Rule-Based Artificial Intelligence Scientific Research Paper

Japo Punzalan

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https://github.com/LaptopEater/Assessment-2-Artificial-Intelligence

Abstract

This study aims to delve into the subject of Artificial Intelligence, Highlighting the Efficiency of Rule Based Artificial Programming integrated into the profession of Accountancy, With the use of two Artificial Programs with distinct rule based programming conditions to decide the efficiency in maximizing the conditions set to the Artificial Programs in search of the eligibility and Efficiency of Rule Based AI in Accountancy, The findings suggest that while rule Based Ai can enhance the productive capabilities in Accountancy, Careful programming and design in maintaining strict rules is a must in deciding the Artificial Programs Efficiency to maximize its

Contents

1 Introduction

With the coming age of Artificial Intelligence (AI) have made its way to be integrated into most and if not all of the occupancies of today, Examples such as Healthcare, Education, Finance, Accountancy. Strydom, N. and Mohammadali-Haji, A., (2025), The implementation of Artificial Intelligence (AI) in accounting is no exception, With the uprise in Rule Based AI technologies to assist the accountancy profession the study aims to assess the efficiency of the Rule Based AI technologies in playing a crucial role in the accountancy occupation examples of such ai technology implemented within the occupancy are, Robotic Press Automation (RPA), Machine Learning (ML) And Natural Language Processing (NTP) that all play a crucial roles such as tax assessing,data entry and such. Despite the potential of Artificial Intelligence in the profession it raises questions within the community, introducing unresolved governance and risks without human supervision, Ethical complications and worry of Artificial Intelligence dominating the occupancy

- Determine if Rule Based AI is efficient in handling Accountancy related tasks.

- Determine the efficiency of Rule Based-AI in Loan Eligibility Assessment

2 Literature Review

The section provides the study with an introduction to the research and how the study compares to other researches, Already existing researches have provided the resources that show the efficiency, accuracy ,consistency of Artificial Intelligence. The study aims to provide the researchers with the knowledge of determining the efficiency of Rule Based Ai Programming in Accountancy.

2.1 Artificial Intelligence in accountancy

A study conducted by Strydom, N. and Mohammadali-Haji, A., (2025) explores the implementation of Artificial Intelligence technology into multiple aspects of Accountancy, Conducting the impact of the technology into reshaping the profession itself to modern advances, Conducting the efficiency of the automated tasks and reducing operational costs which struck a moral dilemma within the Accountancy Industry with the topic of AI replacing personnel. The study aims to highlight the applications of AI tackling the moral issues whilst highlighting the uses of the problem solving softwares, Cost Reductive technology Artificial Intelligence offers

2.2 The Impact of Artificial Intelligence in Accountancy Profession

The study conducted by Emetaram, E. and Uchime, H.N., (2021), The study focuses on the potential of Artificial Intelligence in dominating the industry whilst being able to perform tasks effectively and concisely comparable to the other research study conducted by Strydom and Mohammadali, The comparability of the study is the application of a Neural Network that aims to install the ability of Artificial Intelligence learning the computer programs and being able to think and make decisions like a human being, referring to (RPA) Robotic Press Automation.

2.3 Relevance to the Study

Both studies that have been presented offer a comfortable standing within the Study, As we discuss their relevance in this section towards the Study itself, The most notable parts are the combination of the topics, The studies aim to show the readers the relevance, applications, advantages of the usage of Artificial Intelligence in Accountancy, also highlighting it's efficiency in achieving tasks with the use of (RPA) Robotic Press Automation to handle tasks effectively, In this study we will conduct a study and experiment with our own Artificial Intelligence to check the findings more accurately.

3 Methods

The study aims to utilize a experimental quantitative approach to experiment with the capabilities of rule based Artificial Intelligence within the occupancy of Accountancy, The objective of the Research Method is to test the efficiency of the Bot's when given different concise conditions to be compared based on their ability to assess the datasets eligibility based on different values and their efficiency in handling the eligibility of the users in receiving or denying loans using a premade financial criteria dataset.

