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Analysis of Association Patterns Between Online Gambling Behavior and Divorce in Langkat Regency Using Data Mining

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Abstract

This study aims to identify and analyze the association patterns between online gambling behavior and divorce cases in Langkat Regency using the Apriori data mining algorithm. The research applies the Knowledge Discovery in Databases (KDD) methodology, which includes data selection, preprocessing, transformation, mining, and interpretation. Data were obtained through questionnaires distributed to respondents directly related to divorce cases, focusing on variables such as gambling type, financial loss, domestic conflicts, and divorce status. The Apriori algorithm was implemented using RapidMiner to discover frequent itemsets and generate association rules based on minimum support and confidence thresholds. The results reveal significant association patterns, indicating that specific online gambling behaviors are strongly linked to increased divorce rates, particularly through financial strain and recurring conflicts. These findings provide valuable insights for policymakers, social workers, and community leaders in designing targeted interventions to mitigate the negative social impact of online gambling.

Keywords: *Algorithm; Association Rules; Data Mining; Divorce; Online Gambling.*

1. Introduction

The rapid growth of digital technology and the internet from 2020 to 2025 has significantly impacted various aspects of life, including the rise of online gambling in society. The Ministry of Communication and Informatics (Kominfo) actively blocked nearly one million gambling sites in 2023 alone. However, this effort could not match the massive financial turnover of the illegal industry, which the Indonesian Financial Transaction Reports and Analysis Center (PPATK) estimated at hundreds of trillions of rupiah in 2023. Easy access through smartphones and the internet has accelerated the spread of online gambling to households, leading to severe consequences, including financial ruin and domestic breakdowns. In Langkat Regency, several divorce cases have cited online gambling as a primary trigger, often starting from financial problems and escalating into persistent conflicts. This study aims to explore the association between online gambling behavior and divorce likelihood using the Apriori algorithm in data mining. Data will be collected via online and offline questionnaires to uncover association patterns between gambling-related factors and divorce outcomes.

2. Litelatur Riview

The phenomenon of increasing divorce rates in Langkat Regency cannot be separated from the various social and economic dynamics in society, one of which is the misuse of technology in the form of online gambling. Family economic instability, a lack of education on the dangers of online gambling, and weak control within the household all contribute significantly to the breakdown of marital relationships [Rahayu & Hidayat, 2020]. In various studies, it was found that problem gambling causes intense emotional pressure, household conflicts, and even domestic violence [Dowling et al., 2016]. In addition, easy access to online gambling through social media also accelerates the destruction of spousal relationships [Hidayat & Sari, 2021].

A longitudinal study by [Lee & Kim, 2019] showed a significant decrease in the stability of families regularly exposed to online gambling activities. Several studies in Indonesia also show that online gambling has become one of the dominant factors in divorce filings, especially in urban and semi-urban areas [Firdaus, 2021]. The act of hiding gambling habits from a partner, coupled with financial pressure from losing income or debt, makes divorce an emotional and irrational last resort.

This study uses a data mining approach with the Apriori algorithm to identify patterns of association between variables related to online gambling and divorce [Chen & Wang, 2018]. With this method, it is hoped that hidden patterns that are not visible to the naked eye but have a significant influence on household dynamics can be found. These findings are expected to not only be an academic contribution, but also to be a basis for consideration for the community and policymakers in Langkat Regency to formulate intervention and prevention strategies to reduce the divorce rate due to the negative influence of online gambling.

3. Analysis and Design

3.1. Research Methodology

Research methodology is a description of the steps so that research can be carried out in a structured manner to achieve a desired research objective. This method consists of a series of systematic steps or procedures to plan, execute, and analyze research. There are several stages of research methods carried out in solving the problem. The stages are as follows:

1) Research Preparation: This stage is the initial step taken by determining the research topic, identifying the background, and setting the research boundaries.
2) Problem and Objective Formulation: At this stage, the researcher formulates the problem that is the main focus of the research and determines the objectives to be achieved.
3) Data Collection: Data is collected through questionnaires distributed to respondents to be the main material to be analyzed further.
4) Data Processing and Analysis: At this stage, the collected data is organized and analyzed to provide meaningful information.
5) Conclusion Drawing: The final stage of this research is drawing conclusions based on the analysis that has been carried out in this study.

