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Rought Set: Effective Method for Determining Scholarship Recipients

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Abstract: Every year, higher education institutions receive a KIP Tuition scholarship quota that has been determined by Ristek Dikti through LLDIKTI which is given during the new student admissions process. The process of determining recipients is carried out manually resulting in inaccurate scholarship recipients being selected and the selection results may not be the same based on those who participated in making the decision. This research is motivated by the need for an algorithm for determining prospective scholarship recipients that is appropriate and effective because the recipient selection process often takes a long time because many high school and equivalent students register so that they exceed the quota limit while the quota given is limited. This research aims to use a system for scholarship recipients and provide rules and knowledge, namely rough set Theory and adapted to the Rosetta application, using prospective student data during the selection process for new students who apply for the KIP Kuliah scholarship in the 2020/2021 academic year. The resulting decision is the KIP Opportunity which consists of 4 (four) attributes, including parents' income, housing status, dependents, and parental status. The results of this research using sample data from 12 people produced 6 (six) rules and knowledge of 26 rules. This research is very supportive in identifying the eligibility of KIP Kuliah recipients.

Keywords: KIP college; Knowledge; Rules; Rought set scholarships

Introduction

The most important component for the country is education because education is the main key to forming human beings who have resources (Tungadi et al., 2018). As contained in Article 31 paragraphs 1-2 of the 1945 Constitution of Indonesia, all Indonesian citizens have the right to education (Sulistiani, 2018). Therefore, the Government is trying to make the nation's children smart, in the form of the Smart Indonesia Program by issuing the Smart Indonesia College Card (KIP Kuliah) in 2020 according to political advertisements in the 2019 presidential election with the promise of Mr. Ir. H. Joko Widodo and Prof. Dr. (H.C.) KH. Ma'ruf Amin will "Make Indonesia a Country with Millions of Scholars, a Country of Champions" (Tinarbuko, 2019). The KIP College Scholarship is college support provided for high school graduates who come from low-income families so that they can continue their education to the next stage, submitted by Ristek Dikti through the Higher Education Service Institute (LLDIKTI) (Jaroji et al., 2016).

Every year, higher education institutions receive a scholarship quota which has been determined by Ristek Dikti through LLDIKTI which is given during the new student admission process. To be on target, the selection of KIP Lecture applicants by higher education institutions as mandated by Ristek Dikti must be done quickly and by the criteria that have been set so that the target scholarship recipients are right. The criteria that must be met by applicants include parental income, home status, dependents, and parental status. The process of selecting recipients often takes a long time because many high school and equivalent students register so that they exceed the quota limit while the quota given is limited.

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Obstacles are always experienced by decision-makers, giving rise to errors because the process of determining recipients is carried out manually resulting in inaccurate scholarship recipients being selected and the election results may not be the same based on those who participated in making the decision (Dwivedi et al., 2021). To carry out assessment activities with large amounts of data, to reduce subjectivity during the decision-making process, and effectiveness in decision-making increases. So, a system is needed that can predict the number of scholarship recipients (Felzmann et al., 2020). The appropriate system for predicting scholarship recipients and providing rules and knowledge is a rough set Theory adapted to the Rosetta application (Skowron & Dutta, 2018). In 1982 Rough sets were developed by Pawlack, an efficient mathematics-based artificial intelligence technique for finding hidden knowledge in large-scale databases (Pattaraintakorn & Cercone, 2008). Research with Rough Set was conducted by Wang (2005), aimed at helping managers analyze consumer behavior in destination marketing (Hariri et al., 2019). Research conducted by Riegler (2023), Gleißner et al. (2022), and Cosma et al. (2020), aims to ensure the level of sustainability as accurately as possible for each bank. Research conducted by Xu et al. (2022), and Mauro et al. (2022) aims to identify the level of damage (Tibaduiza Burgos et al., 2020; Rahayu et al., 2022). Research conducted by Gustriansyah et al. (2022), Sleiman et al. (2022), aims to predict product sales in determining future product availability policies (Zhang & Qiu, 2021; Krishnan et al., 2023).

Method

The method used in this research is Rough Set, which uses prospective student data during the selection process for new students who apply for the KIP Kuliah scholarship in the 2020/2021 academic year from the site https://kip-kuliah.kemdikbud.go.id/sim/auth /login (Li et al., 2023). After the data is prepared, the next step is to carry out the process of determining scholarship recipients using the Rough Set method with Rosetta software. For more clarity, the research stages use the Rough Set method as in Figure 1.

