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State of Affairs of the ICT Development in Rakhine State

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ABSTRACT

Rakhine rich people, scientists, technocrats, doctors, engineers, rectors, business men and IT professionals are once one of the best and famous in Myanmar, but now it seems these traditions gradually wither. The next generation should inherit and sustain these endeavors and successes to sculpt their Rakhine future. Students strive to become professionals that who will lead to the Rakhine state in every sector. For ICT development, addition to the local survey results and our analysis shows it is only 0.5% to 3% of students in the Rakhine state are qualified to attend the University of Computer Studies (Sittway) UCSS to become IT graduate. It is not only qualified but also their interestingness in IT. And then the students from the Sittway district are much more qualified and interesting to enroll to the UCSS, whereas the students from the Maung Daw district have less qualification and interestingness is shown by using proposed algorithm and t-weight interestingness measure. Not all, most of the students have lack of prospects about the future, addicted into drugs and alcohols then falling into violence. Our research results intend to motivate for Rakhine young people who require improving their qualification and the authorities and ICT companies noticed that still require to build up the ICT development in the region.

Keywords: ICT development, tweight

1. INTRODUCTION

Rakhine situated at the West of Myanmar, and it is neighbor of Bangladesh, Chin state and Magway division. There are 17 cities divided into 5 districts described detail in section 4.1. The map [9] illustrated in figure 1.

International surveys and indicators describe Rakhine is now ranks as one of the least developed states in Myanmar. Because of the geographical conditions such as mountains and hills cut off from the other states means isolated. States have very limited infrastructure, capacity builing, transport link, electricity, lower literacy and higher poverty rate, unhealthy food and nutrition, conflicts, rough weather condition, storm and natural disasters. Rakhine is vulnerable geographic position surrounded with sea and also stumble upon migration, and conflicts. According to the Integrated Household Living Condition Survey (2009-2010), poverty rate is 43.5% compared to the national average of 25.6%. From the subsequent World Bank re-estimation, overall poverty incidence in Rakhine upwards to 78%, this is the highest in the country compared to a revised national average of 37.5%. Additionally, this state has the highest rates of unemployment in the Union, and lowest rate of labor force participation.

Figure1. The Map of Rakhine State

The education sector also lags behind compare with other states, adult literacy rates are round about 75% compared to Union levels of 91%. And also primary and secondary net enrolment rates, primary completion rate is also at the bottom level compare with Union averages [9].

1.1 Local Survey

As far as we can see that, the economic development is depend on their cultivation of crops, livestock and fisheries. According to our observation, the quality of rice is not good compare to the quality of rice from Ayawaddy division and Shwe Bo division. Thus, this rice cannot trade widely to other states in Myanmar, they only cultivate for local people. The consuming rate of fishes and chilies are very high in the state. Some dry fishes, prawns, fish pastes imported to the other states in Myanmar. Lobster breeding camps can be seen in regions most of them are exported. According to the supply and demand, lobsters, fishes, chickens, and pork are expensive to buy. The commodity prices and inflation rate are very high within ten years has started from 2007 to 2017. Rakhine is also the route for distribution of the Narcotic drugs, WY and ice etc, via from the conveyors, vessels to the other countries. And also this state is just a junction for distribution collected from middle division of Myanmar such as Mandalay, Magway and Pyay and Yangon and that makes a illegal market for demand.

For the social sector, food and hygiene are necessary to rise up for readily available good quality eatables. Restaurants should be educated to be creating cleaner environments. Street foods need hygiene. Fresh vegetables and fruits are imported from other states and very expensive to buy so people cannot eat healthy food. And also their every day meals contain excess use of chilies, so demand is high undeniably the cost is higher than other states. The real estate prices are extremely high compare with Yangon. Because of the demand is high the reasons is the UN, NGO, Foreigners has worked and stayed at Rakhine and most of the Rakhine people from the Maung Daw and Bu Thi Taung city, they migrated to stay at Sittway because of safe and security issues. They abandoned their native and buy very narrow places with high price in Sittway. Some people become rich because of real estate, illegal black business, and make money laundry. The inter-communal conflict is one of the factors in economic underdevelopment.