3.2. Research Supporting Data

The research supporting data was obtained from a questionnaire distributed to respondents in the Langkat Regency area. A total of 20 data were used as a sample. The main variables analyzed include gender, age, education, gambling frequency, playing duration, type of gambling, expenses, financial problems, frequency of arguments, addiction, impact on divorce, and reason for divorce. This data was then transformed into a numerical or binary form to be processed using the Apriori algorithm.

3.3. Method Application

In this study, the Apriori method was used to identify the relationship between the intensity of playing online gambling and the possibility of divorce. The process starts from the input of the transformed questionnaire data, determines the itemset and frequent itemset, and then calculates the support and confidence values.

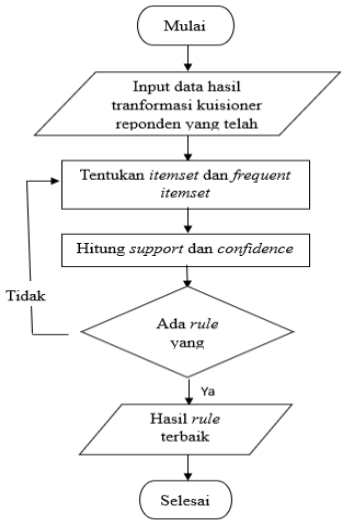

Fig.1: Flowchart of the Apriori Algorithm

Table. 1 : Gender

No	Gender	Code
1	Female	JK1
2	Male	JK2

Table. 2 : Age Rage

No	Age	Code
1	< 20 Years Old	UMR1
2	20-30 Year Old	UMR2
3	31-40 Year Old	UMR3
4	41-50 Years Old	UMR4
5	>50 Years Old	UMR5

Table. 3: Last Education

No	Last Education	Code

1	SD/Equal	PT1
2	SMP/Equal	PT2
3	SMA/Equal	PT3
4	Diploma/Equal	PT4

Tabel. 4 : Frequency of playing online gambling per week

No	Frequency of playing	Code
1	Almost every day	FBJ1
2	(2-3 kali/week)	FBJ2
3	(1 kali/week)	FBJ3
4	(<1 kali/week)	FBJ4

Tabel. 5 : Playing duration per session

No	Play time	Code
1	(<30 minutes)	DB1
2	(30 minutes – 1 Hours)	DB2
3	(1–2 Hours)	DB3
4	(>2 Hours)	DB4

Tabel. 6 : Types of Gambling Played

No	Periode Bermain	Kode
1	Togel/Lotere Online	JJ1
2	Taruhan Olahraga	JJ2
3	Kasino Online	JJ3
4	Lainnya	JJ4

Tabel. 7: Expenses Spent on Gambling

No	Pengeluaran	Kode
1	Kurang dari RP 500Rb	PDB1
2	Rp 500Rb- Rp 2 Jt	PDB2
3	2 Jt lebih 1 – 5 Jt	PDB3
4	Lebih dari Rp 5 Jt	PDB4

Tabel. 8: Financial Problems Due to Online Gambling

No	Masalah Keuangan	Kode
1	1 (Ya)	MK1
2	0 (Tidak)	MK2

Tabel. 9: Frequency of Fights Due to Gambling

No	Frekuensi Pertengkaran	Kode
1	1 (Tidak Pernah)	FB1
2	2 (Jarang 1-2 Kali/bln)	FB2
3	3 (Sering 1-2 Kali/bln)	FB3
4	Hampir Setiap Hari	FB4

Tabel. 10: Online Gambling Addiction

No	Minat	Kode
1	1 (Ya)	KJO1

2	0 (Tidak)	KJO2

Tabel. 11: The Impact of Online Gambling on Divorce

No	Pengaruhnya	Kode
1	1 (Ya) Cerai	PJO1
2	0 (Tidak) Tidak Bercerai	PJO2

Tabel. 12: Reasons for Divorce Due to Online Gambling

No	Alasan Bercerai	Kode
1	Kecanduan Bermain Judi Online	ABJ1
2	Masalah Keuangan dalam Pernikahan	ABJ2
3	Pertengkaran/Komunikasi yang Buruk	ABJ3
4	Kekerasan dalam Rumah Tangga	ABJ4
5	Ketidakjujuran Pasangan Akibat dari Judi	ABJ5