Based on Figure 1, the research stages using a Rough Set can be explained as follows: Data is prepared in tabular form (Decision System); Is the process of forming condition attributes and decision attributes; Form an Equivalence Class Formation of Equivalence Class based on Table 1 (Decision System) by eliminating data that has similarities into 1 (one) record; Form a Discernibility Matrix or Modulo D Discernibility Matrix; The Discernibility Matrix or Dicernibility Modulo D Matrix is formed based on the Equivalence Class, by first forming the Discernibility Matrix, and then the Dicernibility Matrix Modulo D; Process Reduction; Selecting the Condition Attributes that will be used to generate knowledge is carried out by a Reduction process; Generating Rules Process, It is a process to produce knowledge after the reduct is produced.

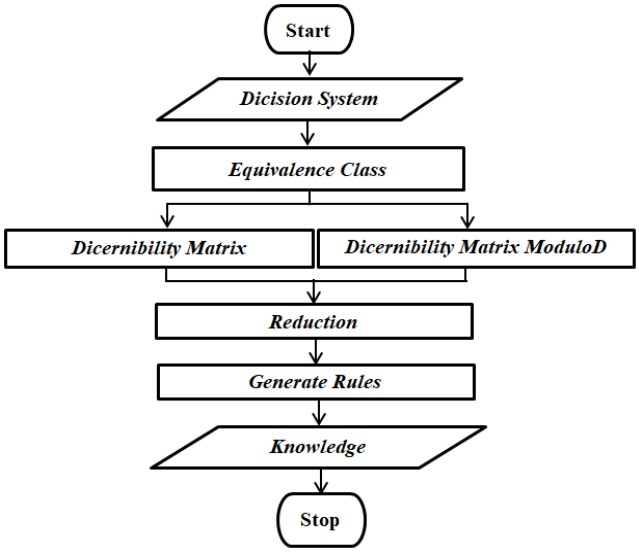

Figure 1. Research stages using the Rough Set method

Result and Discussion

According to Wang et al. (2021), "Data mining is a mining process useful information from such a large amount of data. Data mining includes collection data, data extraction, data analysis, and data statistics. According to Jassim et al. (2021), and Križanić (2020) 'Data mining is a process that uses statistical techniques, mathematics, artificial intelligence to extract and identify useful information and related knowledge from various databases big' (Ekwonwune et al., 2022; Järvinen et al., 2021). According to Leventhal (2010), Wu et al. (2021), Pejić Bach et al. (2019), Data Mining is analysis and review of data sets to discover unexpected relationships and summarize data in a different way than before, which is understandable and beneficial for data owners According Shu et al. (2023), and Sarker (2021), Data Mining is several processes employ one or more computer learning (machine learning) techniques to analyze and extract knowledge automatically. The Rough Set algorithm is a data mining knowledge technique for obtain information in the form of a decision system (table equipped with attributes criteria and decisions) (Huang & Li, 2021; Greco et al., 2001; Chelly Dagdia et al., 2020). The main advantage of using rough sets over fuzzy sets Data analysis does not require initial or additional data about the data, such as probability in statistics, membership levels or probability values in theory fuzzy sets (Yao & Zhou, 2016; Kumar & Premalatha, 2023; Chen & Huang, 2021).

Before using Rosetta software in the Rough Set process, you need to do the following (Kaufmann et al., 2010; Dwiputranto et al., 2022; Akbari et al., 2018): Prepare the KIP College scholarship applicant data. As a condition for the opportunity to receive KIP College, it can be in the form of Parents' Income (PO) with the following conditions; PO > 5.000,000 is declared High; 3.000.000 ≤ PO ≤ 5.000,000 is declared Normal; PO<3.000,000 is declared Low; House Status (SR) consists of Annual Rent; Hitchhiking; Own: Dependents (TG) with conditions; TG > 3 People, declared Many; TG ≤ 3 People, declared Slight; Parental Status (SO) consists of Orphan; Life.

Preparing Data in Tabular Form (Decision System)

From applicant data, data is prepared in table form (Decision System) consisting of 4 (four) condition attributes and 1 decision attribute with a total of 12 applicants. The table (Decision System) is prepared in Table 1.