For ICT development sector, the 24 hours electricity facility has recently got in these previous years. Not all the IT graduated becomes IT professional because there must be the loss of IT human resources in every year based on these factors. The main cause is there have very rare job opportunities for IT professionals who are graduated from UCSS. ICT is underdevelopment compare with other states. According to our survey, most of the IT graduated went to Yangon, some went to foreign countries caused brain drain, and some worked at Banks (eg. KBZ, Ayawaddy, CB) in local. Others worked their own business, shops, stores, mobile sales shops to earn their money. Some IT female students became housewives they could not move to work at other regions because of they did not accept risks and their stereotyped parents. There are at most four computer and accessories sale shops and at most three computer application training centers in the Sittway. There have recently only two grocery shops which used POS system. The local government offices have still lack of use of computerized system. The local ICT companies from Yangon are also reluctant to invest in this state because of encountering many situations. On the other hand, the reversely think that this will be the highest market demand in business accompanied with ICT sectors, and the IT students will become entrepreneur in their region. The UCSS is the one which is the critical source for breeding IT professionals in Rakhine State. Obviously, this is our self-experience encounter the situations of the educational, un-equal economic factors, poor capacity building, lack of qualified human resources, social, and ICT development tend

towards motivated to discover some analysis in basic and higher education. In order to analyze the ICT development, we survey not only the main causes of factors such as very rare job opportunities, geographical position and market situation, but also analyze the main source of ICT breeding industry, the UCSS. With the help of computer science methods, we analyze the students from 6 districts all over the Rakhine State interested in and qualified to enroll to the UCSS. Thus the some part of interestingness in enrollment to the computer university is partially included in the future of ICT development in the Rakhine State.

Descriptive data mining is described in section 2. Some related works are stated in section 3. Proposed system in the section 4, the experimental results depicted in the section 5 and finally, section 6 is the conclusion.

2. DESCRIPTIVE DATA MINING

Data Mining can be categorized into two groups. First is descriptive data mining and second is predictive data mining. Descriptive data mining illustrates the data set in a concise and summarative manner and presents interesting general properties of the data. Predictive data mining analyzes the data in order to construct one or a set of models and attempts to predict the behavior of new data sets [4]. Our research is not likely just a kind of descriptive data mining.

2.1 Concept Description

Descriptive data mining is also known as concept description. It has two factors such as characterization (summarization) of the given collection of data and another is comparison (discrimination) of two or more collections of data.

2.2 Data Generalization: Summarization based characterization

Data generalization is a process that abstracts a large set of task relevant data in a database from a relatively low conceptual level to higher conceptual levels. Two well known methods are the data cube (OLAP) and the attribute oriented induction (AOI) approach. AOI approach is numeric data and the generalization reach to desire level whereas the OLAP approach restricts to a small number of dimension and measure types and it is user control process [2].

Data focusing: collect the task-relevant data table, the result is the initial working relation and the induction will be performed. The induction should be performed either of two ways attribute removal or attribute generalization.

Attribute-removal: remove attribute *A* if there is a large set of distinct values for *A* but: (1) there is no generalization operator on *A*, or (2) *A*'s higher level concepts are expressed in terms of other attributes.

Attribute-generalization: If there is a large set of distinct values for *A*, and there exists a set of generalization operators on *A*, then select an operator and generalize. There are two methods to control a generalization process:

Attribute-threshold control: typical 2-8 is a specified/default value, if the number of distinct values in an attribute is greater than the attribute threshold, then removal or generalization applies.

Generalized relation threshold control: sets a threshold for the generalized (final) relation/rule size.If the number of distinct tuples in the generalized relation is greater than the threshold, and then further generalization applies [3].

2.3 Attribute Oriented Induction Algorithm

The following are the steps of Attribute Oriented Induction algorithm.
c. W← get task relevant data.