Table.13 : Support 1 Itemset

Itemset 1	Count	Support
JK1	1/20	0,5%
JK2	19/20	95%
UMR2	8/20	40%
UMR3	6/20	30%
UMR4	6/20	30%
PT2	4/20	20%
PT3	16/20	80%
FBJ1	17/20	85%
FBJ2	3/20	15%
PDB1	10/20	50%
PDB2	10/20	50%
MK1	13/20	65%
MK2	7/20	35%
FB2	11/20	55%
FB3	9/20	45%
KJO1	20/20	100%
PJO1	6/20	30%
PJO2	14/20	70%
ABJ1	5/20	25%
ABJ2	1/20	5%

After obtaining the results from the 1-itemset, itemsets that do not meet the minimum support value of 30% are eliminated. The process continues with the formation of 2-itemsets, 3-itemsets, and 4-itemsets.

Table. 14 : Support 2 Itemset

Itemset 2	Count	Support
{JK2, KJO1}	19	95.00%
{JK2, FBJ1}	18	90.00%
{FBJ1, KJO1}	18	90.00%
{JK2, PT3}	16	80.00%
{PT3, KJO1}	16	80.00%
{PT3, FBJ1}	15	75.00%
{KJO1, PJO2}	13	65.00%
{MK1, KJO1}	13	65.00%
{JK2, MK1}	12	60.00%
{JK2, PJO2}	12	60.00%
{FBJ1, PJO2}	12	60.00%
{FBJ1, MK1}	11	55.00%
{PDB1, PJO2}	10	50.00%
{PT3, PDB2}	10	50.00%
{FBJ1, FB2}	10	50.00%
{PDB1, KJO1}	10	50.00%
{MK1, FB3}	10	50.00%
{PDB2, KJO1}	10	50.00%
{FB2, KJO1}	10	50.00%
{JK2, FB2}	10	50.00%
{JK2, PDB2}	10	50.00%
{FB3, KJO1}	10	50.00%
{PDB2, MK1}	9	45.00%
{FB2, PJO2}	9	45.00%
{FBJ1, PDB2}	9	45.00%
{FBJ1, PDB1}	9	45.00%

Itemset 2	Count	Support
{PT3, PJO2}	9	45.00%
{JK2, PDB1}	9	45.00%
{JK2, FB3}	9	45.00%
{PT3, MK1}	9	45.00%
{PT3, FB2}	8	40.00%
{FBJ1, FB3}	8	40.00%
{PDB2, FB3}	8	40.00%
{PT3, FB3}	8	40.00%
{UMR2, KJO1}	8	40.00%
{PDB1, FB2}	8	40.00%
{JK2, UMR2}	8	40.00%
{UMR2, PT3}	7	35.00%
{KJO1, PJO1}	7	35.00%
{PT3, MK2}	7	35.00%
{FBJ1, MK2}	7	35.00%
{JK2, MK2}	7	35.00%
{PT3, PJO1}	7	35.00%
{MK2, PJO2}	7	35.00%
{MK2, KJO1}	7	35.00%
{UMR2, FBJ1}	7	35.00%
{PDB2, PJO1}	7	35.00%
{MK2, FB2}	7	35.00%
{JK2, PJO1}	7	35.00%
{MK1, PJO1}	7	35.00%
{MK1, PJO2}	6	30.00%
{FB3, PJO1}	6	30.00%
{UMR4, KJO1}	6	30.00%
{UMR4, FBJ1}	6	30.00%
{JK2, UMR4}	6	30.00%
{UMR2, PDB2}	6	30.00%
{PT3, PDB1}	6	30.00%
{UMR4, PJO2}	6	30.00%
{PDB1, MK2}	6	30.00%
{UMR3, KJO1}	6	30.00%
{FBJ1, PJO1}	6	30.00%
{UMR2, MK1}	6	30.00%