Table 1. Decision System

Student	Income Parent (A)	Home Status (B)	Dependents (C)	Parental Status (D)	KIP Opportunities
M1	Low	Alone	Lots	Life	Worthy
M2	Normal	Alone	A little	Orphan	Considered
M3	Tall	Alone	A little	Orphan	Not feasible
M4	Low	Alone	Lots	Life	Worthy
M5	Normal	Annual Rental	Lots	Orphan	Worthy
M6	Tall	Alone	Lots	Life	Not feasible
M7	Normal	Annual Rental	Lots	Life	Worthy
M8	Low	Hitchhiking	Lots	Orphan	Worthy
M9	Tall	Alone	A little	Life	Not feasible
M10	Normal	Annual Rental	Lots	Orphan	Worthy
M11	Low	Hitchhiking	Lots	Orphan	Worthy
M12	Tall	Alone	Lots	Life	Not feasible

Forming an Equivalence Class

Is the process of grouping objects that have the same Condition Attribute values based on table 1 (Decision System), the resulting equivalence class is explained in table 2.

Table 2. Equivalence Class

Equivalence Class	Income Parent (A)	Home Status (B)	Dependents (C)	Parental Status (D)	KIP Opportunities
EC1	Low	Alone	Lots	Life	Worthy
EC2	Normal	Alone	A little	Orphan	Considered
EC3	Tall	Alone	A little	Orphan	Not feasible
EC4	Normal	Annual Rental	Lots	Orphan	Worthy
EC5	Tall	Alone	Lots	Life	Not feasible
EC6	Normal	Annual Rental	Lots	Life	Worthy
EC7	Low	Hitchhiking	Lots	Orphan	Worthy
EC8	Tall	Alone	A little	Life	Not feasible

Shaping Discernibility Matrix or Dicernibility Matrix Modulo D

Matrix will form in the Discernibility Matrix process is an 8x8 based matrix Equivalence Class, like Table 3. After forming the discernibility Matrix, so step next determine the Distinction Matrix Modulo D based on the Equivalence Class. After doing steps like forming the Discernibility Matrix, I generated a Distinction Matrix Modulo D like in Table 4.

Table 3. Discernibility Matrix

EC	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8
EC1	X	ACD	ACD	ABD	A	AB	BD	AC
EC2	ACD	X	A	BC	ACD	BCD	ABC	AD
EC3	ACD	A	X	ABC	CD	ABCD	ABC	D
EC4	ABD	BC	ABC	X	ABD	D	AB	ABCD
EC5	A	ACD	CD	ABD	X	AB	ABD	C
EC6	ABD	BCD	ABCD	D	AB	X	ABD	ABC
EC7	BD	ABC	ABC	AB	ABD	ABD	X	ABCD
EC8	AC	AD	D	ABCD	C	ABC	ABCD	X

Tabel 4. Dicernibility Matrix Modulo D

EC	EC1	EC2	EC3	EC4	EC5	EC6	EC7	EC8
EC1		ACD			A			AC
EC2	ACD		A	BC		BCD	ABC	AD
EC3	ACD	A		ABC		ABCD		
EC4		BC	ABC		ABD			ABCD
EC5	A	ACD		ABD		AB		
EC6		BCD	ABCD		AB			ABC
EC7		ABC			ABD			A B C D
EC8	air conditioning	AD		A B C D		A B C		

Carrying out the Reduction Process

To get knowledge based on Distinction Matrix Modulo D, using equality Boolean algebra later the result made Reduct. For more explanation of the resolution process reduction outlined in Figure 2.