//Query processing of task-relevant data, deriving the initial relation, Let W is working relation

b.   Prepare for generalization(W);

// based on the analysis of the number of distinct values in each attribute, determine generalization plan for each attribute: removal? or how high to generalize?

c. P← generalization(W)

The prime generalied relation P, perform generalization to the right level is derived by replacing each value v in W while accumulating the counts [4].

3. RELATED WORK

J.Han et.al proposed generalization based data mining in object oriented databases. The object cube model is proposed for class based generalization, online analytical processing and data mining [5]. The comparison of simple conceptual hierarchy for students and the students of a local IEEE chapter are summarized by using attribute oriented method. This method can combined with neural network, rough set, visualization to deal with efficient data mining process [10]. The survey of various techniques for determining the interestingness of patterns discovered by the data mining process reviewed in [6]. This paper stated the advantages and disadvantages of user driven approach and data driven approach and described their recent work paradox detection. The author presented in [8] is the general overview of the more successful and widely known data mining techniques and algorithms , interestingness measures from the literature that have been successfully employed in data mining applications. The author proposed method to justify the capabilities of data mining model for higher education system in the university. The decision tree method is used to evaluate student's performance in educational data mining process [1]. The author stated that the lots of data are collected in educational databases but it remains unutilized. It was comprehensive survey towards educational data mining and its scope in future [7].

4. OVERVIEW FRAMEWORK OF THE SYSTEM

The contribution of this analysis of ICT development will come out from this main motivation of educational analysis shown in figure 2. In this paper, we focused only on the enrollment rate and interestingness in the UCSS that attempt to achieve partially the basic part of the analysis of ICT development which is circled in the figure 2. According to the international survey, Rakhine has the highest poverty rate, lowest literacy rate and the country announcement, that the lowest 10th standard (also known as University entrance exam) passed rate among all over the country. Literacy rate and poverty rate directly link to the state's economic situations and underdevelopment. The children dropped out from the school to find money source solving for their everyday living. This triangulation of education, economic, ICT development sectors, we analyze the situation as a beneficial to the states. Firstly, the motivation of our research is educational sector need some assessments and analysis. The contribution is we want to analyze the data from 1988 to 2018, 30 years of primary, middle, high school student's enrollment data. We need to find dropped out rate between one stage to another, and trace if the students had made continuous learning started from primary to middle and then to high school. After the students passed 10th standard we find how many Rakhine students would join to which university? How many were graduated? So we construct a overview framework for educational sector analysis as depicted in figure 2.
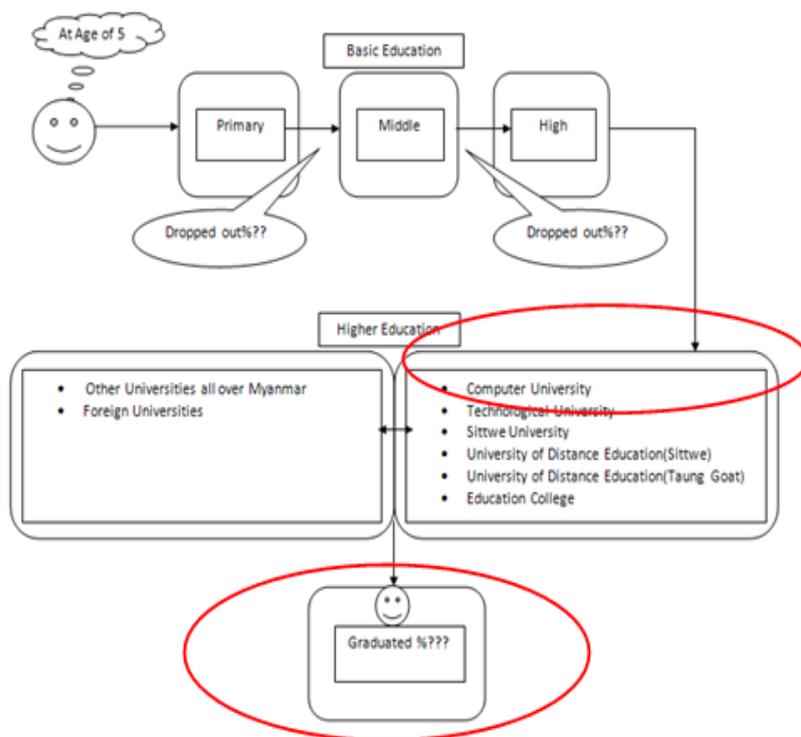

