

TRANSACTIONS ON MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

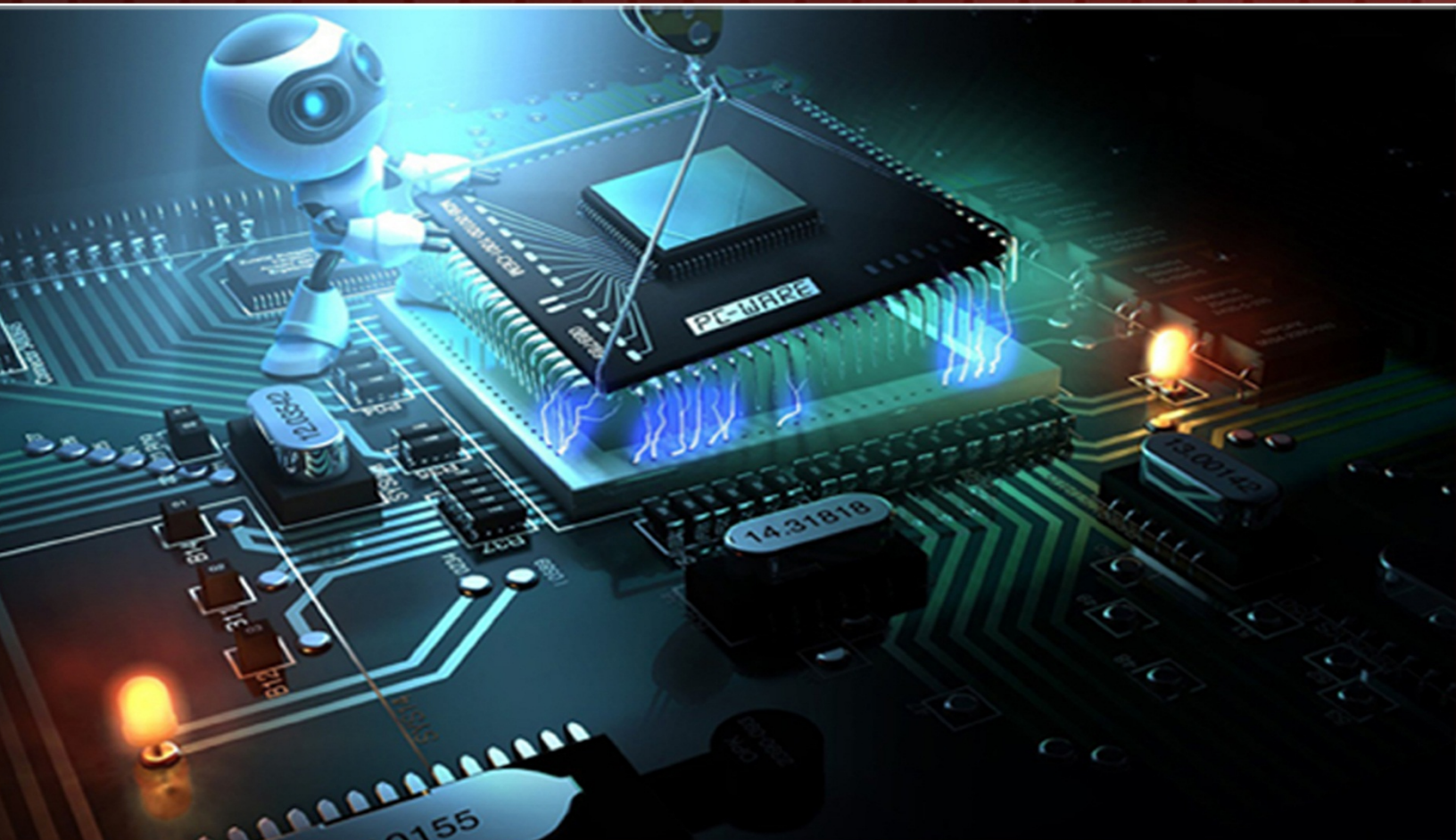


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Image Category Recognition using Bag of Visual Words Representation

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ABSTRACT

Image category recognition is one of the challenging tasks due to difference in image background, illumination, scale, clutter, rotation, etc. Bag-of-Visual-Words (BoVW) model is considered as the standard approach for image categorization. The performance of the BoVW is mainly depend on local features extracted from images. In this paper, a novel BoVW representation approach utilizing Compressed Local Retinal Features (CLRF) for image categorization is proposed. The CLRF uses interest point regions from images and transform them to log polar form. Then two dimensional Discrete Wavelet Transformation (2D DWT) is applied to compress the log polar form and the resultant are considered as features for the interest regions. These features are further used to build a visual vocabulary using k-means clustering algorithm. Then this visual vocabulary is used to form a histogram representation of each image where the images are further classified using Support Vector Machines (SVM) classifier. The performance of the proposed BoVW framework is evaluated using SIMPLicity and butterflies datasets. The experimental results show that the proposed BoVW approach that uses CLRF is very competitive to the state-of-the-art methods.

Keywords: Bag-of-visual-words; Object recognition; Local image features; Interest point detector; Image descriptor.

1 Introduction

Image category recognition has become an important topic of research in the computer vision field. Classifying images is one of the challenging tasks due to large variations in terms of illumination, background, occlusion, clutter, size, etc. among images. The BoVW modeling [1, 2, 3] is a standard approach for image and object category recognition. This image representation technique is derived from the text representation approach called Bag-of-Words (BoW) [4]. The BoVW is very popular for image categorization because of its powerful local image region descriptors (feature vectors) [5] where these vector representations can be easily exploited for classification by using supervised learning techniques such as SVM [5].

The image categorization performance of BoVW modeling heavily depends on the local features extracted from images. Hence, the extraction of local features that are invariant to geometric and photometric changes is necessary. Use of local features such as Scale Invariant Feature Transform (SIFT) [6],

Compressed Local Retinal Features (CLRF) [7], Speeded up Robust Features (SURF) [8] and Multisupport Region Order-Based Gradient Histogram (MROGH) [9] can help to overcome from these challenges. Recently we proposed the CLRF descriptor [7] utilizing log polar transformation and two dimensional Discrete Wavelet Transformation (2D DWT) and proved that the CLRF is very competitive to the state-of-the-art descriptors.

In this paper, BoVW modeling using CLRF descriptor is proposed for image category recognition. In contrast to the previous methods [1, 3, 10, 11], the proposed approach uses CLRF descriptor [7] to build local features. The CLRF descriptor has some advantages over other descriptors. It uses log polar transformation (LPT) that sufficiently preserves interest regions structural information and also has the invariance property to translation and rotation [12]. The CLRF descriptor uses the 2D DWT after applying LPT where the usage of 2D DWT makes the local features very compact and discriminative [7].

The remaining sections of this paper are organized as follows. Literature review on BoVW, local image region description and object recognition are presented in section 2. The proposed image category recognition approach is explained in detail in section 3. The experimental results and discussion of the proposed image categorization approach are presented in section 4. Finally, section 5 concludes the paper with future work.

2 Related work

This section reviews the related work on the BoVW modeling based object categorization and local image region descriptors.

2.1 Bag-of-Visual-Words

In the field of Computer Vision, the image category recognition has been active topic of research over decades. The BoVW modeling derived from the text retrieval approach called Bag-of-Words (BoW) [4] is often used for image representation in category recognition task. The simplistic and efficient histogram representation has made the BoVW very popular among the computer vision community. Following the BoVW, many approaches [13, 14, 15, 16] were proposed for image representation.

Fisher Vectors (FV) [17] is considered as an alternative to BoVW modeling. It uses Gaussian Mixture Model (GMM) to describe image patches. The gradient computation is restricted to the mixture weight parameters of the GMM. Incorporation of additional gradients to fisher vectors provides large improvements in terms of accuracy [18]. Since it can be computed from much smaller vocabularies, it is computationally very efficient [18]. The FV works well even with simple linear classifiers. It is noted in [18] that even though FV works better in image representation, it has an important disadvantage comparing to the BoVW. The FV image representation is almost dense while BoVW representation is sparse [18].

In [19], a new image representation framework called sparse vectors is proposed using local visual descriptors. It performs a nonlinear feature transformation on descriptors then aggregates the resultant features together to construct image-level representations, and then it applies the linear SVM for image classification [19]. This sparse vectors approach is scalable in computation [19]. The VLAD [20, 21] is proposed by considering classification accuracy, efficiency and memory utilization. It aggregates local image region descriptors into a vector of low dimensional feature that preserves the quality of vector comparison [21]. Even though several improvements to image representation are proposed, the BoVW is

highly preferred for image representation [22] because of its computation simplicity and effectiveness in image and object categorization applications.

2.2 Image region descriptors

To achieve desired accuracy in image category recognition, the BoVW model should use local image features that are invariant to geometric and photometric transformations. Scale Invariant Feature Transform (SIFT) [6] has been utilized in many object recognition approaches to extract invariant features from images. Though SIFT is a very popular keypoint (or interest region) description approach, its higher dimensionality makes the computation of object recognition system very complex. Following SIFT, Speeded up robust features [8] is proposed that is computationally very faster than the SIFT descriptor. Though SURF [8] is very fast in computing keypoint features, it is not much robust to geometric transformations such as rotation and view point changes. Multisupport Region Order-Based Gradient Histogram (MROGH) [9] is proposed using multiple support region around each interest point to improve feature discrimination. Since the MROGH use multiple support regions, the computation complexity is very high.

Local binary pattern (LBP) [23] based image region descriptors called Orthogonally Combined Local Binary Patterns (OCLBP) [22] and Center Symmetric Local Binary Patterns (CSLBP) [24] have shown better performance in image matching and object recognition tasks. The CSLBP and OCLBP are the dimensionality reduced versions of LBP operator that achieved competitive performance than the SIFT descriptor. Recently, the CLRF [7] has achieved better image matching accuracy than the SIFT descriptor in image matching even though it has less dimensional features than the SIFT features.