3.1 Tool's Used

With the use of multiple software's and websites, such as python, libraries such as sci-kit learn, Kaggle Datasets to provide for the financial dataset loan eligibility. which will be tackled individually in the section

3.2 Dataset

With the use of a Dataset from the website Kaggle, The dataset allows the Bot's to access the columns within and make an assessment depending on the conditions it has been given. The dataset includes the following variables.

- income - The applicants annual income

- credit-score - The applicants credit score

- loan-ammount The ammount the applicant is requesting

- years-employed The ammount the applicant have worked

- loan-approved The status if the actual loan is approved and decides wether the bot's accuracy, score, f1 is true

The dataset is comprised of virtual non-related sensitive information to ensure the privacy.

3.3 The Procedure

Discussing the rules and conditions the researchers have given the two bots for the study.

- Bot 1 - The conditions given to bot 1 is very simple, if the Applicants income was Greater than 50kUSD and have a credit score higher than 400 the applicant then will receive a loan approved from the bot.

- Bot 2 - The conditions given to bot 2 is slightly different having altered different aspects, determining wether the size of the loan would play a crucial part in approving a loan rather than basing it off the applicants income, and determining if the Applicant is eligible of receiving a lone via the years they have worked as a measure of reference and trustabliity.

Sample Code Snippet:

```python
def check_loan_bot1(row):
    if row['income'] > 50000 and row['credit_score'] > 400:
        return 1
    return 0


def check_loan_bot2(row):
    if row['loan_amount'] < 50000 and row['years_employed'] > 2:
        return 1
    return 0
```

4   Results

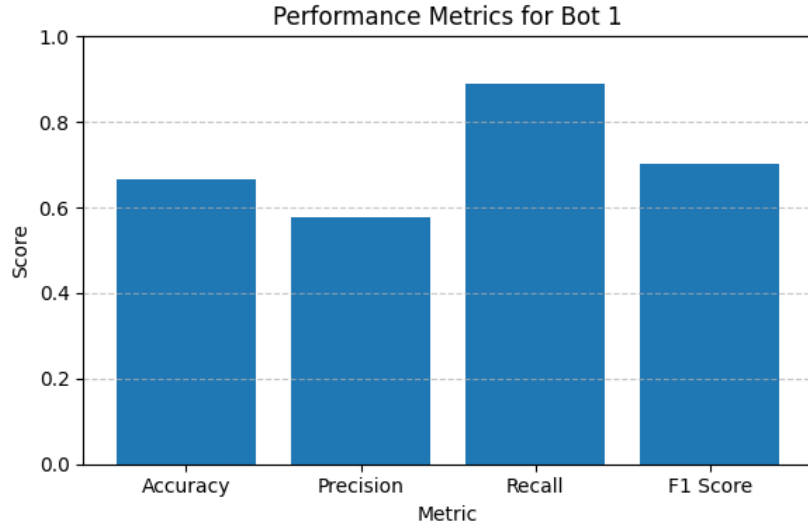Presenting the results of the study and code are the figures to be shown.
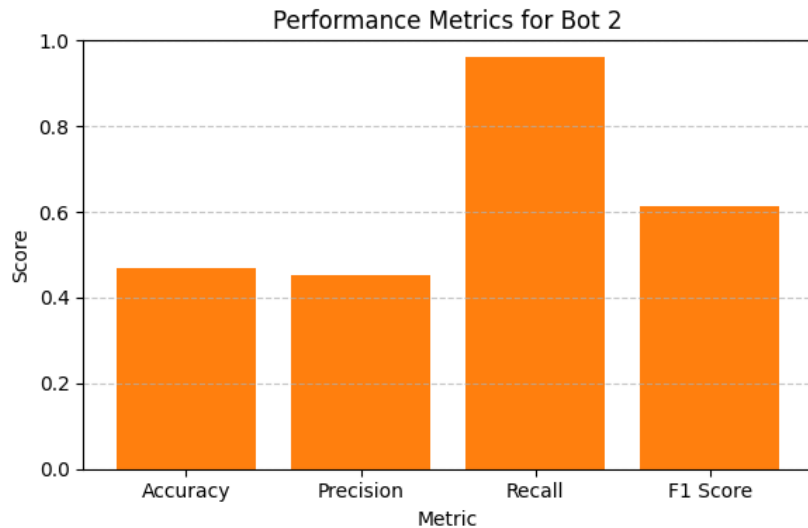
Figure 1: Bot Performance 1

Figure 2: Bot Performance 2

5   Discussion

The results of the study aims to show the use of Artificial Intelligence in the role of efficiently conducting tasks within Accountancy, The main task is where the given conditions are enough to check the loan approvaprove the efficiency of Artificial Intelligence within the Accoutacy Occupation.