Figure 2. Overview of the Main Motivation

4.1 Proposed System Flow Chart

We have requested these 30 years data from higher education department; unfortunately we have not received yet. Well, in this paper, we proposed the analysis of the ICT development in the Rakhine region, as part of the our research, which is circled region in the figure 2, we mainly focused on the student's enrollment and interestingness measure to the University of Computer Studies (Sittway) UCSS from the all districts of Rakhine State.
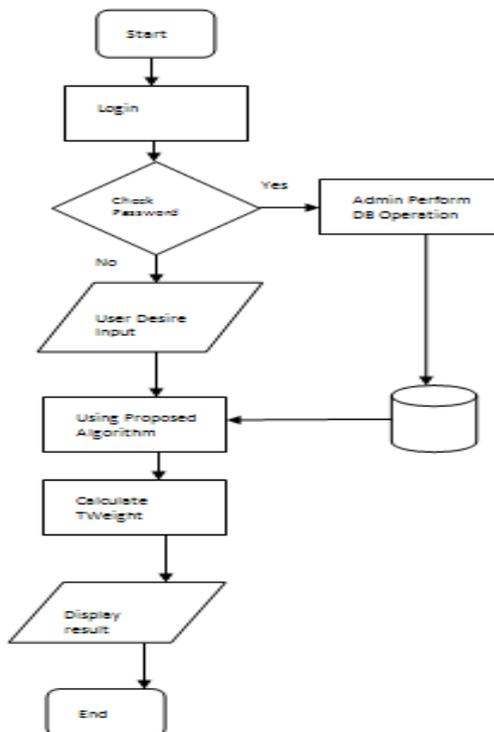

Figure3. Proposed System Flow

Although the Computer University, there is weakness in the record storage is manually with the flat files in the cabinet. So we found the record started from the year 2010 to 2017 of 7 years records. Based on these 7 years data the proposed system flow depicted in figure 3.

4.2 Data and Attributes

Preparation for task relevant data with initial working relation is shown in table 1.

Table1. Initial Working Relation of Attributes

Register-ID	Year	Name	Gender	ID	DOB	Mark	Father's Name	Phno	Residence	City
KaPaTa (SaTa)-1819	2016	Ag Ag Lin	M	11/Takana(N) 098994	23.7.1998	414	U Myint Lwin	9507653271	Thiri Street, Gutar Township	TG
KaPaTa (SaTa)-1820	2016	Myo thant Ag	M	still processing	15.2.1998	410	U Hla Kyaw Phyu	9952376530	KaTha-125,Kone Thae Street, Kone Than Quartar,	ST
KaPaTa (SaTa)-1821	2016	Myat Thu Zar	F	11/Panata(N) 094478	8.10.1998	438	U San Hla Ag	9972965274	537, San Pya Quartar, Min Pha Laung 2 Street	PNG
KaPaTa (SaTa)-1822	2016	Soe Soe Aye	F	11/Bathata(N) 048815	9.4.1998	437	U Kyaw Thein Phyu	9798865240	Khalaya 232,PadaLait village	ST
KaPaTa (SaTa)-1823	2016	Khin Khin Kyaw	F	11/Patana(N) 111438	11.5.1998	435	U Tun Hla Mg	9865437693	No14, Bochin Pyan Street, East Quartar	PT

This example table shows the data for the initial working relation the students enrolled in Computer University (Sittway) UCSS.

The 17 townships with their abbreviation are categorized into 6 district defined as D1, D2, D3, D4, D5 and D6.