Table.15 : Support 3 Itemset

Itemset 3	Count	Support
{JK2, FBJ1, KJO1}	18	90.00%
{JK2, PT3, KJO1}	16	80.00%
{PT3, FBJ1, KJO1}	15	75.00%
{JK2, PT3, FBJ1}	15	75.00%
{JK2, KJO1, MK1}	12	60.00%
{JK2, FBJ1, PJO2}	12	60.00%
{JK2, KJO1, PJO2}	12	60.00%
{FBJ1, KJO1, PJO2}	12	60.00%
{FBJ1, KJO1, MK1}	11	55.00%
{JK2, FBJ1, MK1}	11	55.00%
{FBJ1, KJO1, FB2}	10	50.00%
{JK2, KJO1, PDB2}	10	50.00%
{JK2, KJO1, FB2}	10	50.00%
{PT3, KJO1, PDB2}	10	50.00%
{JK2, FBJ1, FB2}	10	50.00%
{JK2, FBJ1, PDB1}	9	45.00%
{FBJ1, KJO1, PDB1}	9	45.00%
{JK2, KJO1, PDB1}	9	45.00%
{JK2, KJO1, FB3}	9	45.00%
{JK2, PDB2, MK1}	9	45.00%
{PT3, FBJ1, PDB2}	9	45.00%
{FBJ1, KJO1, PDB2}	9	45.00%
{JK2, FBJ1, PDB2}	9	45.00%
{PDB2, MK1, KJO1}	9	45.00%
{FBJ1, PDB2, MK1}	8	40.00%
{FBJ1, KJO1, FB3}	8	40.00%
{UMR2, JK2, KJO1}	8	40.00%
{PDB2, KJO1, FB3}	8	40.00%
{PT3, KJO1, FB3}	8	40.00%
{PT3, FBJ1, MK1}	8	40.00%
{JK2, FBJ1, FB3}	8	40.00%
{PT3, FBJ1, FB2}	8	40.00%
{PT3, KJO1, FB2}	8	40.00%
{PDB2, MK1, PJO1}	7	35.00%
{PDB2, KJO1, PJO1}	7	35.00%
{MK1, KJO1, PJO1}	7	35.00%

Itemset 3	Count	Support
{JK2, KJO1, PJO1}	7	35.00%
{JK2, MK1, PJO1}	7	35.00%
{UMR2, JK2, PT3}	7	35.00%
{PT3, KJO1, PJO1}	7	35.00%
{PT3, FBJ1, FB3}	7	35.00%
{UMR2, FBJ1, KJO1}	7	35.00%
{UMR2, PT3, KJO1}	7	35.00%
{UMR2, JK2, FBJ1}	7	35.00%
{UMR2, MK1, KJO1}	6	30.00%
{FB3, KJO1, PJO1}	6	30.00%
{FBJ1, KJO1, PJO1}	6	30.00%
{UMR2, FBJ1, PT3}	6	30.00%
{UMR2, KJO1, MK1}	6	30.00%
{UMR4, FBJ1, PJO2}	6	30.00%
{UMR4, KJO1, PJO2}	6	30.00%
{UMR4, JK2, FBJ1}	6	30.00%
{UMR4, JK2, KJO1}	6	30.00%
{UMR4, FBJ1, KJO1}	6	30.00%
{UMR2, PT3, PDB2}	6	30.00%
{UMR2, KJO1, PDB2}	6	30.00%
{UMR4, JK2, PJO2}	6	30.00%

Table.16 : Support 4 Itemset

Itemset 4	Count	Support
{PT3, JK2, KJO1, FBJ1}	15/20	75.00%
{PJO2, JK2, KJO1, FBJ1}	12/20	60.00%
{MK1, JK2, KJO1, FBJ1}	11/20	55.00%
{FB2, JK2, KJO1, FBJ1}	10/20	50.00%
{MK1, JK2, PDB2, KJO1}	9/20	45.00%
{JK2, PDB2, KJO1, FBJ1}	9/20	45.00%
{PDB1, JK2, KJO1, FBJ1}	9/20	45.00%
{KJO1, PDB2, PT3, FBJ1}	9/20	45.00%
{JK2, FB3, KJO1, FBJ1}	8/20	40.00%
{MK1, JK2, PDB2, FBJ1}	8/20	40.00%
{MK1, PDB2, KJO1, FBJ1}	8/20	40.00%
{FB2, KJO1, PT3, FBJ1}	8/20	40.00%
{JK2, UMR2, KJO1, FBJ1}	7/20	35.00%
{KJO1, FB3, PT3, FBJ1}	7/20	35.00%
{PJO1, MK1, JK2, KJO1}	7/20	35.00%
{PJO1, MK1, PDB2, KJO1}	7/20	35.00%
{KJO1, JK2, UMR2, PT3}	7/20	35.00%
{JK2, UMR2, PT3, FBJ1}	6/20	30.00%
{UMR4, PJO2, JK2, FBJ1}	6/20	30.00%
{KJO1, UMR2, PT3, FBJ1}	6/20	30.00%
{UMR4, JK2, KJO1, FBJ1}	6/20	30.00%
{UMR4, PJO2, KJO1, FBJ1}	6/20	30.00%
{KJO1, UMR2, PDB2, PT3}	6/20	30.00%
{UMR4, PJO2, JK2, KJO1}	6/20	30.00%

