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# Intelligent Process and Model Applied for E-Learning Systems

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***Abstract*—**E-learning is a developing area especially in education. E-learning can provide several benefits to learners. An intelligent system to collect all components satisfying user preferences is so important. This research presents an approach that it capable to personalize e-information and give the user their needs following their preferences. This proposal can make some knowledge after more evaluations made by the user. In addition, it can learn from the habit from the user. Finally, we show a walk-through to prove how intelligent process work.

***Keywords*—**Artificial intelligence, architecture, e-learning, software engineering, processing.

## I. Introduction

E-LEARNING is the common area to give education and it is rapidly developed [5]. E-learning is defined in [7] as technology-based learning in which learning materials are delivered electronically to remote learners via computer. There are serval definitions for e-learning in the literature. Higher education is moving now to use technology to deliver online courses and decrease traditional learning [5]. It has suggested that e learning is tools to support lifelong learning. E-learning is presented as an explanation to lifelong learning [6].

E-learning can provide many advantages to learners [11]. one of these advantage is that e-learning system can help disable people who have special need to study from their home. In addition, people who have family commitment [3]. E-learning is so important for them to continue their learning [3]-[13]. Furthermore, Students and learners could study course parts at anytime and anywhere, contrasting to traditional learning environments.

The technology for e-learning has been used in more domains and research work for creating new architecture for e-learning [2]. Existing e-learning architecture use several technologies and raise from the limitations of the learning traditional [1]- [4].

Current e-learning platforms are developed to compensate for the disadvantages of traditional education methods and using several technologies. The first architecture of e-learning is presented by Wilson on 2005 [12].

Wilson called its architecture “the future of VLE”. This architecture is general architecture; the updated version for the proposal is presented in [13]. It is an alternative proposal pattern for educational systems that emphasizes symmetric connections with a range of services [8].

Thus, from e learning architecture, it is important to add an intelligent process.

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## II. Expert E-Learning System

### A. Intelligent Process

This section presents an intelligent process for e-learning system that has ability to make recommendation for the user. The e-learning model is automatically generating the approximate solution to satisfy user requirements.

The proposal model has ability to personalize e-information and give the user it; need. Therefore, this research has focused on explain the process of intelligent system and details functionality of Intelligent model with example.

The intelligent process can have knowledge after previous evaluations. This process can approach the preferences of user. The result from this should deliver to the user, to satisfy it need.

Let:

- *n:* is the number of all variables.
- *X:* is the number of variables chosen
- *Y:* variable chosen
- *K(Y):* output of database knowledge component. This function returns Boolean value.

The intelligent process will have an apprenticeship after application of several iterative searches. It can send an auto evaluation (score) of e-resource to user to help them to make decision for the e-resource.

There are two main functions for intelligent components. The first one is that it has ability to give an estimate e-recourse for users. The intelligent process can podcast e-recourse for the user, based on the behaviors and received information. The second role is to fund some knowledges after user evaluations. More details about intelligent process are given in Fig. 1.

The intelligent component (IC) described in [9] is devised into six primary sub components:

- Variable chooser
- Ranker
- DB-Knowledge
- Function
- User ponderation
- Value affectation

The description of each of these sub components is the following:

- ***Variable chooser:*** This sub component has the role to select the variable which we need to evaluate their value. The choice of variable can be done randomly. So, it does not oblige to choose variable in order sorting.
- ***Ranker:*** The main function of this sub component is to give rank for the variable chosen. This rank can be affected

by user or can be transferred to "DB-Knowledge" to try searching of ranked method in history.

- ***DB-Knowledge:*** Saving history of preferences of user and their choice in several times is important to facility research in future. This sub component restores of some history values.
- ***Function:*** This sub component connected with "Ranker" and "DB- Knowledge". So, if there is new information and we cannot find this information in "DB- Knowledge", user must make intervention to give value in "user ponderation" sub component. Otherwise, the function will calculate values and send result to "value affectation".
- ***User ponderation:*** This represents the space where user can make intervention. User gives value of variable if it is new information and not registered and stored in DB-Knowledge.
- ***Value affectation:*** The chosen variable has a value and sorted to be used for modeling.

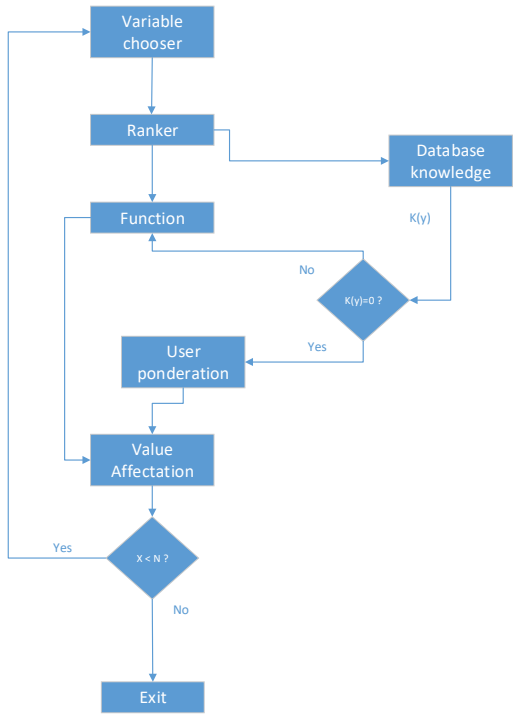


Fig. 1 Intelligent process

### B. Intelligent Model

The value generated by IC can varied from 0 to 100. The evaluation of values is giving by user by using rank. The rank varied between 1 and 5:

- 1: Bad
- 2: Acceptable
- 3: Good
- 4: Interest
- 5: very interest

To calculate score, it is important to define the following variables. We consider the following variables:

- *d*: Domain of work or research.
- *s*: Subject of research.
- k: Keywords proposed by user
- r: References
- *ki:* Kind of suitable e-resource
- *nb*: Number of pages.
- *Au*: Authors
- *P:* Provider.