Class	CNF of Boolean Function	Prime Implicant	Reduct
E1	=(A∨C∨D)∧A∧(A∨C) =(A+C+D)*A*(A+C) = AA+AC+AD*(A+C) =A*(1+C)+AD*(A+C) =A+AD*(A+C) =A(1+D)*(A+C) =A*(A+C) =AA+AC =A(1+C) **=A**	(A)	{A}
E2	=(A∨C∨D)∧A∧(B∨C)∧(B∨C∨D)∧(A∨B∨C) ∧(A∨D) =(A+C+D)*A*(B+C)*(B+C+D)*(A+B+C)*(A+D) =(AA+AC+AD)*(BB+BC+BD+BC+CC+CD)*(AA+AD+AB+BD+AC+CD) =(A*(1+C)+AD)*(B*(1+C)+BD+C*(1+B)+CD)*(A*(1+D)+AB+BD+AC+CD) =(A+AD)*(B+BD+C+CD)*(A*(1+B)+BD+AC+CD) =(A*(1+D)*(B*(1+D)+C(1+D))*(A*(1+C)+BD+CD) =A*(B+C)*(A+BD+CD) =(AB+AC)*(A+BD+CD) =AB+ABD+ABCD+AC+ABCD+ACD =AB+ABD+ABCD+AC+ACD =AB(1+D)+ABCD+AC(1+D) =AB+ABCD+AC =AB+(1+CD)+AC **=AB+AC**	(A∧B)∨(A∧C)	{A,B}{A,C}
E3	=(A∨C∨D)∧A∧(A∨B∨C)∧(A∨B∨C∨D) =(A+C+D)*A*(A+B+C)*(A+B+C+D) =(AA+AC+AD)*(AA+AB+AC+AD+AB+BB+BC+BD+AC+BC+CC+CD) =(AA+AC+AD)*(AA+AB+AC+AD+BB+BC+BD+CC+CD) =(A*(1+C)+AD)*(A*(1+B)+AC+AD+B*(1+C)+BD+C*(1+D) =(A+AD)*(A+AC+AD+B+BD+C =A*(1+D)*(A*(1+C)+AD+B(1+D)+C =A*(A+AD+B+C) =AA+AD+AB+AC =A(1+D)+AB+AC =A*(1+B)+AC =A+AC =A*(1+C) **=A**	(A)	{A}

E4

=(B∨C)∧(A∨B∨C)∧(A∨B∨D)∧(A∨B∨C∨D)
=(B+C)*(A+B+C)*(A+B+D)*(A+B+C+D)
=(AB+BB+BC+AC+BC+CC)*(AA+AB+AC+AD+AB
+BB+BC+BD+AD+BD+CD+DD)
=(AB+BB+BC+AC+CC)*(AA+AB+AC+AD+BC+BB+
BD+CD+DD)
=(B*(1+A)+BC+C*(1+A))*(A*(1+B)+AC+AD+B*
(1+C)+BD+D*(1+C)
=(B+BC+C)*(A+AC+AD+D +B+BD)
=(B*(1+C)+C)*(A+(1+C)+D*(1+A)+B*(1+D)
=(B+C)*(A+D+B)
=AB+BD+BB+AC+CD+BC
=AB+B(1+D)+AC+CD+BC
=AB+B+AC+CD+BC
=B(1+A)+AC+CD+BC
=B+BC+AC+CD
=B(1+C)+AC+CD
=B+AC+CD

B∨(A∧C)∨(C∧D) **{B}{A,C}{C,D}**

E5

=A∧(A∨C∨D)∧(A∨B∨D)∧(A∨B)
=A*(A+C+D)*(A+B+D)*(A+B)
=(AA+AC+AD)*(AA+AB+AB+BB+AD+BD)
=(A+AC+AD)*(A+AB+ B+BD +AD)
=(A(1+C)+AD)*(A*(1+B)+B*(1+D)+AD)
=(A+AD)*(A+B+AD)
=(A*(1+D))*(A*(1+D)+B)
=A*(A+B)
=AA+AB
=A(1+B)
=A

A **{A}**

E6

=(B∨C∨D)∧(A∨B∨C∨D)∧(A∨B)∧(A∨B∨C)
=(B+C+D)*(A+B+C+D)*(A+B)*(A+B+C)
=(AB+BB+BC+BD+AC+BC+CC+CD+AD+BD+CD+DD)*
(AA+AB+AC+AB+BB+BC)
=(AB+B+BC+BD+AC+C+CD+AD+D)*
(A+AB+AC+B+BC)
=(B*(1+A)+BC+BD+C*(1+A)+CD+D*(1+A)*(A*(1+B)+
AC+B*(1+C))
=(B+BC+BD+C+CD+D)*(A+AC+B)
=(B*(1+C)+BD+C*(1+D)+D)*(A*(1+C)+B)
=(B+BD+C+D)*(A+B)
=(B*(1+D)+C+D)*(A+B)
=(B+C+D)*(A+B)
=AB+BB+AC+BC+AD+BD
=B*(1+A)+AC+BC+AD+BD
=B+BC+AC+AD+BD
=B(1+C)+AC+AD+BD
=B+AC+AD+BD
=B+BD+AC+AD
=B*(1+D)+AC+AD
=B+AC+AD