3 BoVW image representation using CLRF

In this section, the details of the proposed BoVW based image categorization approach is presented. The block diagram of the image categorization approach is depicted in figure 1. The details of the CLRF local features construction and BoVW modeling are explained in this section.

3.1 CLRF descriptor

First, interest points from images are detected using the Hessian keypoint detector [25] and a patch containing 41×41 pixels surrounding each keypoint is used as interest region. Then, the CLRF [7] descriptor is used to extract features from gray interest regions of an image. Here, the image patches are not rotated to their dominant orientation because this rotation invariance is useful for image matching but decreases the image categorization accuracy [22]. The construction of the CLRF has two steps: 1. Apply log polar transformation (LPT) on each interest region and 2. Apply 2D DWT after applying LPT on interest regions. The computation details of the LPT and 2D DWT are given below.

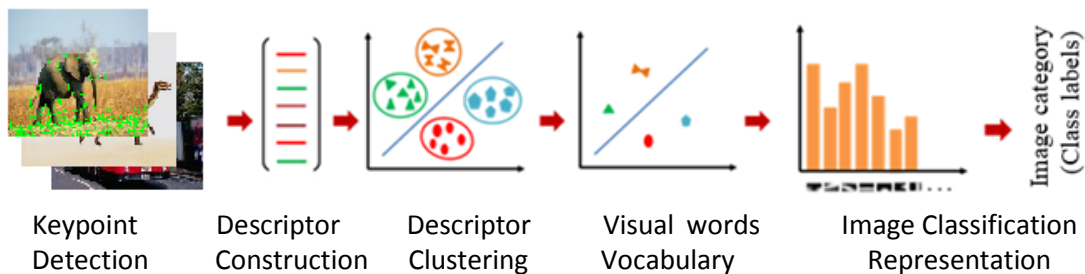


Figure 1. Block diagram of the BoVW based image categorization approach

The LPT converts each interest region from Cartesian coordinates $I(x, y)$ to the log-polar coordinates (ρ, θ) [7] using the equations given below,

$$\rho = \log_{\text{base}} \sqrt{(x - x_c)^2 + (y - y_c)^2} \quad (1)$$

$$\theta = \tan^{-1} \frac{y - y_c}{x - x_c} \quad (2)$$

where (x, y) denotes the sampling pixels, (x_c, y_c) denotes the center of the Cartesian coordinates, and ρ and θ denote different radius and angular sampling positions in the polar geometric structure respectively [7]. The resultant of the LPT is a two dimensional matrix with entries (ρ, θ) . Sample image after applying the log polar transformation is shown in figure 2.

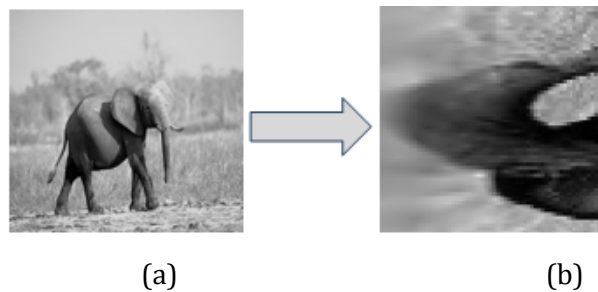


Figure 2. Applying Log polar transformation on image. (a) original image and (b) image after applying log polar transformation

High dimensional features make the system computationally expensive. Hence to reduce the feature dimension, the 2D DWT is used. The 2D DWT decomposes the matrix (image) and splits into an approximation image and three detailed images using a pair of low-pass and high-pass filters as shown in figure 3. The approximation image of each interest region are converted into vectors and kept as feature descriptors [7] which is called CLRF. These CLRF features are then used to build the BoVW as described in the following subsection.



Figure 3. Applying 2D DWT (Level 0 decomposition). (a) Original image and (b) after applying 2D DWT on original image (images are shown in gray scale)

3.2 Bag-of-Visual-Words representation

Once the features are constructed using the CLRF, the BoVW modeling is used to represent each image in terms of a histogram of visual dictionary. The BoVW constructs an order-less collection of interest region descriptions called visual vocabulary (otherwise called visual dictionary) using K-means clustering algorithm. Here, the cluster centers are considered as visual words. Using the BoVW, each image is represented with standard dimension. The size of the visual dictionary needs to be set carefully, since a small size leads to less discrimination where a very large size leads to slower computation speed and less generalizable features. Thus, the visual vocabulary size is chosen appropriately to maintain a good trade-off between generalization and discrimination. Using the constructed visual words, each image feature is quantized into their closest visual word. It produces a histogram feature for each image according to the number of local descriptors assigned for the corresponding visual words. The resultant histogram features are very compact, informative and fixed-length representation [22] which are further exploited for image classification.

3.3 Classification

The popular image classification technique SVM [5] is exploited to identify each image category. The SVM training and prediction are performed using the following equation,

$$K_{\chi^2}(S, M) = e^{(-1/D) \text{dist}_{\chi^2}(S, M)} \quad (3)$$

where S and M are two BoVW image features, χ^2 is chi-square distance measure and it is calculated using the following equation,

$$\chi^2(f, f') = \sum_{i=1}^n \frac{(f_i - f'_i)^2}{f_i + f'_i} \quad (4)$$

Here, f and f' are two features.

4 Experimental results

In this section, the details of the SIMPLiCity and butterflies datasets and experimental setup are presented. Then the performance of the proposed image categorization approach is presented and compared with the state-of-the-art methods.



Figure 4. Sample images from the SIMPLiCity dataset [26] is given here. The image categories are African People, Beach, Building, Bus, Dinosaur, Elephant, Flower, Horse and Mountain and Food (from top left to bottom right).

4.1 Performance on SIMPLicity dataset

The SIMPLicity dataset [26] contains 10 different classes of images and each class contains 100 images. The 10 different categories are African people, beach, building, bus, elephant, flower, food, horse, dinosaur, and mountain. Each category of images contains images with the size of either 256×384 or 384×256 pixels. Sample images from the SIMPLicity dataset are shown in figure 4. Local features applying image region descriptor (SIFT, CSLBP, OCLBP or CLRF) are extracted. Here the dimensions of the local feature descriptors SIFT, CSLBP, OCLBP and CLRF are 128, 256, 512 and 72 respectively. Each of these descriptors are used to construct a visual vocabulary of size 1000 visual words using the K-means clustering algorithm. Using these vocabularies, all the image features are quantized into a standard dimension. For evaluation, 50% of images from each image category is chosen for training and remaining for testing. The SVM classifier is used for training and to predict the class of each testing images. The results are presented in the table 1. From the average image classification accuracy in table 1, it can be seen the proposed BoVW model which uses the CLRF outperforms all the comparative approaches. It can also be understood that the CLRF based BoVW approach is competitive to other comparative approaches for individual image categories.

Table. 1. Image classification accuracy (%) on SIMPLicity dataset

Methods	People	Beach	Building	Bus	Elephant	Flower	Food	Horse	Dinosaur	Mountain	Average
BoVW using SIFT	66	52	44	90	100	78	74	88	46	38	67.6
BoVW using CSLBP	66	36	50	76	100	36	56	70	42	48	58.0
BoVW using OCLBP	64	54	64	98	96	42	56	68	46	66	65.4
BoVW using CLRF	66	54	52	98	100	74	74	70	46	64	69.8

4.2 Performance on butterflies dataset

The Butterflies dataset [27] contains 619 images with 7 categories of butterflies such as Admiral, Black Swallow tail, Machaon, Monarch open, Monarch closed, Peacock and Zebra, where each category contains 111, 42, 83, 84, 74, 134 and 91 images respectively. Sample images from the butterflies dataset are given in figure 5. In this dataset, each class of butterfly contains geometric (rotation and translation) and photometric variations (blur, affine and illumination). A visual vocabulary is generated using first 10 images from each category. The K-means clustering algorithm is used to generate visual words for each descriptor separately. Here, K is set to 500, so the dimension of visual word is 500. The butterflies classification results are presented in table 2. Since LPT is robust for translation and rotational variations, the proposed approach shows better performance than other approaches.



Figure 5. Sample images from the butterflies dataset [27]. Top row contains categories of admiral, Machaon and Monarch_closed (two images per category). Bottom two rows contain Monarch_open, Peacock, Black_swallowtail and Zebra (three images per category)

Table 2. Classification performance on Butterflies dataset

Methods	Admiral	Black swallow tail	Machaon	Monarch open	Monarch closed	Peacock	Zebra	Average
BoVW using SIFT	51.79	33.33	52.38	56.76	54.76	61.19	77.78	55.43
BoVW using CSLBP	60.71	19.05	59.52	27.02	64.29	53.73	55.56	48.55
BoVW using OCLBP	37.50	52.38	50.00	32.43	59.52	53.73	64.44	50.00
BoVW using CLRF	60.00	70.00	53.49	54.78	86.49	74.63	68.89	66.89

5 Conclusion

In this paper, a novel BoVW modeling approach utilizing the CLRF image region descriptor is proposed for image category recognition. Exploitation of the CLRF descriptor has shown some important advantages. It sufficiently preserves interest regions structural information while constructing compact and discriminative features using the log polar transformation and 2D DWT. Performance of the proposed approach is evaluated using the popular SIMPLicity and butterflies datasets. The experimental results showed that the proposed BoVW using CLRF descriptor achieved better accuracy than the comparative approaches for image categorization. Though, the proposed BoVW shows competitive performance in image categorization, the discriminative power can be further improved by extracting local features from double or multiple support regions around each interest point. That will be focused in the future work of this paper.

