Figure 4 Comparison of the priority value obtained through OAS and SR



8. CONCLUSION AND FUTURE WORK

This evaluation was to prove that the proposed framework is apt to prepare the priority list of the requirements for large scale projects. It is proved through an experiment that there is a drastic decrease in the number of comparison while using OAS when compared to AHP. And there is 75% similarity in the result obtained through OAS and SR. Hence the framework results in producing the correct priority list of requirements with the compact number of comparison of requirements, compact number of user involvement, which is suitable for large scale software development.

Further, as an enhancement of OAS framework, technical team can also be included in prioritization process. They can prioritize considering cohesion in the modules and coupling between the modules. The framework can be improved with the technical team.

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