B∨(A∧C)∨(A∧D) **{B}{A,C}{A,D}**

E7

=(A∨B∨C)∧(A∨B∨D)∧(A∨B∨C∨D)
=(A+B+C)*(A+B+D)*(A+B+C+D)
=(AA+AB+AD+AB+BB+BD+AC+BC+CD)*(A+B+C+D)
=(A+AB+AD+AB+B+BD+AC+BC+CD)*(A+B+C+D)
=(A*(1+B)+AD+B*(1+A)+BD+AC+BC+CD)*(A+B+C+D)
=(A+AD+B+BD+AC+BC+CD)*(A+B+C+D)
=(A*(1+D)+B*(1+D)+AC+BC+CD)*(A+B+C+D)
=(A+AC+B+BC+CD))*(A+B+C+D)
=(A*(1+C)+B*(1+C)+CD)*(A+B+C+D)
=(A+B+CD)*(A+B+C+D)
=AA+AB+AC+AD+AB+BB+BC+BD+ACD+BCD+CD+
CD
=AA+AB+AC+AD+BB+BC+BD+ACD+BCD+CD
=A+AB+AC+ACD+AD+B+BC+BD +BCD+CD
=A*(1+B)+AC*(1+D)+B*(1+C)+BD+CD*(1+B)
=A+AC+B+BD+CD
=A*(1+C)+B*(1+D)+CD
=A+B+CD

A∨B∨(C∧D) **{A}{B}{C,D}**

```
E8      =(A∨C)∧(A∨D)∧(A∨B∨C∨D)∧(A∨B∨C)                    A∨(C∧D)      {A}{C,D}
        =(A+C)*(A+D)*(A+B+C+D)*(A+B+C)
        =(AA+AD+AC+CD)*(AA+AB+AC+BB+BC+CC+AD+
          BD+DC)
        =(A*(1+D)+AC+CD)*(A*(1+B)+AC+B*(1+C)+(C*(1+D)
         +AD+BD
        =(A*(1+C)+CD)*(A*(1+C)+B+C+AD+BD)
        =(A+CD)*(A+B+C+AD+BD)
        =(A+CD)*(A*(1+D)+C+B*(1+D)
        =(A+CD)*(A+C+B)
        =AA+AC+AB+ACD+CD+BCD
        =A(1+C)+AB+CD*(1+A)+BCD
        =A(1+B)+CD+BCD
        =A+CD*(1+B)
        =A+CD
```

Figure 2. Completion process *reduction*

From Figure 2 the results of the completion process *reduction* produce 5 (five) Reducts that is:

Table 5. completion Process *Reduction* Produces 5 (five) Reducts

{A}	{PARENT'S INCOME}
{AIR CONDITIONING}	{PARENTS' INCOME, DEPENDENTS}
{A, B}	{PARENT INCOME, HOME STATUS}
{B}	{HOME STATUS}
{CD}	{DEPENDENCE, PARENTAL STATUS}
{A, D}	{PARENT INCOME, PARENT STATUS}

Rule Generating Process

Rule Generating Process done after obtained described reduct _ as following:

{PARENT' S INCOME} or {A}
If the Income of Parents = Low then KIP Opportunity is = Decent
If Income Parents = Normal then KIP Opportunity = Considered or KIP Opportunity = Feasible
If Income Parents =High then KIP Chance = No Worthy

{PARENT INCOME, DEPENDENTS} or {A, C}
If Income Parents = Low and Dependents = Many then KIP Opportunities = Decent
If Income Parents = Normal and Dependents = Few then KIP Opportunities = Considered
If Income Parents = Normal and Dependents = Many then KIP Opportunities = Decent
If Income Parents = Tall and Dependents = Few then KIP Opportunities = No Worthy
If Income Parents = Tall and Dependents = Lots of KIP Opportunities = No Worthy