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Study of Test Anxiety of Freshmen Engineering Boys and Girls Students and their Academic Performance in Science & Humanities Subjects

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ABSTRACT

The main aim of this learning was the effect of teaching of self-regulation on test anxiety; college achievement and met cognition in boy students, The Society under study include all boy and girl students of MLRIT. From this society 154 persons were randomly selected as sample that include experiment and control groups and 110 persons were selected for comparative analyzes. Measurement tools was Test-anxiety inventory that encountered of reliability and validity. Plan of research was kind of pre-test and post-test with manage group. After of pre-test, experimental groups four week, every week, two sessions and every session, an hour to share in education class of self-regulation. After of end experimental to accomplish post test with two groups. The results of T-test show that there are significant difference between test anxiety in pre-test and post-test. Also we can see differenced levels of test anxiety between this student (22.4=low, 56.8=medium 18.4=high, 18.6 tremendous). Mean scores of test anxiety among students whose parents have academic education is higher than whom their parents don't have academic education that show parents with academic education have more stringent whereas, results of t-test show that there are no significant differences between parents with academic education and no academic education also There are no significant different in mother profession and there are significant difference between boys and girls test anxiety ($t=-4.76$, $p<0.00$). With comparison Mean of two groups discover that girls encounter higher test anxiety. Results of meta cognition analyzes show that Mean scores in post-test are higher than pre-test however analyze with t-test method show that there are not significant difference between experimental and control groups in post-test of global reading, problem-solving, support research strategies and total score. results of academic achievement analyzes show that mean scores of courses increase in post-test that show self-regulation is useful in practicable and reading courses. With comparison Mean scores in foreign language books discover that pre-test are almost similar to post-test. Besides analyze with t-test methods show that there are significant difference between experimental and control groups in English, physics, chemistry and mathematics courses ($p<0.05$) however there are no significant difference in mathematical methods, drawing, English and Hindi courses.

Key Words – Learning Skills, Behavior Therapy, Exam Anxiety, Performance in Tests and Mean score

1 Introduction

One of worries and problems of educational system and students is exam problem. Exam, the word that all student are familiar with that and some of them worried by hearing its name of course anxiety have measure and severity and variation undulate. Severity of anxiety is when that exam is near and in exam night increased to its severity. For example terminal exam in may-June and spatially entrance exam. College dropout threaded student society. According to the educational and instructional ministry estimation (in every educational year)of every 110 student dependent to variety bases 45 person were failed and or experienced College dropout[1] According to the studies and empirical dates characterized that almost 60 present of failed students and or persons that showed educational recession in scores. In lower sections and grade were member students that have noticeable achievement however by passing the time and changing sections emerged changes in scores [1] in the way [2] used of The Test Anxiety Inventory for Children and Adolescents (TAICA) test for assessment test anxiety that included scales (problems cognition and inattention, high performance, instrumental anxiety, high physiological arouse, maths humiliation, worry and worry and lie). [3] assessed two treatment that include regular desensitization and role playing for decreasing test anxiety. The result show that psychological role playing was very effective in anxiety treatment. Another study did by [4] The result showed that various factors effected on test anxiety and also consider that factors that increase student comprehension and resulted that cognition approach with relaxant technique and synthetic interventions decrease test anxiety and increase exam performance and Eye progress Desensitization and reprocessing (EPDR) technique also decrease test anxiety and emotional and worries chosen of this spatially [5] in the way [6] cognitive-behavior therapy (CBT) and reception-based behavior therapy (RBBT) compared for the treatment of test anxiety. Results showed that those receiving ABBT experiencing improvements in performance, whereas those receiving CBT exhibited reduced performance. In addition, there was a suggestion that ABBT might have been more effective at reducing subjectively experienced test anxiety. there are inconsistent with [7] Cognitive and regular desensitization technique in decrease test anxiety were analyzed .results showed that test anxiety was lower in both groups in comparison to control group but there was no significant difference between Cognitive and desensitization technique in lowering test anxiety. Another research was performed to evaluate the lowering methods of anxiety with the aim of training of study skills and cognitive-behavior technique and combination of above mentioned technique and control group, results showed that in ternate groups test anxiety scores were lower than control group [8]. and behavior therapy (concentrate on subjective skills) and cognition effect on test anxiety[9]. [10] tried to unravel the influence of various types of education on test anxiety levels that include a stressful, achievement-orientated education; a reassuring, task-orientated education; and an ambiguous education. It turns out that state anxiety and test anxiety do not increase more rapidly as a function of anxiety disposition under stressful conditions compared with reassuring conditions. As in previous research, stage-fright effects were observed in the sense that repeated measures of state anxiety and test anxiety showed a decline of average anxiety levels.

30 boys and girls participated in a 10 sessions group therapy that include training of muscle relaxation and dealing with stress, findings showed that in experimental groups test anxiety scores were lower than control group also it was higher in females in comparison to males. Group therapy had omnipotent influence in scores related to self-confidence [11] The evaluation of three methods namely cognitive therapy, training of reading skills and control group was done by [12] that showed significant different between control and main groups about test anxiety, The case study of Touki showed that the test anxiety

lowered in cognitive therapy group in comparison to control group. Learning the skills of dealing with emotional in lowering test anxiety and enhancing self-confidence were very important. It is possible to education the above-mentioned skills as life skills to prevent stress [13].

The current study by [14] examined whether material presented in an interactive treatment format was effective in reducing state anxiety and test anxiety and increasing academic performance. A wait-list control group served as the comparison group in this study. The interactive component of the program introduced the ability for participants to test their knowledge of each treatment component, to experience imaginal exposure, and to provide anxiety ratings during exposure sessions. It was predicted that the participants in the treatment group would experience a greater decline in test anxiety than the participants in the wait-list control group.

Also other assessment showed that courses and educational strategy provided by Newcastle MLRIT are better than medicinal and psycho treatment [15] effect educational in interest background and test anxiety assessed on 375 student. the result showed that wasn't significant relation but there was significant relation between practical educational with sexual and interest [16]. Furthermore, In educational low-motive student we faced with students that have high scores in class but by passing the time and changing study grades, their information forget and extinguish. They aren't able to use of their information in variety of positions. Teachers, also aren't able easily able to recognition this kind of students and eliminate their problems. Surfaces activities show that they are active in learning but evaluations don't support [17]. in a research that did by [18] resulted that exam time and reward in exam time can effect on test anxiety. so students divided into three groups. To first group many reward, second group average reward, third group little reward and result showed that the group that received average reward have lowest measure anxiety. Study achievement is need to use of rich learning guidelines and coequal self-esteem and relief of anxiety. Researcher doesn't view higher surface test anxiety the only factor of recession performance. But point to the other factors such as achievement motive decrease, the kind of achievement motive, insufficiency in way study, weak organization, analyze information, etc.

In this way researchers reported students that educated purifying, comprehension and the understanding of cognition aspects have less test anxiety than to groups that watched film about test anxiety and the group that had studied the reports to this syndrome [19]. And also in a research that did by [20] resulted that if students have skull duggery paper in test session their test anxiety decrease significant. In other study metacognition role was considered as a metacognition on test anxiety and study theory. They studied Approaches and Study Skills Inventories for Students (ASSIST) Metacognitions Questionnaire (MCQ), and Test Anxiety Scale (TAS). The result showed that it is the metacognition that effected on test anxiety [21].It seem that learning and study method effect on learning translation. Students that was trained by correct study method educated and used of appropriate study method have high study achievement. On the other way researcher reported that maximum students and even student-MLRIT experimented test anxiety that have negative result [22]. other important factors in making test anxiety, is that students are not familiar with correct study method and curriculum. Most of student study different texts with the same speed and method namely. They study mathematic like Hindi.

Current research indicates that some gifted students possess better self-regulated learning strategies than their peers, however gifted students may have done very well in college without using good self-regulation strategies because of a combination of their high abilities and/or an unchallenging curriculum. If learning is relatively easy for someone, less effort, organization and other self-regulated activities are expended. Maths conditions or personal issues may prevent students from developing self-regulated learning strategies. For some students who already have some of these strategies, maths or personal issues may prevent them from using them regularly, and thus, they need to be helped and encouraged to do so. Some gifted and talented students display perfectionism and need to learn to strive for excellence (their personal best) rather than perfection. Some talented students with high potential may find it difficult to learn self-regulation when it is not taught, modeled, or rewarded by the adults in their home and family. Even if students interact regularly with adults who demonstrate self-regulation, they may fail to use these skills themselves due to peer pressure or refuse to use the strategies their parents or teachers regularly employ at home or college. Compared with low achieving students, high achievers set more specific learning goals, use a variety of learning strategies, self-monitor more often, and adapt their efforts more systematically. The quality and quantity of self-regulation processes is crucial. We must recognize that one self-regulation strategy will not work for all students, and that the use of only a few strategies will not work optimally for a person on all tasks or occasions. It is important that students learn to use multiple self-regulatory learning skills rather than single strategies. They must also learn that their goals and their choice of self-regulation strategies have to be continually adjusted. Our hope in this module is that we will be able to work with students to help them shift from performance goals to move towards mastery goals, focusing on understanding the material, persisting when they are challenged or their performance fails. This is especially critical for talented students who seldom experience high levels of challenge.

According to [23] self-regulated learning involves the regulation of three general aspects of academic learning.

First, self-regulation of behavior involves the active control of the various resources students have available to them, such as their time, their study environment (e.g., the place in which they study), and their use of others such as peers and faculty members to help them

Second, self-regulation of motivation and affect involves controlling and changing motivational beliefs such as self-efficacy and goal orientation, so that students can adapt to the demands of a course. In addition, students can learn how to control their emotions and affect (such as anxiety) in ways that improve their learning.