D1->Sittway District: Sittway (ST), Pone

   Na Gyun(PN), Pauktaw (PT), Ya

   The Taung (YT).

D2->Kyauk Phyu District: Kyauk Phyu

   (KP), Man Aung (MA), Yan Byae

   (YB), Ann (AN).

D3->Than Dwe District: Than Dwe(TD),

   Taung Gup (TG), Gwa (GW).

D4->Myauk Oo District: Myauk Oo

   (MO), Kyauk Taw(KT), Min Pya

   (MI), Myay Pone (MY).

D5->Maung Daw District: Maung Daw

   (MD), Bu Thi Taung (BT).

D6-> Others (OT): Yangon, Pa Lat Wa, etc.

Although there are 5 districts in Rakhine States, some students are from Yangon, Pa Lat Wa and others so we defined as D6.

4.3 Module of Proposed Algorithm

Begin

    1. Select year

    2. Scan each tuple

    3. If city= "ST" || "PN" || "PT"||

        "YT" then mark as D1;

     Else if city= "KP" || "MA" ||
       "YB"|| "AN" then mark as D2;
     Else if city= "TD" || "TG" ||
       "GW" then mark as D3;
     Else if city= "MO" || "KT" ||
       "MI"|| "MY" then mark as D4;
      Else if city= "MT" || "BT" then
        mark as D5;
     Else mark as D6.
    4. Calculate t-weight
   5. Return resul

    6.Exit

End

Traditional method AOI remove and generalize some tuples whereas our method does not want to removes tuples. Unlike descriptive data mining, our method construct ordinary database and our algorithm perform residence and city to characterize as the districts D1, D2, .etc.

4.4 T-Weight

T-Weight is also known as an interestingness measure that describes the typicality of each disjunction in the rule of the relation. We calculate t-weight as shown in equation (1).

$$t\_weight = \frac{count\ (q_a)}{\sum_{i=1}^{n} count\ t\ (q_i)} \quad (1)$$

The class of the objects that is to be characterized be called the target class. Where q_a be the characterized tuple describing the target class, n is the number of tuples for the target class in the characterized relation. $q_1,...q_n$ are tuples for the target class in the relation and q_a is in $q_1, ...q_n$. Obviously, the range for t-weight is [0.0, 1.0] or [0%, 100%] [4].

5. EXPERIMENTAL RESULTS

A quantitative characteristic rule can be represented either in the relation table or crosstab form by their corresponding t-weight value and or is represented in the logic form [4].
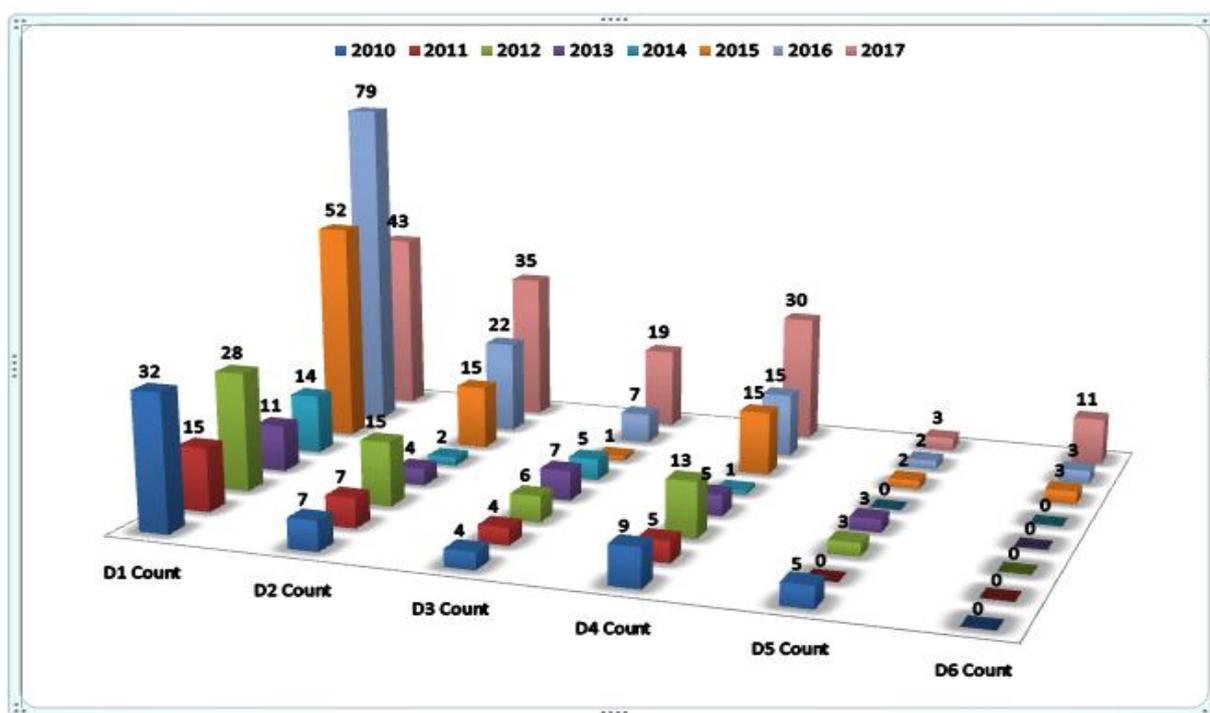

