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# IN PARTNERSHIP WITH PLYMOUTH UNIVERSITY

Module Code: PUSL2021	Module Name: Computing Group Project
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Coursework Title: Project Proposal
Program: BSc (Hons) Data Science, PU

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As part of a team

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## 1. Project Overview and Introduction

### 1.1 Overview

- ✓ This project aims to address the significant economic losses and crop waste faced by farmers every year due to various diseases in potato plants. We will employ image classification techniques using Convolutional Neural Networks (CNNs) and develop a mobile application. This application will allow farmers to take a picture of their potato plants, and it will determine whether the plant has a disease or not. The project will leverage a range of technologies, from machine learning to mobile application development and cloud deployment.

### 1.2 Problem Statement

- ✓ Potato farmers frequently encounter losses and crop damage due to diseases affecting their potato plants. Identifying these diseases at an early stage is crucial for prompt intervention and crop protection. Traditional methods of disease detection often require expert knowledge and are time-consuming. This project addresses this issue by creating a user-friendly mobile application that utilizes image classification powered by CNNs to provide quick and accurate disease diagnosis.

## 2. Objectives of the Project

### 2.1 Main Objective

- The main objective of this project is to develop a mobile application that can accurately identify diseases in potato plants through image classification, enabling farmers to take timely corrective actions and reduce economic losses.

### 2.2 Specific Objectives

- **Model Development:** Build a robust disease classification model using TensorFlow and CNNs, with an emphasis on data augmentation and TensorFlow Datasets.
- **Backend Server and ML Ops:** Develop a backend server using TensorFlow Serving and FastAPI to handle model predictions and provide an interface for the mobile application. Implement ML Ops practices for model versioning and deployment.
- **Model Optimization:** Optimize the model for mobile deployment using quantization and TensorFlow Lite, ensuring efficient and fast disease identification on mobile devices.

- Frontend Development: Create a user-friendly mobile application using React JS and React Native, allowing farmers to capture and analyze images of their potato plants.
- Deployment: Deploy the application on the Google Cloud Platform (GCP) and leverage Google Cloud Functions (GCF) for efficient serverless execution.

### 3. Target Users

The primary target users for this project are:

- Farmers: Small and large-scale potato farmers who want to diagnose diseases in their potato plants and take timely action to mitigate crop damage and losses.
- Agricultural Experts: Individuals or organizations specializing in agriculture who can use the application as a diagnostic tool and offer guidance to farmers.

### 4. Proposed Technologies and Tools

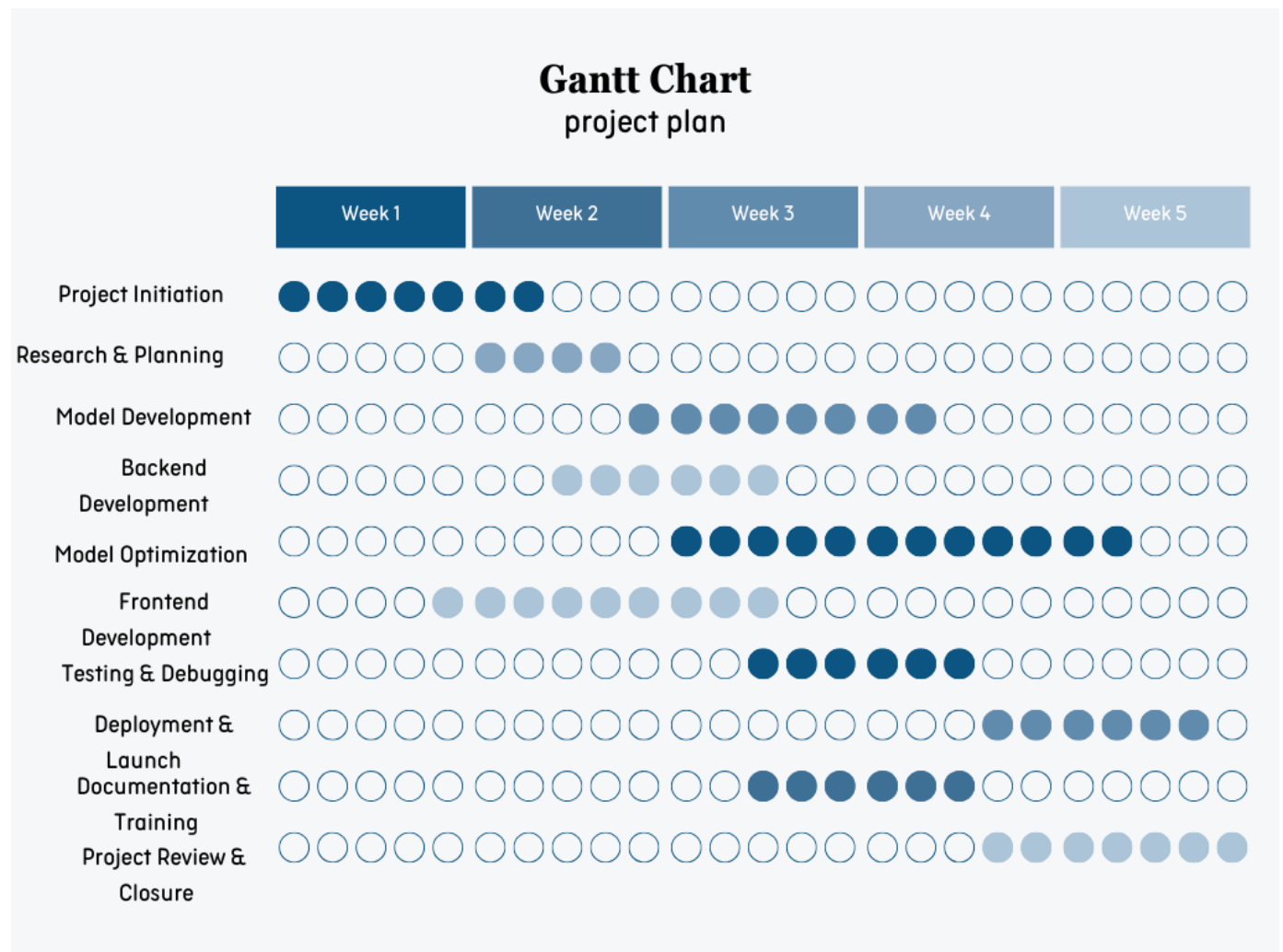
The following technologies and tools will be used in this project:

- Model Building: TensorFlow, Convolutional Neural Networks (CNNs), data augmentation, TensorFlow Datasets.
- Backend Server and ML Ops: TensorFlow Serving, FastAPI, ML Ops best practices.
- Model Optimization: Model quantization, TensorFlow Lite for mobile deployment.
- Frontend Development: React JS for web interfaces and React Native for mobile application development.
- Deployment: Google Cloud Platform (GCP) for hosting the application and Google Cloud Functions (GCF) for serverless execution.

### 5. Time Plan (Gantt Chart)

The project timeline is outlined below, showing key milestones and their estimated completion dates. Please note that this is a rough estimate, and the actual timeline may vary based on project progress and any unforeseen challenges.

## Gantt Chart



## 6. References

- TensorFlow Official Documentation
- FastAPI Documentation
- React Documentation
- React Native Documentation

- Google Cloud Platform
- Google Cloud Functions Documentation

For specific references used during the project, please refer to the respective project documentation and research materials.

This project proposal outlines our approach to solving the problem of potato plant disease identification for farmers. The project's objectives, target users, technologies, and tools to be used are detailed, and a Gantt chart provides a visual representation of the project timeline. For any additional references used during the project, please refer to the relevant documentation and research materials.