Third and finally, self-regulation of cognition involves the control of various cognitive strategies for learning, such as the use of deep processing strategies that result in better learning and performance than students showed previously how does self-regulation develop?

Emotional self-regulation and cognitive self-regulation seem to have the same neural roots; thus, as children grow older and their brains develop, they can increasingly take control of both their thinking and their feelings. Furthermore, if a neural system is repeatedly exercised, it will continue to develop, as with exercising a muscle. Conversely, if children do not systematically engage in self-regulatory behaviors at a young age, the corresponding brain areas may not develop to their full potential [24], [25].

Before of this research, there was not any report of effect training self-regulation on test anxiety and academic achievement and metacognition and in several research were assessed only the test anxiety

relation with variables as fear of success, ways to nurture child, personality pattern, introversion-extraversion and the effect of different treatment and also was assessed purpose orientations with learning methods and test anxiety. According to this theory is it possible self-regulation effect on test anxiety and academic achievement and met cognition? Yet to response to this question a research did on the boy student of third level of high college in shahrbabak.

2 Method Research

With due attention to this self-regulation suppose as independent variable that researcher supervise in this and also existence of control group is experimental. It means made that tried with making independent variable that include self-regulation, consequences in dependent variable namely assess test anxiety, academic achievement and metacognition in selected students. Design research was of kind pre-test and post-test with control group.

The Society under study include all junior boy and girl students of MLRIT branch. From this society 154 persons selected as sample randomly that put in experiment and control groups that.(110 persons were boy students of third level of high college and 54 persons were boy students in guidance college). and 110 persons selected for comparative analyzes.

Design research was of kind pre-test and post-test with control group. For administrating research test anxiety, academic achievement and meatcognition questionnaires administered for two control and experiment group as pre-test. Then all students of experiment group sat encounter in instruction methods training by 8 section, every section, an hour with use of participatory learning and techniques such as lecture, disputation and question and answer and then post-test do. Provided material in sections were:

First section: in the section produced description of effective study and qualification educated that learned to person how of study times have high use.

Second section: the principles of programming, suitable nurture, time of study trained

Third section: it trains about this why we should review subject and also how review them

Fourth section: in this section learning technique one time for always was trained that mastermind by Robinson in year 1996 and its name SQ3R. In the way try to make background in mind before of study, learning process become more and easy

Fifth section: one of the most important learning skills was comprehension and for this need to motive, concentration, prebackground and correct study method. In the background given necessary recommendations specially in background note-writing and memory-tree to students

Sixth section: technique given for increasing mind activity and concentration

Seventh section: fast reading and its obstacles and necessary explanations given to students

Eighth section: necessary explanations given for better performance in exam.

3 Measurement Tool

1- test anxiety questionnaire(TAL)include of 25 item that respond according to four division scale(0=never, 1=seldom, 2=some when, 3=often)minimum and maximum score in the test is zero, 75 respectively and also the test encounter suitable reliability and validity.

Internal consistency: for assessment Internal consistency (TAL) used of Alph Kronbakh. According to provided results Alpha coefficient was for all sample girl and boy, 0.94, 0.95, 0.92 respectively

Retest validity: for assessing validity scale TAL the test repeat afterward from 4 week to 6 week for 91 boys and 90 girls that participate in first stage. Mean and standard deviation of total score girl and boy persons in scale (TAL) in retest stage was $y=34/24$ ($sd=17/26$), $X=32/28$ ($sd=15/8$), $x=2/36$ ($sd=19/44$) respectively. Correlation coefficient between scores of persons in two stage test and retest for all persons include girl and boy were ($r=0/77$), ($r=0/88$), ($r=0/67$) that is satisfactory.

Reliability: for reliability evaluation, TAL this scale with anxiety questionnaire and scale self -steam given to sample students of research to do reliability

Scale 20 item anxiety questionnaire make by factor analysis method and encounter of acceptable and satisfactory psychometric characteristics was made.

Correlation coefficient between all person scores in general anxiety scale or TAL for all sample persons girl and boy are $r=0/67$, $r=0/72$ ($p=0/001$) respectively

Also for reliability assessment TAL used of self-steam Kooper Esmite scale that have 58 division and encounter of satisfactory reliability and validity. Correlation coefficient of all persons scores, girl and boy were in scale self-steam with TAL ($r=0/57$, $r=0/67$, $r=0/43$), ($p=0/001$) respectively. Researcher also accounted norms scores of sample persons ($N=581$) as percent grade and resulted with comparison person scores girl and boy in scale TAL by one test T. in the result girl scores were more than boys in scale TAL ($T=3/31$, $df=524$, $p<0/0001$) at the end, researcher resulted that TAL scale is bonafide for using in psychology researches and recognition test anxiety in children and adolescents in colleges [26].

Meta cognition questionnaire: the first factor analysis showed that a questionnaire measures three factors global reading strategies, problem-solving strategies and support reading strategies. Kronbakh alpha was calculated for each secondary scale and Alpha coefficient was changeable between 89/ to 93/ to shorten the length of the questionnaire, the questions were investigated again and same of the ambiguous questions were deleted because of having low loading, overlapping loading, terminal decreasing traits and being similar to other questions and at the last, thirty items remained for the final prescription were investigated again to remove ambiguity and increase reliability and intelligibility. Afterwards, it performed and conducted on a small group of subjects. By correcting the results of this study, the prepared questionnaire was performed on 443 sixth to twelve-grade students and to analyze data by method like factor analysis and reliability calculate with Kronbakh Alpha were used.

The result of data analysis showed that instead of 60-item questioner the prepare 30 -item questionnaire can measure 3 determined factors with significant reliability degree. 3 scales of this questionnaire include global reading strategies, problem-solving strategies and support reading strategies. Reliability of the questioner: in accordance with their attempts by compilers that were mentioned before, reliability of the questioner is guaranteed satisfactory.

To investigate reliability kronbakh Alpha coefficient was calculated and the calculated coefficient was reported 89/. Therefore scholars can use the reliability of the mentioned questionnaire without any concern and also scholars can use this questioner for metacognition from/by reading strategies [27]

3-academic achievement questioners: there questioners provided by specialists in measurement and assessment branch and encountered of enough reliability and validity. Readable Courses include

(geography, physics, maths, literature), practicable courses (mathematics, experimental, art, profession) and foreign language course (English,Hindi).

4 Result

In the research data analysis with description and inferential statistical method instance mean, standard deviation and test

Test anxiety questionnaire (TAL) include 25 item that responds in basis one scale four division (0=never, 1=seldom, 2=somewhat, 3=often) minimum and maximum score in the test is zero, 75 respectively.

This test perform in 264 persons, society of boy in shahrbabak city and maximum score test anxiety was 66 and so students were ranking.

4.1 Test anxiety analyzes:

Table1: Percent, Median, Mean Students to Severance Degrees Test Anxiety

Descriptive Statistical				
Degree	Mean	Median	Number	Percent
1	15.11	17	9	17.6
2	28.66	40	27	52.9
3	40.90	49	10	19.6
4	56.80	55	5	9.8
Total	31.43	30	51	110

The results of table 1 show that percentages of student have test anxiety low, average, much, very much. 17.6, 52.9, 19.6, 9.8 respectively.

Table2: Demographic Table

Groups	Education of father		Education of mother		Mother 's job	
	Acade	No. A	Acade	No A	House wife	Employe e
Percent	43.1	56.9	13.7	86.3	74.5	25.5

Acade: academic No. A: no academic

Demographic table shows that fathers and mothers of 43 and 13 percentages of students have academic education.

Table3: Descriptive Statistical to Compare Parents Education and Profession

Group		mean	median	St.deva	kurtosis	Skew
Edu of M	acad	37.71	30.00	12.26	0.72	0.91
	No.a	30.43	30.00	11.53	0.32	0.36
Edu of F	acadr	33.63	33.50	14.35	0.10	0.28
	No.a	29.75	30.00	10.36	1.46	0.73
Mother's P	House wife	31.13	30.00	12.49	-0.18	0.28
	employee	32.30	31.00	12.02	5.16	1.80

Edu of M: education of mother, Edu of F: education of father

Mother's p: mother's profession, No. A: no academic

Acade: academic

The table shows that the mean score of test anxiety among students whose parents have academic education is higher than show parents with academic education have more stringent. However there is no significant different in mother profession.

Table4: Number, Mean, Std-Deviation in Pre-Test and Post-Test

Group	Number		Mean		Std-Deviation	
Pre test	50	50	31.43	32.48	12.42	12.42
Post test	50	50	22.90	34.68	7	14.57

Expe: experimental

As it show in table 4 the mean scores of test anxiety change from 31.43 to 22.90 that showed self-regulation is useful and about control group did not change but improved certainly by approaching tests.

Table5: T-Test for Comparison Pre-Test And Post-Test

Groups	Mean	T	df	sig
Pre-test	31.43	7.79	50	0.00
Post-test	22.90			

Table 5 show that self-regulation can effect in test anxiety ($t=7.79$, $p<0.000$).

Table6: Comparison Test Anxiety In Boy And Girl Students

Groups	Mean	T	df	sig
Boys	31.43	-4.66	50	0.00
Girls	41.37			

Upper table show that there are significant different between boys and girls test anxiety score ($t=-4.66$, $p<0.00$) and we find by comparing mean of two groups that girls encounter higher test anxiety.

Table 7: Comparison of Test Anxiety Based On Father's Education

Groups	F	Sig	T	df	Sig (2-ta)
Equ Var	3.10	0.08	--	49	0.26
Ass			1.12		
Equ Var			--	36.60	0.29
Not Ass			1.07		

Equ. var. ass: equal variance assumed, M: mean

This table shows that there are no significant differences between two groups based on father's education.

