INSTITUT D'ENSEIGNEMENT SUPÉRIEUR DE RUHENGERI

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FACULTY OF APPLIED FUNDAMENTAL SCIENCES

DEPARTMENT OF COMPUTER SCIENCE

Artificial Intelligence (AI)

Group Assignment

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Problem Statement:

Access to financing is essential for small businesses to grow, create jobs, and contribute to economic development. However, many entrepreneurs in Rwanda and other African countries face challenges when applying for loans. These challenges include complex application processes, unclear eligibility criteria, and limited financial literacy. Additionally, financial institutions often struggle to efficiently assess a large number of loan applications, leading to delays and missed opportunities for businesses that need timely funding.

This expert system aims to address these challenges by providing an automated solution that evaluates a business's eligibility for a loan based on predefined criteria. By using a decision-making process with clear IF-THEN rules, the system offers quick, transparent, and consistent assessments. Small business owners can use this system to check their eligibility before applying, helping them save time and avoid unnecessary rejections. Financial institutions can also use the system as a pre-screening tool to identify qualified applicants, improving operational efficiency and reducing manual workloads.

This system is particularly relevant in the Rwandan and African context, where small and medium enterprises (SMEs) are a key driver of economic growth. By simplifying access to credit, the expert system can support entrepreneurship, promote financial inclusion, and contribute to the overall development of the region.

Relevance in the Rwandan/African Context:

In Rwanda and other African countries, small and medium enterprises (SMEs) are the backbone of the economy. However, limited access to credit hinders their growth. By providing quick and accurate loan eligibility assessments, this system can help businesses understand their chances of approval before applying, saving time and increasing financial inclusion.

Key Stakeholders

1. **Small Business Owners** (Primary Users)

o Need quick, reliable assessments to know their chances of getting a loan.

o Benefit from clear eligibility criteria and guidance on improving their chances.

2. **Banks and Microfinance Institutions** (Secondary Users)

o Use the system to pre-screen applicants, reducing manual work.

o Ensure applicants meet minimum requirements before applying.

3. **Government and Regulatory Bodies**

o Promote financial inclusion by supporting SMEs with easier access to credit.

o Monitor loan approval trends to inform policy decisions.

4. **Developers and System Administrators**

o Ensure the system runs smoothly, updating rules as lending policies change.

IF-THEN Rules

The expert system uses logical rules to determine loan eligibility. Here are some key rules based on common lending criteria:

1. **Business Revenue**

o IF monthly revenue $\geq$ 500,000 RWF, THEN eligible for loan.

o IF monthly revenue $<$ 500,000 RWF, THEN not eligible.

2. **Business Age**

o IF business age $\geq$ 2 years, THEN eligible for loan.

o IF business age $<$ 2 years, THEN not eligible.

3. **Credit History**

o IF credit score $\geq$ 70, THEN eligible for loan.

o IF credit score $<$ 70, THEN not eligible.

4. **Debt-to-Income Ratio (DTI)**

o IF DTI $\leq$ 40%, THEN eligible for loan.

o IF DTI $>$ 40%, THEN not eligible.

5. **Collateral Availability**

o IF collateral is provided, THEN increase loan limit.

o IF no collateral, THEN limit loan to 3,000,000 RWF.

6. **Loan Repayment History**

- IF no previous defaults, THEN eligible for higher amounts.
- IF previous defaults, THEN restricted or denied.