Figure4. Students from Each District 2010-2017

This figure 4 shows the number of students from each district who enrolled to Computer University. Where the left frontier D1 count 32 means the number of students from Sittway district enrolled at 2010, and then 15 in 2011, and finally 43 in 2017. The district D6 count 0 means there was no students enrolled from 2010 to 2014. But D6 was 3 in 2015 and 11 in 2017.
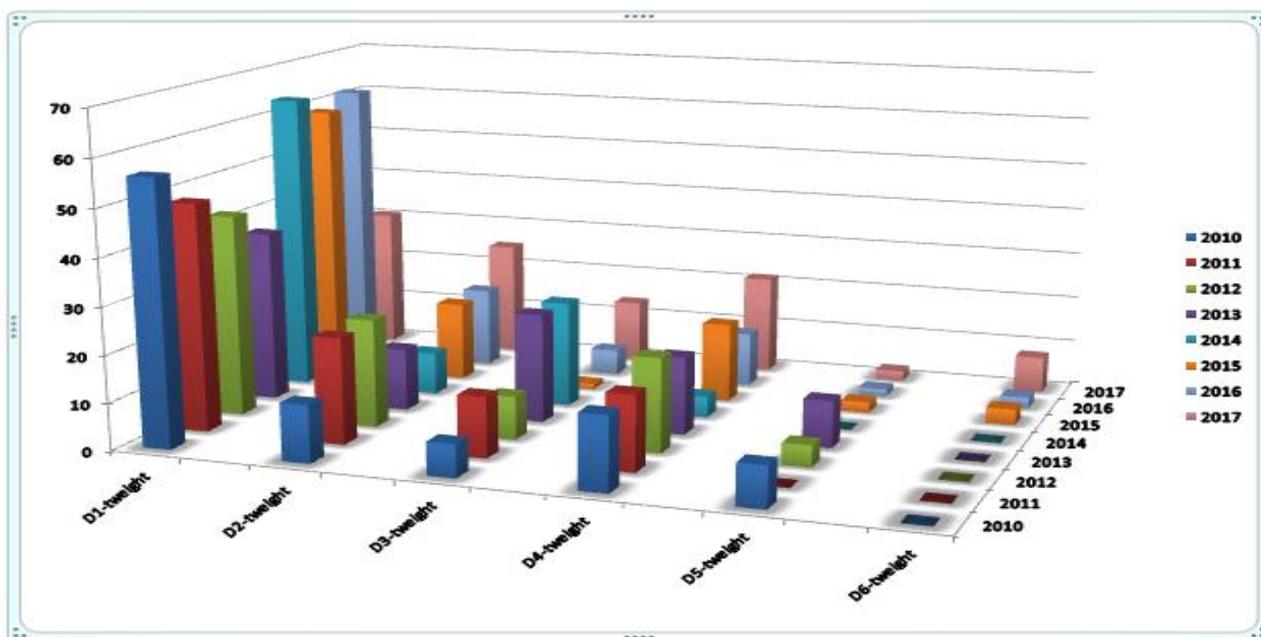
Figure5. Students from Each District Calculated by t-weight.