5.1   Relation to the Research Question

The research question aimed in assessing the relevance and efficiency of Rule Based AI and It's efficiency in the Accounting Department.

- Figure 1 - Bot 1's conditions that based it's decisions on income and credit score of the applicant received a high accuracy and precision comparable to figure 2,

Strengthening the idea where more defined rules could equal a better accurate program.

- Figure 2 - Bot 2 same amount of conditions as Bot 1 but slightly different alterations which included the conditions of the size of the loan amount and years the applicant has been employed in, Realistically the conditions given provide little to no rationality. hence receiving a lower accuracy and precision score than Figure 1.

The results decide the relevance of the research question by showing the idea of Rule Based Artificial Intelligence in Accountancy's structured decision making and areas to improve in Accountancy, The performance of the Rule Based AI heavily relies on the set amount of conditions the researcher defines to the bot and will affect its performance

5.2 Efficiency

Rule based Artificial Intelligence can process large amounts of financial data clearing way for more efficient use reducing workload and overall cost, The decisions are constant and the workload is at ease when Artificial Intelligence is implemented also deterring the possibility of human judgement. This approach could be applied to real loan approval scenarios and invoice processing and other accounting tasks. Adjusting the rules allows the researchers to manoeuvre and access the efficiency of artificial intelligence by any means of what conditions the researchers set.

5.3 Findings of the Study

- In the use of the bots, Bot 2 would approve loans that initially Bot 1 would reject, This shows the conditions of the bots contradict each other and tested with the score, Bot 1 would prove to be more accurate than Bot 2 signifying the correct use of the conditions to give to the bots is the main impact towards accuracy.

- The sensitive use of the Bot's would offer a challenge due to the Bot's capabilities lying in the conditions the researchers would set, Due to this the conditions must be precise and sure as The Bot's accuracy shows how sensitive Rule Based Artificial Programming is.

5.4 Limitations

- Rule Dependence - Rule based Artificial Programming are very risky as they are not up to date and cannot learn or adapt to new forms of data rendering it obsolete when compared to RPA (Robotic Press Automation) as the researchers would need to manually input the conditions rather than the AI adapting to the new datasets.

- Limited Variables - Only a few variables where tested in the dataset, Real accounting decisions would provide broader additional factors.

- Human Comparison - The Study lacks the comparison in which the Bot's accuracy is compared with a Human Accountants accuracy which would provide a baseline whether Rule Based Artificial Intelligence is Efficient Compared to Human Accountants.

6 Conclusion

Rule Based Artificial Intelligence Marks a new age in the coming worlds but is shown to be overshadowed/obsolete when compared to new technologies such as RPA, while Rule Based Artificial Intelligence would still be of use to certain scenarios it proves to be promising in providing accurate, fastly, consistent, and straightforward when given the right conditions, However the efficiency of the Rule Based Artificial Intelligence still raises questions in reliability directly tied to the design in which it must be manually set unlike Robotic Automative Press in which the AI is adapting and learning, Nonetheless careful consideration and planning when it comes to Rule Based Artificial Intelligence is a must in maximizing the output and efficiency it will provide.

7 References

Strydom, N. and Mohammadali-Haji, A., 2025. The Accountancy Profession and the Challenges of Artificial Intelligence. In Artificial Intelligence in Accounting, Auditing and Finance: A Guide for Implementation and Use (pp. 45-61). Cham: Springer Nature Switzerland.

Shehaba, M., 2025. Artificial Intelligence in Accountancy: Skills Evolution, Ethical Challenges and Future Directions in Digital Economy.

Emetaram, E. and Uchime, H.N., 2021. Impact of artificial intelligence (AI) on accountancy profession. Journal of Accounting and Financial Management, 7(2), pp.15-25.

8 Appendix

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