**Project Title: “Enhancing Youth Employment through Quality Education in Rwanda”**

**1. Problem Identification**

Core Problem: Unemployment among Rwandan youth (aged 0-25 years).

Key Contributing Factor: Lack of quality education leading to a mismatch between the skills youth possess and those required by the job market.

Research Questions:

* What are the specific gaps in the education system contributing to youth unemployment in Rwanda?
* How can personalized education paths enhance employability among youth?
* What role does real-time data on job market trends and education play in improving employment outcomes?

**2. Project Objective**

Primary Objective: To reduce unemployment in Rwandan youth by providing them with actionable insights on the education paths and skills needed to succeed in the job market.

Secondary Objectives:

1. Build a web application that provides real-time insights into the correlation between education and unemployment.
2. Develop predictive models to forecast future unemployment trends based on education data.
3. Recommend personalized courses and skill development plans for youth based on their current education and skills, using predictive algorithms.

**3. Proposed Solution**

The project will create a Streamlit-based web application offering the following features:

* Home Page: Overview of the project, including its goals, the unemployment problem, and how quality education can address this issue. Clear explanations of the features of the app.
* Dashboard: A data-driven interface that shows the current trends in unemployment rates in Rwanda, segmented by education levels, sex, age groups, and other demographic factors.
* Prediction Page: A machine learning model that predicts future unemployment trends based on historical data, providing insights on what the future holds.
* Skill & Course Recommendation System: A system that allows users to input their current education and skills and receive personalized recommendations for further education or skill acquisition that aligns with current job market demands.

**4. Project Steps**

**Step 1**: Problem Understanding and Research

Key Tasks:

* Conduct a comprehensive literature review on youth unemployment in Rwanda.
* Collect data on factors contributing to unemployment, focusing on the education system, skills mismatch, and job market demands.
* Engage with key stakeholders: educational institutions, job boards, and government agencies (e.g., National Institute of Statistics Rwanda) to gather additional insights.

**Step 2**: Data Collection

Data Sources:

* Unemployment data: Historical and current unemployment rates in Rwanda segmented by education levels, age, region, and sex from official sources like Rwanda Labour Force Survey.
* Education data: Information on youth educational backgrounds, qualifications, and skills.
* Job market data: Collect job market data, including job requirements and popular roles, from online platforms like LinkedIn, job portals, and government job boards.
* Survey data: Conduct surveys of young people to get self-reported data on their skills, education, and job-seeking experiences.

Key Metrics:

* Unemployment rates by education level, region, age, and gender.
* Skill gaps in the job market.
* Common job roles carried by youth.

**Step 3**: Data Preprocessing and Exploration

Key Tasks:

* Clean and preprocess the collected data (handling missing values, outliers, etc.).
* Perform Exploratory Data Analysis (EDA) to understand trends in the data.
* Generate insights into how unemployment correlates with education and other key indicators.
* Use visualizations (bar charts, heatmaps, scatter plots) to highlight unemployment trends, skill gaps, and educational impact.

**Step 4**: Dashboard Creation

Key Tasks:

* Develop an interactive Streamlit dashboard with real-time visualizations showing unemployment trends segmented by:
* Education levels (e.g., high school, university, vocational training).
* Demographic factors (e.g., sex, age groups, regions).
* Job roles commonly held by youth and their employment trends.
* Add visual components like line charts, bar graphs, and pie charts to represent unemployment trends across different dimensions.

**Step 5**: Predictive Model Development

Objective: Build a machine learning model to predict future unemployment trends based on historical data.

Key Tasks:

* Use historical unemployment and education data to train a regression model or time series forecasting model (e.g., ARIMA, Prophet) that predicts unemployment rates for the next 5-10 years.
* Evaluate model performance using metrics such as Mean Squared Error (MSE), R-squared, and forecast accuracy.
* Integrate the predictions into the Streamlit web app to provide real-time forecasts of youth unemployment based on education levels.

Step 6: Skill and Course Recommendation System

Objective: Provide personalized education and skill recommendations based on user input.

Key Tasks:

* Build a recommendation engine using collaborative filtering or content-based filtering that:
* Suggests courses or skills needed for youth to align with job market requirements.
* Integrates data on job market demands, identifying high-demand skills.
* Allow users to input their current qualifications, skills, and career goals into the system.
* Use predictive modeling to recommend courses or training programs that best match the user’s needs to improve employability.
* Link users to online education platforms (e.g., Coursera, Udemy) for acquiring recommended skills or certifications.

**Step 7**: Deployment

Key Tasks:

* Host the web application using a cloud service (e.g., Heroku, AWS, or Streamlit Sharing).
* Ensure the app is accessible to users with real-time data updates on unemployment trends and job market insights.
* Provide a user-friendly interface and detailed explanations to help users understand and interact with the predictions and recommendations.

**5. Project Deployment and Testing**

User Testing: Conduct testing with youth users, educators, and policymakers to gather feedback on the application’s usability, accuracy of predictions, and quality of recommendations.

Continuous Monitoring: Track usage data (e.g., number of users, recommendations made) and collect feedback for further iterations and improvements.

Retraining Models: Update models and retrain them periodically as new data becomes available to ensure the app provides the most accurate and relevant predictions.

**6. Expected Outcomes**

Reduction in Unemployment: Youth will be better equipped with the right skills and qualifications, leading to higher employment rates.

Personalized Learning Paths: Users will receive recommendations tailored to their specific needs, helping them make informed decisions about their education and career.

Insights for Policymakers: The dashboard and predictions will provide valuable insights for government agencies and educational institutions on how to improve youth education and address unemployment trends.

**7. Conclusion**

This project aims to directly address youth unemployment in Rwanda by leveraging data science to provide data-driven insights, predictive forecasts, and personalized education paths. Through an interactive web application, young people can gain access to the resources and information they need to bridge the gap between their current skills and the demands of the job market.