{PARENT INCOME, HOME STATUS} or {A, B}
If Income Parents = Low and Home Status = Alone then KIP Opportunities = Decent
If Income Parents = Low and House Status = Hitchhiking then KIP Opportunities = Decent
If Income Parents = Normal and Home Status = Alone then KIP Opportunities = Considered
Income Parents = Normal and House Status = Rented Annually then KIP Opportunity = Feasible
Income Parents = Height and Home Status = Alone then KIP Opportunity = No Worthy

{HOME STATUS} or {B}
House Status = Own then KIP Opportunity = Eligible or KIP Opportunity = Considered or KIP Opportunity = No Worthy
Home Status = Hovering then KIP Opportunity = Decent
If House Status = Rented Annually then KIP Opportunity = Feasible

{DEPENDENCE, PARENTAL STATUS} or {C, D}
If Dependents = Many and Parental Status = Alive then KIP Opportunity = Eligible or KIP Opportunity = No Worthy
If Dependents = Many and Parental Status = Orphaned then KIP Opportunity = Decent
If Dependents = Few and Parental Status = Orphaned then KIP Opportunity = Considered or KIP Opportunity = No Worthy
If Dependents = Few and Parental Status = Alive then KIP Opportunity = No Worthy

{PARENT INCOME, PARENT STATUS} or {A, D}
If Income Parents = Low and Parental Status = Alive then KIP Opportunities = Decent
If Income Parents = Low and Parental Status = Orphaned then KIP Opportunities = Decent
If Income Parents = Normal and Parental Status = Orphaned then KIP Opportunity = Considered or KIP Opportunity = Feasible
If Income Parents = Normal and Parental Status = Alive then KIP Opportunities = Decent
If Income Parents = Height and Status of Parents = Orphans then KIP Opportunity = Decent

If Income Parents = Height and Status of Parents = Living then KIP Opportunities = Decent

Test Result Rough Set method

Data processing carried out manually can _ test the truth using Rosetta which is one of the software from the Rough Set method with results of the test displayed in Figure 3.