TABLE I
SCORE VALUE AFFECTATION AND RANK

| Scores | Ranks |
|---|---|
| [00-25] | 1 |
| [26-54] | 2 |
| [55-70] | 3 |
| [71-85] | 4 |
| [86-100] | 5 |

Now we have 8 variables: *d, s, k, r, ki, nb, Au and P*. The user gives rank to each variable. After that the IC process will be applicate to give the value of each variable. In case which we give the maximum rank for all variables, we should assign 100 for all variables. Thus, we have the total of 800. We calculate the score as following:

$$Score = [(d + s + k + r + ki + nb + Au + P)/800] * 100$$

Now, the evaluation of founded score is based in the relative ranking table.

**Example:** Suppose that the following ranked variables:d: 5, s: 4, k: 5, r: 3, ki: 2, nb: 4, Au: 3, P: 5. After application of IC process, the variables value given by:d: 88, s: 74, k: 99, r: 58, ki: 30, nb: 77, Au: 63, P: 95;

$$Score = [(88 + 74 + 99 + 58 + 30 + 77 + 63 + 95)/800] * 100 = 73$$

Reference to table 1, the calculated score gives us the rank 4. Thus, the result search is interest. The IC will generate the score automatically based on data base knowledge.

### C. Walk-through of the Intelligent Process

In this section, we explain the several phases of intelligent process. The intelligent process requires several phases to complete modeling;

- Choosing variable
- Ranking
- Testing rank
- Ponderation
- Affectation and testing

Phase 1: Choosing variable: In this phase "variable chooser", the user of the system must fixe their first preference for searching. The first step of the intelligent process is to set up preferences search by choosing one from the following lists:

- Domain of work or research.
- Subject of research.
- Keywords proposed by user
- References.
- Kind of suitable e-resource

- Number of pages.
- Authors
- Provider.

After chose of preference, a rank must be affected to variable represent this preference as it shows in Fig. 2. This rank represents the satisfaction of user.

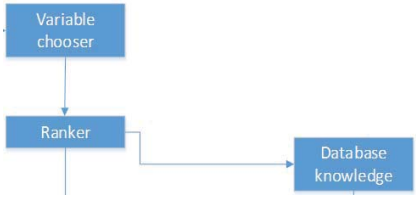


Fig. 2 Choose of variable and contact Database knowledge

Phase 2: Ranking: In Phase 2, the preference is fixed and the variable is known. For ranking, two cases have occurred:

- Transferred the order to give rank to chosen variable to the "database knowledge" to verify the history of previous ranking of the chosen preference for this search. In this case the rank can be found in history because the user rank the same preference and result in previous situation and date.
- In this case, the user can give a rank manually. After that this rank must be send directly to "Function" component to calculate the value of the variable.

Phase 2 is presented in Fig. 3 below.

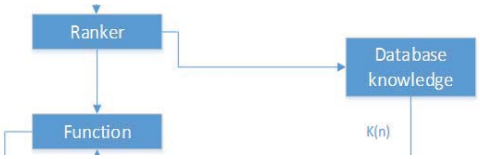


Fig. 3 Ranking

Phase 3: Testing rank: In phase 3, the value returned by the function *k(Y)* will be tested. So, two cases can appear:

***Case 1:*** If *k(Y) =0* then the variable is not saved in database knowledge and it necessary to have value. In this case, the user can give directly the value which consist his evaluation if he does not give a rank in phase 2 (case 2).

***Case 2:*** If *k(Y) =1* then the variable is saved in database knowledge. Thus, the rank found in the database will returned to the component "Function". Phase 3 is shown in Fig. 4 below.

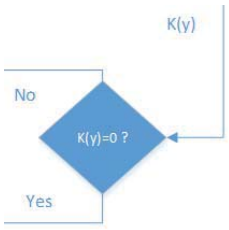


Fig. 4 Test of previous ranking

Phase 4: Ponderation: After confirmation that the ranking variable is not exist in database KB, next stage is phase 4 where the user of the system can give ponderation of this variable, Fig. 5 shows this phase.

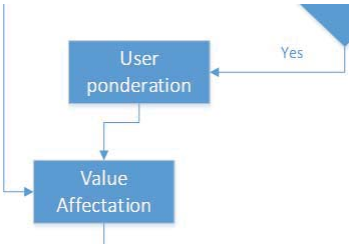


Fig. 5 Ponderation

Phase 5: Affectation and testing: After ponderation, the value of the corresponding variable will be calculated and tested finish variables.

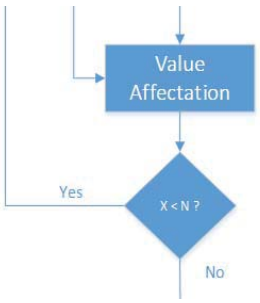


Fig. 6 Affectation and testing

In the testing, if number of variables chosen in process is less than the total of variable, looping to the chooser variable component to repeat the same procedure to the next one. All variables must be processed to construct model.

## III. Conclusion

In this paper, we proposed an intelligent component process and an intelligent component model. This research has proposed intelligent system built into the architecture proposed by [9]. The goal for this work is enhance intelligent component to be more intelligent and more. We expect that some of the ideas that have been developed in this paper would be used by different methods, but this would require more development. Finally, walk-through has been presented that show how intelligent process work. E learning is still an active area, as there many ideas can achieve to decrease the e-information to the user.

## Acknowledgment

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