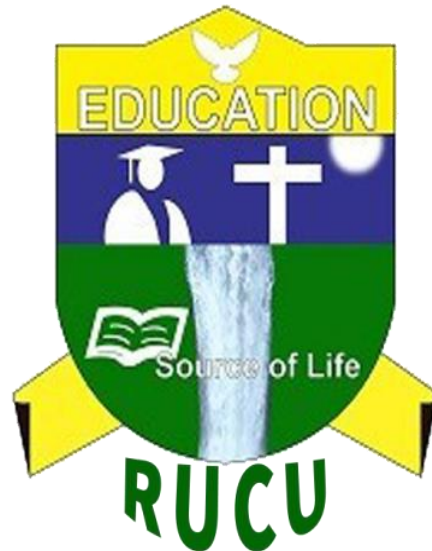


RUAHA CATHOLIC UNIVERSITY



FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE

PROJECT SYNOPSIS

YEAR OF STUDY: 3rd year

SUBMISSION DATE: DECEMBER 2025

GROUP MEMBERS

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Concept Note for Computer Science Degree Projects

Project Titles:

1. Early Detection of Diabetic Retinopathy Using Deep Learning
2. Design and Implementation of a Smart Beverage Ordering and Delivery System
3. FARMLINK: A Mobile Agricultural Advisory and Market Information System with AI-Powered Pest Detection for Smallholder Farmers in Tanzania
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Description on each title based on requirements on building and necessity on Tanzania societies

1. Early Detection of Diabetic Retinopathy Using Deep Learning

Background:

Diabetes is a growing health concern in Tanzania, with thousands of patients at risk of complications such as diabetic retinopathy. Access to ophthalmologists is limited, especially in rural areas, and diagnostic facilities are concentrated in urban hospitals. Delays in detection often lead to preventable blindness, affecting patients' ability to work and support their families.

Problem Statement:

Many diabetic patients in Tanzania remain undiagnosed or receive late diagnosis due to a lack of screening facilities, specialists, and awareness. This contributes to increased medical costs, loss of productivity, and reduced quality of life.

Objective:

To develop a deep learning-based system capable of detecting diabetic retinopathy at an early stage from retinal images, improving accessibility for underserved populations.

Methodology (Brief):

The project will use publicly available retinal (fundus) image datasets and apply Convolutional Neural Networks (CNNs) to detect early signs of the disease. Python with TensorFlow/Keras will be used for model development. System performance will be evaluated using accuracy, precision, and recall. This system can be deployed in local clinics to assist health workers and reduce the urban-rural healthcare gap.

2. Design and Implementation of a Smart Beverage Ordering and Delivery System

Background:

In Tanzanian urban centers, street vending of beverages is a common livelihood. However, vendors and small businesses often struggle with order management, delivery inefficiencies, and customer tracking. Traditional manual methods increase errors and reduce profitability. The COVID-19 pandemic also highlighted the need for contactless ordering and delivery services.

Problem Statement:

The lack of a digital system for ordering and delivery leads to poor service quality, delays, and financial losses for vendors and inconvenience for customers. Many street vendors also lack integration with mobile payment platforms, limiting business growth.

Objective:

To design and implement a web and mobile-based digital system for beverage ordering and delivery that integrates mobile payments and real-time delivery tracking.

Methodology (Brief):

The system will be developed using frontend technologies (HTML, CSS, JavaScript), backend frameworks (Laravel/Django), and a MySQL database. Modules will include customer ordering, vendor management, delivery tracking, and administrative reporting. Testing will focus on reliability, user-friendliness, and suitability for Tanzanian street vendors and urban customers.

3. FARMLINK: A Mobile Agricultural Advisory and Market Information System with AI-Powered Pest Detection for Smallholder Farmers in Tanzania

Background:

Agriculture is the backbone of Tanzania's economy, employing more than 70% of the population. Smallholder farmers face challenges such as low access to agricultural extension services, unreliable market information, and crop losses due to pests. These challenges contribute to food insecurity and low-income levels. Mobile technology penetration is growing, offering an opportunity to improve information delivery.

Problem Statement:

Smallholder farmers often make decisions without timely advice, market data, or early pest detection. This leads to reduced yields, post-harvest losses, and limited income generation, perpetuating poverty in rural communities.

Objective:

To develop a mobile application that provides agricultural advisory, market information, and AI-based pest detection to support smallholder farmers in Tanzania.

Methodology (Brief):

The mobile application will be developed using Flutter/Android. AI image classification models will detect pests from crop images. Backend APIs and databases will store farmer profiles, market prices, and advisory content. The system will provide real-time notifications and recommendations to improve productivity, reduce losses, and empower farmers with market intelligence.

Conclusion

These projects aim to leverage Artificial Intelligence, Web, and Mobile Computing to address pressing social problems in Tanzania:

Limited healthcare access and preventable blindness

Urban vendor inefficiencies and lack of digital payment integration

Agricultural challenges affecting smallholder farmers' productivity and income

By focusing on local contexts, these projects not only fulfill academic requirements but also have the potential to create social impact, improve livelihoods, and support sustainable development in Tanzania.