Table 8: Comparison of Test Anxiety Based On Mother's Education

Test anxiety sc.		Levenne's for Equ of Var		t.test for equ of M	
Groups	F	Sig	T	df	Sig (2-ta)
Equ Var	0.77	0.38	--	49	0.14
Ass			1.47		
Equ Var			--	7.06	0.27
Not Ass			1.17		

This table shows that there are no significant differences between two groups based on mother's education. Academic achievement analyzes:

Table 9: Descriptive Comparison of Readable Course in Experimental Group

Experimental group		mean	median	St.deva	kurtosis	Skew
Hindi	Pre-test	16.22	17.00	2.30	0.05	-0.86
	Post- test	17.27	18.00	1.98	3.65	-1.59
Physics	Pre-test	18.63	19.00	1.43	1.03	-1.31
	Post- test	18.54	19.00	1.65	1.24	-1.19
Chemistry	Pre-test	17.00	17.50	2.82	0.44	-1.13
	Post-test	17.95	18.50	1.88	1.28	-1.23
Drawing	Pre-test	17.04	17.50	2.73	1.50	-1.36
	Post-test	18.00	20.00	3.26	1.31	-1.65
Maths	Pre- test	18.00	18.50	2.07	1.96	-1.62
	Post- test	18.59	19.00	1.70	1.68	-1.49

As it showed in table9. Mean scores in pre-test are lower than post-test and scores students have noticeable achievement.

Table 10: Descriptive Comparison of Practicable Course in Experimental Group

Experimental group		mean	median	St.deva	kurtosis	Skew
	Pre-test	16.36	18.00	3.79	-0.64	-0.89
	Post- test	17.18	18.50	2.57	-0.59	-0.88
Experimental	Pre-test	17.79	19.00	2.38	2.14	-1.53
	Post- test	18.31	19.00	1.91	2.71	-1.85
Drawing	Pre-test	19.90	20.00	0.29	8.08	-3.05
	Post-test	21.09	20.00	5.57	21.86	4.66
Profession	Pre-test	19.22	20.00	1.02	0.04	-1.09
	Post-test	19.68	20.00	0.56	2.15	-1.66

The table shows that the mean score of courses increase in post-test that show self-regulation is useful in practicable courses.

Table 11: Descriptive Comparison of Foreign Language Books in Experimental Group

Experimental group		mean	median	St.deva	kurtosis	Skew
English	Pre-test	18.09	19.00	2.65	0.53	-1.37
	Post- test	17.45	18.00	2.40	0.33	-1.13
Hindi	Pre-test	17.61	19.00	3.03	0.93	-1.31
	Post- test	18.31	19.00	2.85	5.79	-2.53

Mean scores in pre-test are almost similar to post-test.

Table 12: Descriptive Comparison of Readable Courses in Control Group

Control group		mean	median	St.deva	kurtosis	Skew
Hindi	Pre-test	15.56	16.00	2.12	-0.78	0.11
	Post- test	15.59	15.00	2.01	-0.46	0.62
Physics	Pre-test	17.79	19.00	2.53	3.09	-1.72
	Post- test	16.72	17.50	2.67	-1.07	-0.48
Chemistry	Pre-test	16.86	18.00	2.91	0.17	-1.13
	Post-test	15.68	16.00	2.41	-0.87	-0.38
Drawing	Pre-test	15.59	15.50	3.54	-0.73	-0.49
	Post-test	16.13	16.00	2.35	-0.57	-0.27
Maths	Pre- test	17.50	18.00	2.08	1.49	-1.19
	Post- test	17.09	17.00	2.02	-0.76	-0.40

Mean scores in pre-test are almost similar to post-test and there are no significant different between pre-test and post-test

Table 13: Descriptive Comparison of Practicable Courses In Control Group

Control group		mean	median	St.deva	kurtosis	Skew
Mathematics	Pre-test	16.36	17.00	3.31	0.19	-0.95
	Post- test	15.36	15.00	2.36	-0.96	-0.14
Experimental	Pre-test	16.70	17.00	2.11	1.26	-1.05
	Post- test	16.27	16.00	2.43	-0.57	-0.28
Drawing	Pre-test	19.90	20.00	0.29	8.08	-3.05
	Post-test	19.54	20.00	0.59	0.02	-0.93
Profession	Pre-test	18.00	17.00	2.11	1.26	-1.05
	Post-test	17.13	17.00	1.45	0.39	0.14

Mean scores in pre-test are almost similar to post-test however mean scores in pre-test are higher than post-test in mathematic and profession because of being more difficult or the increase of capacity

Table 14: Descriptive Comparison of Foreign Language Books In Control Group

Control group		mean	median	St.deva	kurtosis	Skew
Hindi	Pre-test	17.27	17.50	3.22	1.97	-1.45
	Post- test	16.86	17.00	2.81	-0.99	-0.43
English	Pre-test	16.95	17.00	2.55	-0.96	-0.51
	Post- test	16.40	17.00	2.80	-1.12	-0.40

Mean scores in pre-test are almost similar to post-test.

Table 15: T-Test for Comparison Post-Test in Experimental and Control Groups in Readable Lessons

Paired Differences				
lessons	mean	t.test	df	significant
Hindi	1.68	2.18	21	0.040
Physics	1.81	2.44	21	0.023
Chemistry	2.27	3.27	21	0.004
Drawing	1.86	1.94	21	0.065
Maths	1.50	2.69	21	0.017

Upper table show that there are significant different between experimental and control groups in literature, physics, chemistry and maths courses ($p < 0.05$) however there is not significant different in drawing lesson.

Table 16: T-Test for Comparison Post-Test in Experimental and Control Groups in Practicable Courses

Paired Differences				
lessons	mean	t.test	df	significant
Mathematics	1.81	2.40	21	0.025
Experimental	2.04	2.84	21	0.010
Drawing	1.54	1.31	21	0.202
Profession	2.54	6.97	21	0.000

Upper table show that there are significant different between experimental and control groups in mathematics, experimental and profession courses ($p < 0.05$). However there are no significant different between experimental and control groups in art course.

Table 17: T-Test for Comparison Post-Test in Experimental and Control Groups In Foriegn Language Books

Paired Differences				
lessons	mean	t.test	df	significant
English	1.04	1.26	21	0.21
Hindi	1.45	1.76	21	0.09

Upper table show that there aren't significant different between experimental and control groups in English and Hindi courses. Meta cognition analyzes:

Table 18: Descriptive Comparison of Met Cognition in Experimental Group

Experimental group		mean	median	St.deva	kurtosis	Skew
Glo.rea.s	Pre-test	36.36	38.50	6.53	0.50	-1.16
	Post- test	39.27	37.00	7.74	-1.03	0.53
Pro-sol.s	Pre-test	29.90	32.00	6.10	4.34	-1.78
	Post- test	30.09	32.00	5.13	0.07	-0.43
Sup.rea.s	Pre-test	38.00	38.50	7.67	1.81	-1.10
	Post- test	39.45	38.50	7.19	-1.13	0.07
Total	Pre-test	104	110	183	2.47	-1.49
	Post- test	106	102	15.07	-1.00	0.08

Glo. rea. s: global reading strategies pro. sol. s: problem-solving strategies up.rea.s: support research strategies

Mean scores in post-test are higher than pre-test however mean score in pre-test is almost similar to post-test in problem-solving strategies.

Table 19: Descriptive Comparison of Met Cognition in Control Group

Control group		mean	median	St.deva	kurtosis	Skew
Glo.rea.s	Pre-test	37.27	37.50	6.34	-0.62	0.16
	Post- test	38.40	39.00	5.79	-0.40	-0.19
Pro-sol.s	Pre-test	30.22	31.50	4.81	-0.73	-0.26

	Post-test	30.31	30.00	3.66	0.44	-0.60
Sup.rea.s	Pre-test	41.45	42.50	5.75	0.18	-0.14
	Post-test	38.77	38.50	6.71	1.29	-0.93
Total	Pre-test	109.00	109.00	14.23	-0.03	-0.17
	Post-test	107.50	107.50	13.58	-0.39	-0.33

Mean scores in pre-test are almost similar to post-test in problem-solving strategies however mean scores in pre-test are higher than post-test in support research strategies and total scores.

Table 20: T-Test for Comparison Post-Test in Experimental and Control Groups in Meta Cognition Scales

Paired Differences				
<i>lessons</i>	<i>mean</i>	<i>t.test</i>	<i>df</i>	<i>significant</i>
Glo.rea.s	0.86	0.40	21	0.69
Pro.sol.s	-0.22	-0.14	21	0.88

Sup.rea.s	0.68	0.37	21	0.71
Total	-0.72	-0.16	21	0.86

This table show that there are not significant different between experimental and control groups in post-test of met cognition.

5 Conclusion

Students that have test anxiety although they learned subjects and concepts and course subjects are not able to provide and express self taught. Society and spatially education, of is fond and worry toward destiny of student in relation with this problem and successful development evolution in society and it expected that should achieve required abilities and skills and it expected that students should achieve required abilities and skills in different cognition, affective, personality aspects to achieve development and ascendancy on the other hand should recognize factors that caused better education and efflorescence of student capacities, and after given them achievement and development .

There is a growing awareness among developmental scientists that the better a child can self-regulate, the better she can rise to the challenge of mastering ever more complex skills and concepts. In the simplest terms, self-regulation can be defined as the ability to stay calmly focused and alert, which often involves - but cannot be reduced to - self-control. The better a child can stay calmly focused and alert, the better he integrates the diverse information coming in from his different senses, assimilates it, and sequences his thoughts and actions. For someone who thinks that self-regulation is really just a matter of a child's getting in control of his negative emotions, there is very little difference between self-regulation and compliance. But, unlike compliance based on punishment, self-regulation nurtures the ability to cope with greater and greater challenges because it involves arousal states, emotions, behavior, and - as the child grows older - thinking skills.