From the results of the 4-itemset combination, the process was stopped because no 5-itemset combinations were found. The following are the highest frequency patterns obtained.

Table. 17: Support Highest Frequency Pattern Results

Itemset	Count	Support
{MK1, KJO1, PDB2, JK2, FBJ1}	8/20	40.00%
{UMR4, KJO1, JK2, PJO2, FBJ1}	6/20	30.00%
{KJO1, JK2, PT3, UMR2, FBJ1}	6/20	30.00%

After all the highest frequency patterns were found, the association rules that met the minimum confidence requirements were then searched for by calculating the confidence or association of A rightarrow B with a minimum confidence requirement of 80%.

Table. 18: Final Association Rule Results

If antecedent then consequen	*Support*	*Confidence*
If {JK2, KJO1, PDB2, FBJ1} → {MK1}	45.00%	0,30/0,35 = 0,88
If {MK1, KJO1, PDB2, FBJ1} → {JK2}	40.00%	0,40/0,40 = 1
If {UMR4, KJO1, FBJ1} → {JK2, PJO2}	30.00%	0,30/0,30 = 1
If {UMR4, JK2, KJO1} → {FBJ1, PJO2}	30.00%	0,30/0,30 = 1
If {UMR4, JK2, FBJ1} → {KJO1, PJO2}	30.00%	0,30/0,30 = 1
If {UMR4, KJO1, PJO2} → {JK2, FBJ1}	30.00%	0,30/0,30 = 1
If {UMR4, PJO2, FBJ1} → {JK2, KJO1}	30.00%	0,30/0,30 = 1
If {KJO1, JK2, PT3} → {UMR2, FBJ1}	35.00%	0,30/0,35 = 0,8571

From the results of the tests carried out in the above calculations, a final association rule result was obtained: MK1 land KJO1 land PDB2 land FJB1 with a support value of 40% and a confidence value of 100%. Therefore, the conclusion from the above association rule results

is: If online gambling players who are male (JK2) and are already addicted (KJO1) and have an expenditure of Rp 500,000 - Rp 2,000,000 (PDB2) tend to experience financial problems (MK1) THEN they have a playing frequency of almost every day (FBJ1).

4. Discussion and Implementation

4.1. Discussion

The steps taken to analyze the association patterns between online gambling behavior and divorce in Langkat Regency using the Apriori algorithm aim to generate new information for related parties and provide a basis for making every decision related to online gambling and divorce issues. This analysis identifies the relationship patterns between online gambling behavior (such as: playing frequency, type of gambling, expenses spent on gambling, playing frequency) and divorce (divorced/not, reason). The system used in this study was built using Python and integrated with a Telegram Bot, GitHub, and Render. The interface uses a Telegram Bot which functions to facilitate data input and output and user interaction

4.2. Implementation and Testing

System implementation was carried out by building a Telegram Bot integrated with the Render server and the GitHub repository. This system is used to manage the process of inputting respondent data, recapitulation, and analysis of association patterns using the Apriori algorithm. System testing showed that every command, from /start, /input, /recap, to /apriori and /rules analysis, worked well

5. Conclusion

Based on the results of the research that has been carried out regarding the analysis of the influence of online gambling on the increasing number of divorces in Langkat Regency using the Apriori algorithm, several conclusions can be drawn as follows:
The system built using Python, Telegram Bot, GitHub, and Render ran well and can be used to perform data input, data recapitulation, and association pattern analysis.
Based on the 20-data sample, a strong association pattern was found showing that male online gambling players (JK2) who are addicted (KJO1) and have medium expenditure (PDB2) tend to experience financial problems (MK1) and have a playing frequency of almost every day (FBJ1). The formed association pattern shows a strong relationship between online gambling behavior and financial problems and high playing frequency, which in turn can trigger divorce.

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