**Key Points**

It seems likely that creating a great product for a hackathon involves thorough planning and focusing on key features, based on the provided product idea.

Research suggests that developing an AI-powered EdTech platform requires defining requirements, designing the system, implementing it, and testing for deployment, all within tight time constraints.

The evidence leans toward using a PowerPoint (PPT) to outline each step and feature, ensuring a clear presentation for judges.

Understanding the Product

The product is an AI-powered EdTech platform for personalized learning, designed to adapt to individual student needs. Key features include adaptive quiz generation, personalized study recommendations, sustainable learning options, and real-time analytics. The platform uses technologies like HTML & CSS for the frontend, Flask for the backend, MySQL for the database, and AI/ML algorithms such as Reinforcement Learning (RL), Graph Neural Networks (GNN), and Collaborative Filtering (CF).

**Steps for Product Development**

To make this product for a hackathon, follow these steps:

Define Requirements: Understand the problem (personalized learning) and key features, ensuring scalability for over 100 users.

Design the System: Create a high-level architecture, data models, and user interfaces, focusing on AI/ML components.

Implement the Platform: Set up the environment, develop the frontend and backend, set up the database, and integrate AI/ML models.

Test and Deploy: Conduct testing for functionality and deploy the platform for demonstration.

Unexpected Detail

An unexpected aspect is the inclusion of sustainable learning features like dark mode and low-bandwidth content, which enhance accessibility and energy efficiency, making the platform suitable for diverse environments.

Survey Note: Detailed Plan for Developing the AI-Powered EdTech Platform for a Hackathon

This comprehensive guide outlines the process of developing an AI-powered EdTech platform for personalized learning, tailored for a hackathon setting. The plan is based on the provided product idea, which is detailed in the attached PDF, and focuses on creating a PowerPoint (PPT) to explain each step and feature of the product-making process. This note aims to provide a professional, detailed breakdown, ensuring all aspects are covered for a successful hackathon submission.

**Introduction and Context**

The product, as described in the attachment, is an AI-powered EdTech platform developed by a team from Symbiosis Institute of Technology, Pune, under the Google Developers Group. It addresses the need for personalized learning by offering adaptive quiz generation, personalized study recommendations, sustainable learning features, and real-time performance analytics. Given the hackathon context, the focus is on creating a functional prototype within limited time, using a PPT to outline the development process for presentation to judges.

The current time is 10:05 AM PST on Friday, March 07, 2025, and this plan assumes a typical hackathon duration of 24-48 hours, with adjustments for efficiency. The plan leverages the detailed product description from the attachment, ensuring alignment with the specified features and tech stack.

Step-by-Step Development Plan

Step 1: Define Requirements and Scope

The first step is to understand the problem and define the scope, ensuring alignment with hackathon goals. The platform aims to provide personalized learning experiences, addressing limitations of standardized learning methods. Key features include:

Adaptive Quiz Generation: Uses Reinforcement Learning, specifically the Multi-Armed Bandit Algorithm, to adjust quiz difficulty based on student performance. For example, if a student answers correctly, the next question increases in difficulty; if incorrect, simpler questions with explanations are provided.

Personalized Study Recommendations: Leverages Graph Neural Networks (GNN) to map concept relationships via a Knowledge Graph and Collaborative Filtering (CF) to suggest materials based on similar student behaviors. Recommendations include videos, articles, practice questions, and personalized learning paths.

Sustainable Learning Features: Includes dark mode for energy efficiency, low-bandwidth content for accessibility in remote areas, and an engagement leaderboard to encourage consistent study habits.

Real-Time Performance Analytics: Provides instant feedback on quiz performance and tracks learning progress, helping students and educators monitor improvement.

The tech stack is predefined: HTML & CSS for the frontend, Flask for the backend, MySQL for the database, and AI/ML components like RL, GNN, and CF. Constraints include scalability for over 100 users and the time-limited nature of the hackathon.

Step 2: Design the System

This phase involves creating a blueprint for the platform, ensuring all components integrate seamlessly. The high-level architecture includes:

Frontend: A web interface using HTML & CSS, designed to be responsive and accessible.

Backend: Flask API handling user authentication, quiz management, recommendation generation, and analytics.

Database: MySQL for storing user profiles, quiz results, and study materials, with a schema designed for efficiency.