The results of T-test show that there are significant difference between test anxiety in pre-test and post-test. Also we can see differenced levels of test anxiety between this student (17.6=little, 52.9=average, 19.6=high, 9.8 extreme). Mean scores of test anxiety among students whose parents have academic education is higher than whom their parents don't have academic education that show parents with academic education have more stringent whereas, results of t-test show that there are no significant differences between parents with academic education and no academic education also There are no

significant different in mother profession and there are significant difference between boys and girls test anxiety ($t=-4.66$, $p<0.00$). With comparison Mean of two groups discover that girls encounter higher test anxiety.

Results of meta cognition analyzes show that Mean scores in post-test are higher than pre-test however analyze with t-test method show that there are not significant difference between experimental and control groups in post-test of global reading, problem-solving, support research strategies and total score.

[28] Comprehend students that have infirmity in information analysis and subject organization experience higher test anxiety during exam. Students that used of low learning level method have problem in information analysis and profound understanding of lesson subjects and result that caused weak academic performance and experience high test anxiety.

Self-regulation is a deep, internal mechanism that enables children as well as adults to engage in mindful, intentional, and thoughtful behaviors. Self-regulation has two sides:

First, it involves the ability to control one's impulses and to stop doing something, if needed—for example; a child can resist his immediate inclination to blurt out the answer when the teacher poses a question to another child.

Second, self-regulation involves the capacity to do something (even if one doesn't want to do it) because it is needed, such as waiting one's turn or raising one's hand. Self-regulated children can delay gratification and suppress their immediate impulses enough to think ahead to the possible consequences of their action or to consider alternative actions that would be more appropriate. While most children know that they are supposed to "use their words" instead of fighting; only children who have acquired a level of self-regulation are actually able to use them. This ability to both inhibit one behavior and engage in a particular behavior on demand is a skill used not just in maths interactions (emotional self-regulation) but in thinking (cognitive self-regulation) as well. For example, to read the word cat when it appears under a picture of a dog, a child must overcome the desire to pay more attention to the picture and instead focus on the word [29]. In fact, research shows that children's self regulation behaviors in the early years predict their college achievement in reading and mathematics better than their IQ scores [30], [31] are almost similar this research, results of academic achievement analyzes show mean scores of courses increase in post-test that show self-regulation is useful in practicable and reading courses. With comparison Mean scores in foreign language books discover that pre-test are almost similar to post-test. Besides analyze with t-test methods show that there are significant difference between experimental and control groups in literature, physics, chemistry and maths courses ($p<0.05$) however there are no significant difference in drawing, art, english and Hindi courses. Also the results this research is the same as [32] that showed student that used of higher learning method experience more academic achievement than students that used of low learning methods. [33] in every two self study discovered significant and positive relation between academic achievement and profound methods. In research [34] mind review method negatively and supervision in subject perception positively were predictor of academic achievement. And also results of [35] showed that education of cognitive method and met cognitive and cooperative study cause students exhibit better performance in course scores and self-regulation process can effect on decreasing test anxiety students [36]. self-regulation, self-esteem know as negative predictor of test anxiety and external motivations as predictor positive test anxiety [37]. These findings suggest that the Head-to-Toes Task(

HTT) may be a useful measure of behavioral regulation for Taiwanese precollegeers and provide evidence for the importance of behavioral regulation for academic achievement in Taiwan. Practical implications focus on supporting the development of behavioral regulation in early childhood settings, which can promote early college success [38]. The present study [39] examined the efficacy of a self-regulation intervention with 65 precollege children. Using circle time games, the study examined whether participating in a treatment group significantly improved behavioral self-regulation and early academic outcomes. The findings from this study provide preliminary evidence for the efficacy of the intervention in terms of improving precollegeers' behavioral self-regulation for children low in these skills and improving letter-word identification. Although preliminary, these results have the potential to inform precollege curricula that emphasize behavioral self-regulation as a means of facilitating college readiness. findings suggest that students' self-regulation of learning, self-efficacy beliefs, academic delay gratification, and final course grade are related [40]. Results [41] obtained are mirroring perceived competence of self-regulation and differ from the results concerning metacognitive accuracy. Metacognitive self-regulation persists as an important predictor of college achievement at all developmental levels, and the motivational self-regulation has significant impact on performance in the first and second age group. Finally, children's chronological age, and not whether they experienced one versus two years of precollege, predicted children's vocabulary and self-regulation outcomes. Implications for precollege curricula and instruction are discussed, including the increasing emphasis on literacy learning prior to kindergarten entry and the need to address self-regulation development along with academic learning [42]. Analyses [43] also suggest significant benefits of MLRIT Readiness Project (MRP) for children's preacademic skills, as measured by vocabulary, letter-naming, and math skills. Partial support was found for improvement in children's self-regulation as a hypothesized mediator for children's gains in academic readiness. Implications for programs and policies that support young children's behavioral health and academic success.

Students that encounter in evaluation and exam continuously have low test anxiety and high achievement motive[44] that in this way [45] discovered that students who experience test anxiety in high level when exams them online test anxiety decrease and obvious natural abilities. The current study by [46] influence of genetical evaluation on lowering test anxiety and students academic achievement were analyzed and results showed that they ameliorated the above-mentioned skills but they had no influence on students creativity .Findings [47] provide partial support for the self-regulatory model of test anxiety. Suggesting that additional routes are required to account for the role of parental pressure and teachers' performance-avoidance goals and a re-examination of the relationship between test anxiety and achievement goals. Factor analysis of responses to survey items by a second sample of students refined the initial framework. The final framework comprised three broad domains of perceptions of sources of test anxiety: students' perceptions of the test, their self-perceptions, and their perceptions of the test-taking situation are larger for math than English. Few gender differences emerge, but one prospective analysis reveals that girls who devalue English are more likely to maintain moderate levels of test anxiety across the transition to junior high college. also [50] investigated self-efficacy, gender and trait anxiety as moderators of test anxiety. Results of regression analysis indicated that the model was significant. Self-efficacy contributed 14% of the variability in test anxiety, whereas trait anxiety moderated 49% of the variability in test anxiety. Gender was not a significant predictor of test anxiety. Persons with lower self-efficacy had higher test anxiety scores. Also There are Negative correlations between deductive reasoning and standardized test scores [51].

Results [52] make clear this that test anxiety have significant and positive relation with past exam experience and significant and inverse relation with self-esteem. [53] selected number 2482 person in self research and discovered that a) there are weak relation between test anxiety and achievement b) there are positive and significant relation between self-concept and study habits with achievement.

6 Suggestions

In the end with regard to results of this study self-regulation education can have a effective role in students test anxiety. So it necessary about this problem more serious. And make courses as the way of study for students to decrease this problem and also achievement and society bright capacity growing.

How help to Self-Regulate in Children?

1. Model self-control and self-regulation in your words and actions when you are frustrated with a classroom situation.
2. Provide structure and predictability. Children with self-regulation problems are internally "unstructured." The more freedom and flexibility they have, the more likely they are to demonstrate uncontrolled behaviors.
3. Anticipate transitions and announce changes in classroom schedules.
4. Reward children with good self-regulation capabilities with freedom and flexibility that will offer them opportunities for spontaneous, creative play and learning.
5. Try to identify the most "reactive" and impulsive children and keep them apart from each other. Pairing children who face these challenges can escalate the problem.
6. Remember that impulsive and aggressive children can create an atmosphere of chaos and fear that inhibit the capacity of other children to learn. Don't be afraid to immediately re-direct inappropriate words and actions. Your actions will make the rest of the children feel safer.
7. Seek help. Don't be afraid to point out a child's self-regulation problems with parents or other college personnel. Early identification and intervention can save the child and family years of failure and pain [54].

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Analysis of User's Behavior on Borrowed Book Record in National Central Library University of Laos

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ABSTRACT

The purpose of this paper is to analyze the student's behavior of borrowing book in order to find out the frequent group of book items using association rule technique based on the data mining technologies. Data mining is a powerful tool for discovering interesting relationships hidden in large data set. Apriori algorithm can be applied on the university's library transaction database to improve resource management to find out the relationship which two groups of books nearby together that user like to borrow. In this paper we collected data set of user's record from Central Library National University of Laos. The number of user's behavior data for training set was 6,615 record of personal log and the analysis is done by WEKA application software. The study shows that the total of 8 rules are with the confidence of 75%, 64%, 61%, 52%, 45%, 37%, 34%, and 23% respectively, the results about user's behaviors can be used to manage the library resource.

Keywords: Data mining, Association rule, user's behavior, Library, Apriori Algorithm.

1 Introduction

Library plays a very important role in any organization as the collection source of knowledge and information for Educational institutions, which made it accessible to a defined community for reference or borrowing. Just as now library always supports on and off line services and library services provide a lot of resources, library's collection may include books such as, e-books, periodicals, newspapers, CDs, document and online database so on, to support knowledge learning for students. Computer and communication technology has been currently used in library service to keep resource and user's information and then to provide the students better services. Using technology to search for useful information from the saved data in order to enhance library service is beneficial. Giving exact resources to the users demonstrates the library's effectiveness in passing knowledge to the users. When we compare the borrowed book behavior of every library, we can find that one user can borrow many books at the same time. This can influence the precision in keeping track of books for future use; therefore, the library might not have enough resources for the users' need. Consequently, it is very important to analyze library users' behavior in order to enhance and oversee Library Management [1].

The Central library was created within the National University of Laos (NUOL), a university in Vientiane, the capital of Laos. Central library is a source of information to students, teachers, professors, researchers as well as general user whose interest aggregates for learning resources and information services to

support learning, teaching, research and publication in the academic community field. And cultural mission of the university is to make the operation more efficient to provide service to most users, the corresponding users' services and the maintenance of information resources and tools available to them.