RULE

	Rule	LHS Support	RHS Support	RHS Accuracy	LHS Coverage	RHS Coverage	RHS Stability	LHS Length	RHS Lengt
1	PENGHASILAN ORANGTUA(RENDAH) AND STATUS RUMAH(SENDIRI) => PELUANG KIP(LAYAK)	2	2	1.0	0.166667	0.285714	1.0	2	1
2	PENGHASILAN ORANGTUA(NORMAL) AND STATUS RUMAH(SENDIRI) => PELUANG KIP(DIPERTIMBANGKAN)	1	1	1.0	0.083333	1.0	1.0	2	1
3	PENGHASILAN ORANGTUA(TINGGI) AND STATUS RUMAH(SENDIRI) => PELUANG KIP(TIDAK LAYAK)	4	4	1.0	0.333333	1.0	1.0	2	1
4	PENGHASILAN ORANGTUA(NORMAL) AND STATUS RUMAH(SEWA TAHUNAN) => PELUANG KIP(LAYAK)	3	3	1.0	0.25	0.428571	1.0	2	1
5	PENGHASILAN ORANGTUA(RENDAH) AND STATUS RUMAH(MENUMPANG) => PELUANG KIP(LAYAK)	2	2	1.0	0.166667	0.285714	1.0	2	1
6	PENGHASILAN ORANGTUA(RENDAH) AND TANGGUNGAN(BANYAK) => PELUANG KIP(LAYAK)	4	4	1.0	0.333333	0.571429	1.0	2	1
7	PENGHASILAN ORANGTUA(NORMAL) AND TANGGUNGAN(SEDIKIT) => PELUANG KIP(DIPERTIMBANGKAN)	1	1	1.0	0.083333	1.0	1.0	2	1
8	PENGHASILAN ORANGTUA(TINGGI) AND TANGGUNGAN(SEDIKIT) => PELUANG KIP(TIDAK LAYAK)	2	2	1.0	0.166667	0.5	1.0	2	1
9	PENGHASILAN ORANGTUA(NORMAL) AND TANGGUNGAN(BANYAK) => PELUANG KIP(LAYAK)	3	3	1.0	0.25	0.428571	1.0	2	1
10	PENGHASILAN ORANGTUA(TINGGI) AND TANGGUNGAN(BANYAK) => PELUANG KIP(TIDAK LAYAK)	2	2	1.0	0.166667	0.5	1.0	2	1
11	PENGHASILAN ORANGTUA(RENDAH) => PELUANG KIP(LAYAK)	4	4	1.0	0.333333	0.571429	1.0	1	1
12	PENGHASILAN ORANGTUA(NORMAL) => PELUANG KIP(DIPERTIMBANGKAN) OR PELUANG KIP(LAYAK)	4	1, 3	0.25, 0.75	0.333333	1.0, 0.428571	1.0, 1.0	1	2
13	PENGHASILAN ORANGTUA(TINGGI) => PELUANG KIP(TIDAK LAYAK)	4	4	1.0	0.333333	1.0	1.0	1	1
14	PENGHASILAN ORANGTUA(RENDAH) AND STATUS ORANGTUA(HIDUP) => PELUANG KIP(LAYAK)	2	2	1.0	0.166667	0.285714	1.0	2	1
15	PENGHASILAN ORANGTUA(NORMAL) AND STATUS ORANGTUA(YATIM) => PELUANG KIP(DIPERTIMBANGKAN) OR PELUANG KIP(LAYAK)	3	1, 2	0.333333, 0.666667	0.25	1.0, 0.285714	1.0, 1.0	2	2
16	PENGHASILAN ORANGTUA(TINGGI) AND STATUS ORANGTUA(YATIM) => PELUANG KIP(TIDAK LAYAK)	1	1	1.0	0.083333	0.25	1.0	2	1
17	PENGHASILAN ORANGTUA(TINGGI) AND STATUS ORANGTUA(HIDUP) => PELUANG KIP(TIDAK LAYAK)	3	3	1.0	0.25	0.75	1.0	2	1
18	PENGHASILAN ORANGTUA(NORMAL) AND STATUS ORANGTUA(HIDUP) => PELUANG KIP(LAYAK)	1	1	1.0	0.083333	0.142857	1.0	2	1
19	PENGHASILAN ORANGTUA(RENDAH) AND STATUS ORANGTUA(YATIM) => PELUANG KIP(LAYAK)	2	2	1.0	0.166667	0.285714	1.0	2	1
20	TANGGUNGAN(BANYAK) AND STATUS ORANGTUA(HIDUP) => PELUANG KIP(LAYAK) OR PELUANG KIP(TIDAK LAYAK)	5	3, 2	0.6, 0.4	0.416667	0.428571, 0.5	1.0, 1.0	2	2
21	TANGGUNGAN(SEDIKIT) AND STATUS ORANGTUA(YATIM) => PELUANG KIP(DIPERTIMBANGKAN) OR PELUANG KIP(TIDAK LAYAK)	2	1, 1	0.5, 0.5	0.166667	1.0, 0.25	1.0, 1.0	2	2
22	TANGGUNGAN(BANYAK) AND STATUS ORANGTUA(YATIM) => PELUANG KIP(LAYAK)	4	4	1.0	0.333333	0.571429	1.0	2	1
23	TANGGUNGAN(SEDIKIT) AND STATUS ORANGTUA(HIDUP) => PELUANG KIP(TIDAK LAYAK)	1	1	1.0	0.083333	0.25	1.0	2	1
24	STATUS RUMAH(SENDIRI) => PELUANG KIP(LAYAK) OR PELUANG KIP(DIPERTIMBANGKAN) OR PELUANG KIP(TIDAK LAYAK)	7	2, 1, 4	0.285714, 0.142857, 0.571429	0.583333	0.285714, 1.0, 1.0	1.0, 1.0, 1.0	1	3
25	STATUS RUMAH(SEWA TAHUNAN) => PELUANG KIP(LAYAK)	3	3	1.0	0.25	0.428571	1.0	1	1
26	STATUS RUMAH(MENUMPANG) => PELUANG KIP(LAYAK)	2	2	1.0	0.166667	0.285714	1.0	1	1

Figure 3. Rules

Conclusion

Based on the analysis and discussion that has been carried out on predictions of KIP College scholarship recipients, the following conclusions can be drawn: The rough set method used is very supportive in identifying and determining the eligibility of KIP College scholarship recipients; The contribution made to this research can identify and determine the eligibility of KIP scholarship recipients for college.

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Author Contributions

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Conflicts of Interest

The authors declare no conflict of interest.

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