AI/ML Services: Separate modules for quiz generation (Multi-Armed Bandit Algorithm) and recommendations (GNN and CF).

Data models include:

User: ID, name, preferences, performance history.

Quiz: Question ID, topic, difficulty, student responses.

Study Materials: Material ID, type, topic, metadata for recommendations.

User interfaces will cover login/registration, quiz interface, recommendation page, and performance dashboard. AI/ML components are critical, with the Multi-Armed Bandit Algorithm balancing exploration and exploitation for quiz difficulty, and GNN/CF ensuring personalized recommendations based on concept relationships and user behavior.

Step 3: Implement the Platform

Implementation is the core of the hackathon, requiring efficient task division and prioritization. Estimated time allocations for a 24-hour hackathon are:

Phase Estimated Time (Hours) Key Tasks

Setting Up Environment 1 Install Python, Flask, MySQL, AI libraries; set up Git.

Front-end Development 6 Design and implement HTML & CSS interface, ensure responsiveness.

Back-end Development 6 Implement Flask API for user management, quizzes, recommendations, analytics.

Database Setup 2 Design schema, create tables, implement data migration.

AI/ML Model Development 4 Implement Multi-Armed Bandit for quizzes, GNN for concept mapping, CF for recommendations; integrate with backend.

Testing and Deployment 5 Conduct unit and integration tests, deploy on local server or cloud.

Setting Up the Environment: Install necessary tools like Python, Flask, MySQL, and AI/ML libraries such as PyTorch for GNN and Surprise for CF. Use version control for collaboration.

Front-end Development: Design a lightweight, responsive web interface using HTML & CSS, ensuring accessibility for all users.

Back-end Development: Implement Flask API endpoints for user authentication, quiz generation, recommendation generation, and analytics, ensuring seamless integration with the frontend.

Database Setup: Design and create MySQL tables for users, quizzes, and study materials, with data migration if needed. Use mock data for initial testing.

AI/ML Model Development: For quiz generation, implement the Multi-Armed Bandit Algorithm, defining state space, actions, and reward function. For recommendations, build or use a pre-existing Knowledge Graph for GNN, and implement CF using user interaction data. Integrate these models with the backend API, possibly using pre-trained models or simplified algorithms for speed.

Given time constraints, consider simplifications like using mock data, limiting topics for quizzes, and leveraging open-source libraries to reduce development time.

Step 4: Testing and Deployment

Testing ensures the platform is functional and ready for demonstration. Conduct unit tests for individual components, integration tests for combined functionality, and user acceptance tests to verify requirements. Deployment involves setting up a local server or using a cloud platform like Heroku or AWS, configuring database connections, and ensuring accessibility for judges.

PPT Content for Presentation

The PPT should explain each step and feature in detail, ensuring clarity for judges. Suggested slide structure:

Slide Number Title Content

1 Title Slide Project title, team name, institution.

2 Introduction Problem statement (need for personalized learning), project goals.

3 Key Features Adaptive quizzes, personalized recommendations, sustainable features, analytics; include diagrams.

4 Technology Stack HTML & CSS, Flask, MySQL, AI/ML (RL, GNN, CF); explain choices.

5 System Design High-level architecture diagram, data models, user interfaces.

6 Development Process Steps (requirements, design, implementation, testing, deployment); time allocations.

7 AI/ML Components Detail Multi-Armed Bandit for quizzes, GNN/CF for recommendations.

8 Testing and Deployment Testing strategies, deployment plan.

9 Future Scope Potential enhancements (e.g., multilingual support, gamification).

10 Conclusion Summary of impact, benefits for students and educators.

Each slide should use bullet points, minimal text, and visuals like flowcharts or screenshots. Practice the presentation to fit within time limits, ensuring a professional delivery.

Considerations for Hackathon Success

Given the time constraints, prioritize core features like adaptive quizzes and basic recommendations, using pre-existing libraries and mock data. Document the process for clarity in the PPT, and rehearse the demonstration to ensure a smooth presentation. Unexpected details, such as sustainable learning features (dark mode, low bandwidth), enhance accessibility and energy efficiency, making the platform suitable for diverse environments.

This plan ensures a thorough, professional approach to developing and presenting the AI-powered EdTech platform, aligning with the hackathon's goals and leveraging the provided product idea for a compelling submission.

Key Citations

AI-Powered EdTech Platform for Personalized Learning Detailed Description