According to this figure 5, the student from D1 Sittway district, the interestingness measure t-weight value is 56.14%. This means the students from Sittway district are very interested to join and qualified to attend UCSS, D2 Kyauk Phyu district is 12.28% , D3 Than Dwe district is 7.02%, D4 Myauk Oo district is 15.79%, D5 Maung Taw district is 8.77% and D6 others district is 0% at 2010. The highest measure get at 2014 from D1 Sittway district is 63.64% and D5 Maung Daw district and D6 Others are 0% in 2010. As a conclusion, 2010 to 2017 within these 7 years which is depicted from figure 5, the students from D1 Sittway district is highest enrollment to Computer University (Sittway), the second is the D2 Kyauk Phyu district, the third is the D4 Mayuk Oo district, the fourth is the D3 Than Dwe district, the fifth is the D5 Maung Daw district and the last is D6 Others district.
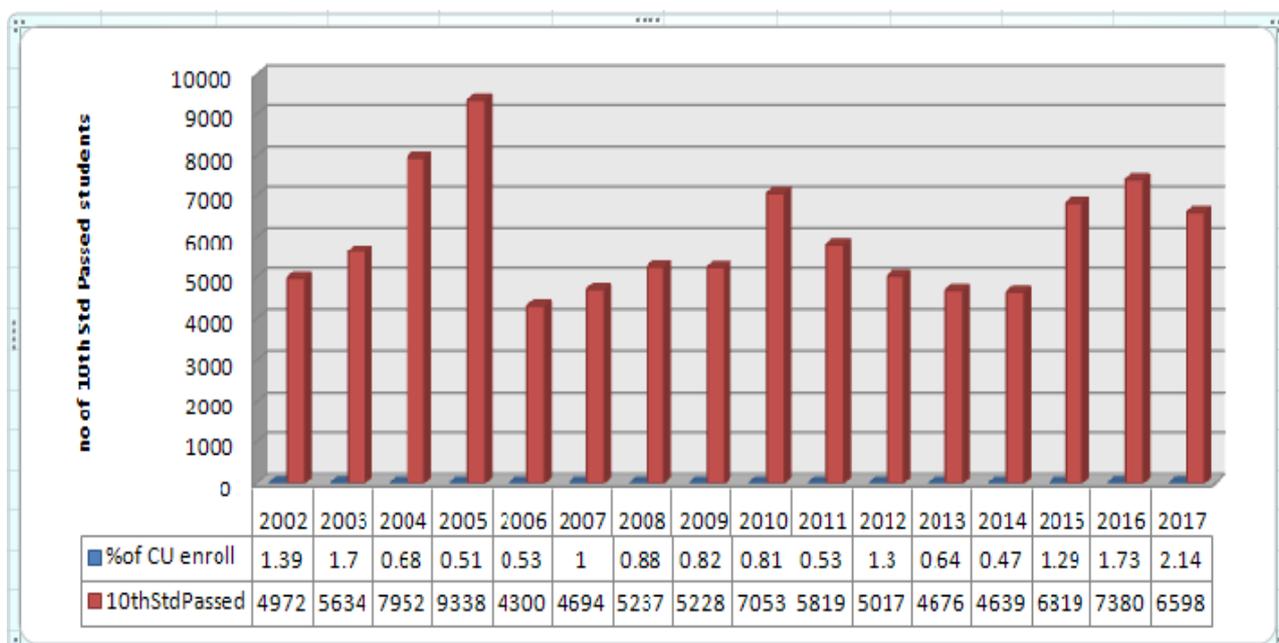

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
%of CU enroll	1.39	1.7	0.68	0.51	0.53	1	0.88	0.82	0.81	0.53	1.3	0.64	0.47	1.29	1.73	2.14
10thStdPassed	4972	5634	7952	9338	4300	4694	5237	5228	7053	5819	5017	4676	4639	6319	7380	6598

Figure6. The Number of 10th Standard Passed Students Within 16 years.