In the Central library National University of Laos, there are a lot of books which are clarified as many groups of books and there are also many users who borrow those books. To provide more attentive service, the arrangement and display of books in the library can be modified based on the inference out of analysis of the library for instance, when a user wants to borrow some books at the same time the manager in the library will recommend some related books together which will ease the time spent by the user.

Association rule mining which is one of the most popular data mining approaches has been used. Data mining is the analysis of relevant information results and to produce different perspectives to understand more about the user's behavior so as to handle library resources. Besides that, it can also figure out what factors to affect users how to use the library including what categories are related to their interest and how to estimate the future needs [2]. Association rule mining is a procedure which is meant to find frequent patterns, correlations, associations, or causal structures from data sets found in various kinds of databases such as relational databases, transactional databases, and other forms of data repositories. [3]

Various algorithms for association rule mining have been presented over time and the most popular algorithm as we know among them is Apriori algorithm.

Apriori algorithm finds the frequent item set from the sets of items that have minimum support. Subset of a frequent item set must also be a frequent item set. Repetitious finding frequent item sets from 1 to k (k-item set) and use the frequent item set to generate association rule.

We will use association rule data mining technique with Apriori algorithm to improve association rule to find two group of books arranged closely to each other after that we will use WEKA software to process dataset. The remainder of this paper is organized as follows. Section 2 describes related work and data mining. Section 3 discusses about methodology such as association rule mining, Apriori algorithm and program WEKA. Section 4 discusses the Experimental and Resultant, the conclusion is in section 5.

2 Related work

2.1 Data mining.

Data mining is a process to create the knowledge from transactional and large amounts of data stored in database, data warehouse by using statistic procedure and machine learning and training set to get the precise information for future management to be used in decision making, also summarizing the useful information results data analysis and knowledge discovery, which may not be displayed in real time by using a database in the fields such as artificial intelligence that can the information or knowledge research. There are several data mining models, every model include a business equation and results in different forms such as starting from rules then becoming decision trees[4].

3 Methodology

In this paper we use Association rule learning which is a popular method for discovering interesting relations between variables in large databases. It is intended to identify strong rules discovered in databases using some measures of interest, and talking about Apriori algorithm.

3.1 Association rule mining

Association rule mining (ARM) is the one most popular method of data mining for discovering interesting relations between items in the dataset. The concept of strong rules was used by Agarwal et al [5] to find association rules in items sold for large scale transaction data base log by point of borrowed systems in library.

An Association rule can be expressed in the form of, $X \rightarrow Y$, Let $I = \{i_1, i_2, i_3, \dots, i_m\}$ which is the set of all items available at the store. Where X and Y are two disjoint item sets. X is an antecedent and Y is a consequent, in other words, X implies Y . The main concept of association rules is to examine all possible rules between items and turn them into 'if-then' statements. In this case the 'if' part is X or the antecedent, while the 'then' part is Y or the consequent. There are two basic parameters importance thresholds for measure association rule mining: support and confidence [6].

The support of a rule is the probability of the item set $\{X, Y\}$ that mean the relative of the rule and the confidence of a rule is the conditional probability of Y given X that indicate the exactness of the rule.

$$\text{Support}(X, Y) = \frac{\text{Support count } X, Y}{\text{Total number of transactions in } D} \quad (1)$$

Therefore, confidence is an important measure of the association rules to indicate the strength rules. If the confidence of the association rule is 80%, it means that 80% of the transactions that contain x also contain y , based on users to indicate the specified minimum confidence [7].

$$\text{Confidence}(XY) = \frac{\text{Support}(XY)}{\text{Support}(X)} \quad (2)$$

3.2 Apriori Algorithm

Apriori algorithm is an influential algorithm in the mining of Association rules in a centralized database. The main idea of Apriori algorithm is described in the following [8]

```
Apriori algorithm
(1)  L1 = {find_frequent_1-itemsets};
(2)  For (k = 2; Lk-1 ≠ ∅; k++) do begin
(3)  Ck = apriori_gen(Lk-1);    // New candidates
(4)  For all transactions t ∈ D do begin
(5)  Ct = subset(Ck, t); // Candidates contained in t
(6)  For all candidates c ∈ Ct do
(7)      c.count ++;
(8)  end
(9)  Lk = {c ∈ Ck | c.count ≥ min_sup}
(10) End
(11) Answer = UkLk;
```

Figure: 1 Apriori Algorithm

3.3 WEKA

WEKA is full name for Waikato Environment for Knowledge Analysis; the abbreviation of this software also is a unique bird in New Zealand. Interestingly, the main developer of WEKA just comes from New Zealand's University of Waikato. WEKA is a free license for academic use, which does not integer with other systems.

WEKA is completely open software for data mining work provides a unified interface, collects the most classic machine learning algorithm and data preprocessing tools. As a complete knowledge acquisition system, it includes the data preprocessing, classification, clustering, and Association rule, attribute selection, and achieves visualization in a new interactive interface.

3.4 Mining Association rule process

The problem is that the manager in the library does not know user's behavior of borrowing book. It is impossible to predict which group of book any student like to borrow together or are related. Therefore, we collected data set to assess user's behavior record from Central Library University in Laos for find relationship borrowed by design and process data analysis to find association rule.

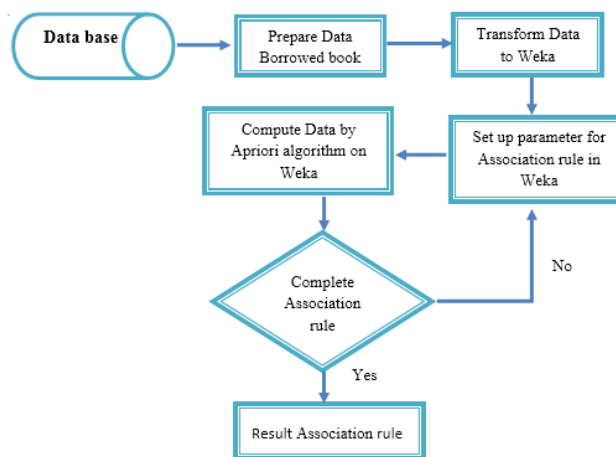


Figure2: Mining association rule process

Figure2: step for preparing data and transforming data to discover association rule by using WEKA software. The core on Figure 2 is computing Data by Apriori algorithm on WEKA. The Apriori algorithm is an influential algorithm for mining frequent item sets. Apriori is a seminal algorithm proposed by R. Agrawal and R. Srikant in 1994 for Boolean association rule. The name of the algorithm is based on the fact the algorithm uses prior knowledge of frequent item set properties.

After transform data from excel to LibofNoul.arff file that can support to WEKA software and arff file was loaded in to WEKA explorer. The associate option in WEKA enables to apply Apriori algorithm on dataset before compute data .We set up Apriori algorithm you can see on figure 4: then WEKA software will compute data for find association rule.

4 Experiment and Analysis

Our paper, we collected data set user's record from Central Library National University in Laos. The number of user's behavior borrowing data was 6,615 the data is composed of personal log, loaning records file from library system as shown in figure 3

List of borrower book				Central library NUOL		
IDuser	Name	Name of book	Author	IDGroup	Date issue	Date due
ລະຫັດຜູ້ໃຊ້	ສິດຊື່	ສິດຊື່ປຶກ	ສິດຊື່ແຕ່ງ	ໝວດປຶກ	ວັນທີອິດ	ວັນທີສິງ
S001134	ນ.ທິບນະຈິນ ນິມມະເສນ	Advanced spoken English	Jones, daniel	E110	2/5/2016	9/5/2016
S001105	ນ.ແສງຈິນ ວັນນະສີ	ຮຽນພາສາອັງກິດດ້ວຍຕົນເອງ	ຍຸທອນ ໄກຍະສອນ	L070	2/5/2016	9/5/2016
S001105	ນ.ແສງຈິນ ວັນນະສີ	High-ED.s Mathematics	ສະໃໝ່ ຫຼ້າວານິດ	M010	2/5/2016	9/5/2016
A011203	ທ. ອິນຕະພອນ ສຸວັນນະສີ	ລາວສືກສາ 2 Ls202	ບຸນສົມ ສີທາທຸກ	C040	2/5/2016	9/5/2016
		speaking Chinese about				
C002014	ທ. ແກງວິນຄຳ ປານແສງ	China(Revised)/T.Lin	Kohli A.B	L070	2/5/2016	9/5/2016
C008001	ທ. ຕຳຕັງສີ ປາມິວ	Landscapes of defence/ jonh R.Gold	Gold, John R	H050	2/5/2016	9/5/2016
C009011	ທ.ປິດໃຈຄຳ ອິນທະວອນ	PHP MySQL	ສິງຄຳ ບຸນສິໂກ	Journal050	2/5/2016	9/5/2016
C009011	ທ.ປິດໃຈຄຳ ອິນທະວອນ	the pronunciation of english	Jones, daniel	L070	2/5/2016	9/5/2016
		ແບບຝຶກຫັດ ແລະ ຜູ້ກຳນົດການແກ້ບັນຫາໂຈດແຄນ				
P004011	ອ.ຈ ຕາວິນ ສຸນປຸໄລ	ຄຸລິດ	ວິໄຊ ທິບມານີ	M030	2/5/2016	9/5/2016
B011041	ທ. ລຽນນະນາ ສີປະເສີດ	ເຄມີທົ່ວໄປຫຼັກ 1(ສະບັບລວມອັດ)	ລິດດາ ມິສຸກ	H650	2/5/2016	9/5/2016
C008012	ນ. ພອນສະຫວັນ ແກ້ວພິນດີ	Intermediate spoken chinese part Two	Delian,Liu	L010	2/5/2016	9/5/2016
		the state stare Ref retrrom in Lation				
C008012	ນ. ພອນສະຫວັນ ແກ້ວພິນດີ	America	Education Lpra	R100	2/5/2016	9/5/2016
C008012	ນ. ພອນສະຫວັນ ແກ້ວພິນດີ	PHP MySQL	ວິໄຊ ທິບມານີ	Journal050	2/5/2016	9/5/2016
B041015	ນ.ຈິນທະຈອນ ຈິນທະວິງ	ຄູ່ມືປຶ້ມແຮມ Matlab ສະບັບສົມບູນ	ມະນັດສິງວອນສິນ	A070	2/5/2016	9/5/2016
B120035	ນ.ຈິນທະຈອນ ຈິນທະວິງ	ຄູ່ມືການເຮັດວຽກເອິດແຄນຄູລິດ 1	ສຸກັນຍາ ສິນດວງນະຍະຍຸກ	M520	2/5/2016	9/5/2016
B120035	ທ. ກິດສະຫາ ພອນສະຫວັນ	Physical science	Tiller,Bill W	H740	2/5/2016	9/5/2016

Figure 3: user's borrowing record

Figure 3: Data set user's record from database include user name, name of book, authors, group of book, date issue and date due, for this training set we use only group of book to find out which groups of books users like to borrow. In the column group for example the full name of code E110 is English, L070 is Language, M010 is Mathematics, and H050 is History and so on.