As a consequence, this figure 6 shows the number of 10th standard passed students from 2002 to 2017 in Rakhine State. At 2002, the numbers of 10th standard passed students are 4972 from all over the Rakhine State. The number of students who qualified to attend Computer University is 69. This mean that 1.39% of Rakhine students would be qualified and attended to UCSS that would became IT graduate. The lowest enrollment rate was 0.51% in 2005 the highest enrollment rate was 2.14% in 2017.
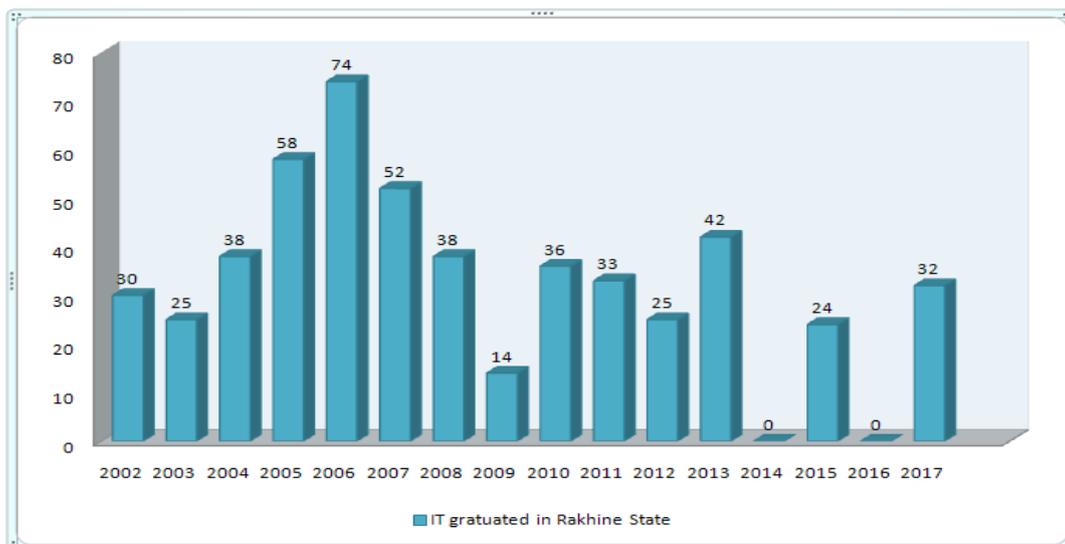
Figure7. IT Graduated in Rakhine State

This figure 7 illustrated the number of IT graduated students from 2002 to 2017. The highest was 74 students in 2006. The 0 students from 2014 and 2016 means the new academic plan changed 4 years in 2014 and 5 years plan in 2016. Therefore it was 24 students from 2015 and 32 students from 2017. These 2017 IT graduated students passed 10th standard exam in 2012. So according to figure 6 and 7, among 5017 students from Rakhine state there was only 32 students became IT graduated in 2017.

6. Conclusion

In order to develop the ICT sectors in Rakhine States, according to these figures Rakhine students should be built their skills as a robust foundation from the basic education level. As consequences, the IT professionals still need to be required in their region in order to develop ICT sectors in the Rakhine State. For my opinion, this situation depends on basic education teaching methodologies, encouragements, self motivation, the state's economic situation, parent's education, encouragement, transportation, city development, religious, and conflicts. As a highly requirement of the market demand, the shop keepers, government officers should need to educate in using computerized system. Additionally, authorities must be required to create job opportunities for IT professional in Rakhine State.

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