After extracting data from the system, then we cut and remove some column that does not relate to this training set for example we cut user name and date issue off after complete screening data. Each attribute is a binary or has a value that can be entered in each column as follows.

- Denote t user borrows book.
- Denote? user null borrows book.

While preparing data set from the record, we proceeded to change data files to files suitable with program WEKA used to analyze the data. Therefore, we convert the original file format of Microsoft Excel 2007 to file .arff that can be open in the program WEKA.

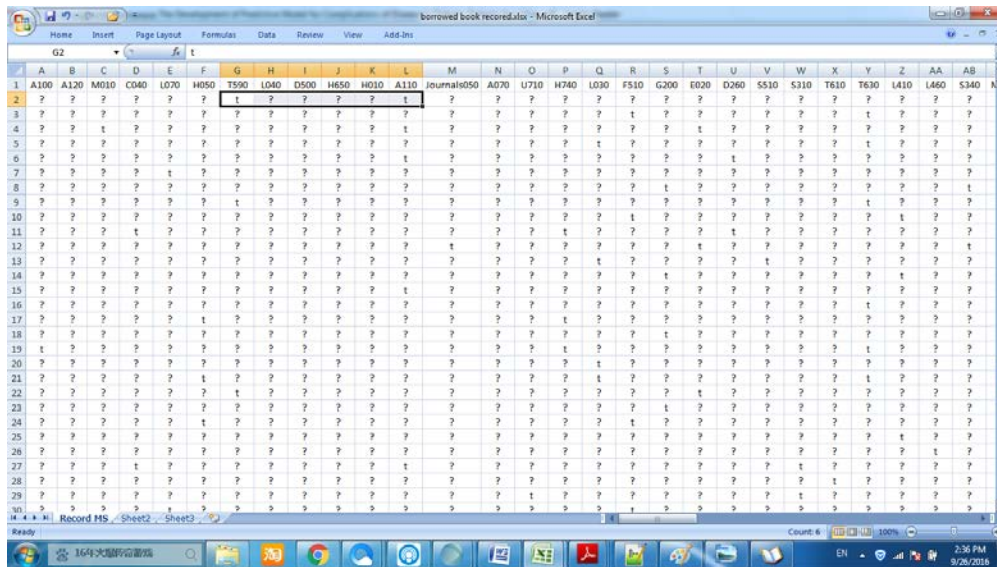


Figure 4: transform record in format of Microsoft excel

Figure 4 shows how to transform data for finding out association rules. This section describes the following: the user borrows book from group T590 and she/her will borrows from group A110 together.

4.1 Setting Parameters

In the WEKA software we will use is the default algorithm selected. However, in order to change the parameters for this run “support and confidence...” we click on the text box of the ‘Choose’ button then select Apriori look at figure 5:

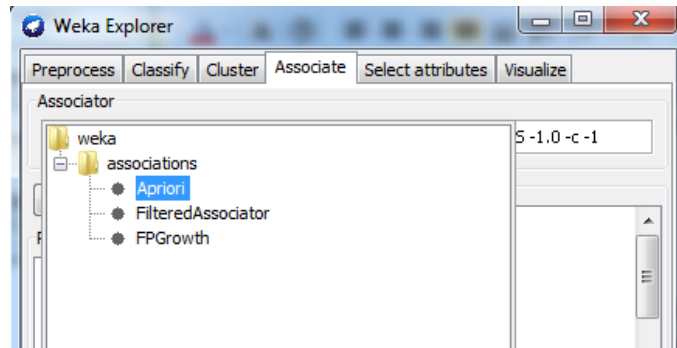


Figure 5: select Apriori algorithm

To find the relation that is the most reliable we can set the parameter associated with Apriori algorithm by program WEKA to find association rule by setting lower bound minimum support 0.03(3%) upper Bound minimum support to 0.1(100%) and setting num. rule is 100 rules look at figure 6.

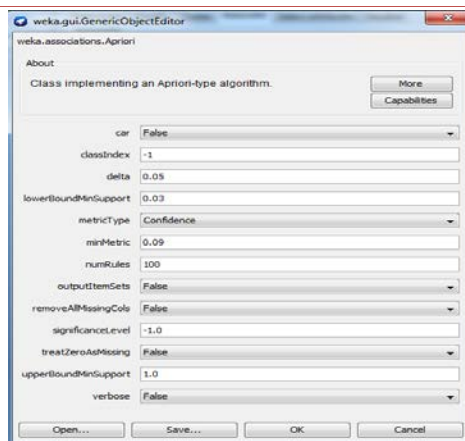


Figure 6: Apriori setting program in WEKA

The data set used for the Training Set was 6,615 user's record from created association rule. This process was found 8 rules showed in figure 7:

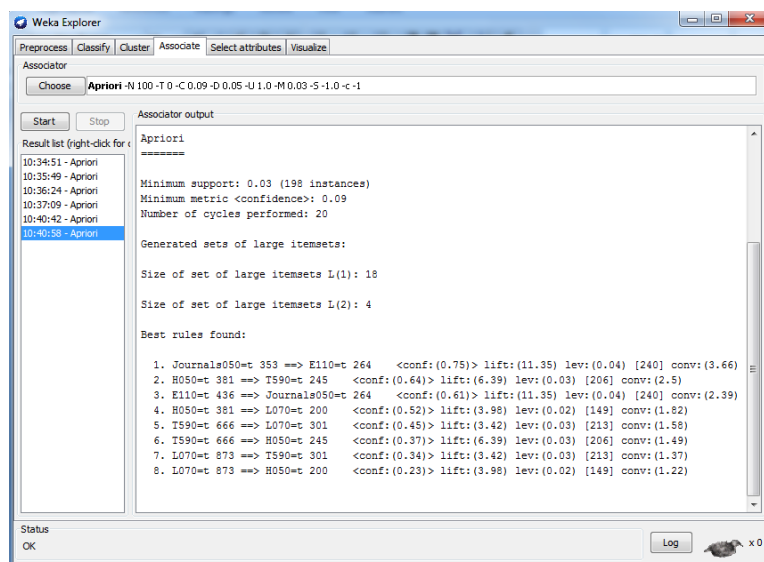


Figure 7: Result association rule found by WEKA 3.7

Display the rules associated with the Minimum Support 0.03 Number of Cyclic Performance 20 Minimum Metric 0.09 is the most appropriate look as figure: 7

1. Rule 1: Journals050 = t 353 ==> E110 = t 264 that mean if user borrowing book from group Journal050 he/she will borrow from group E110 together by confidence 0.75(75%).
2. Rule 2: H050 = t 381 ==> T590 = t 245 that mean if user borrowing book from group 50 H050 he/she will borrow from group T590 together by confidence 0.64(64%).
3. Rule 3: E110 = t 436 ==> Journals050 = t 264 that mean if user borrowing book from group E110 he/she will borrow from group Journal050 together by confidence 0.61(61%).
4. Rule 4: H050 = t 381 ==> L070 = t 200 that mean if user borrowing book from group H050 he/she will borrow from group L070 together by confidence 0.52(52%).

5. Rule 5: T590 = t 666 ==> L070 = t 301 that mean if user borrowing book from group T590 he/she will borrow from group L070 together by confidence 0.45(45%).
6. Rule 6: T590 = t 666 ==> H050 = t 245 that mean if user borrowing book from group T590 he/she will borrow from group H050 together by confidence 0.37(37%).
7. Rule 7: L070 = t 873 ==>T590 = t 301 that mean if user borrowing book from group L070 he/she will borrow from group T590 together by confidence 0.34(34%).
8. Rule 8: L070 = t 873 ==> H050 = t 200 that mean if user borrowing book from group L070 he/she will borrow from group H050 together by confidence 0.23(23%).

5 Conclusion

Data Mining System is useful to study borrowing behavior of the student in library. In particular we use data mining techniques and provides Association rules for apply to library find out of frequent patterns, correlation from between item in the dataset and implement decision support in library was to selected by Apriori algorithm. From the experimental results by using program WEKA we can found relationships and rules is very appeal. The study shows the total of 8 rules with the confidence of 75%, 64%, 61%, 52%, 45%, 37%, 34%, and 23% respectively the results showed that user's behavior can use to manage the resource library. According to the results we can recommend to Management in library (change library layout) may move group of books nearby together to make comfortable for student. Model in this paper can be benefit to manage in resource library.

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