**Slide 1: ChefMate - Smart Recipe Assistant**

**Description:** Transforming Culinary Experiences with AI and Image Recognition

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**Slide 2: Introduction to ChefMate**

**Overview:** ChefMate is an application designed to enhance culinary experiences by providing personalized recipe suggestions and allergen detection through image recognition and AI.

**Features:**

* Ingredient Recognition
* Personalized Recipes
* Allergen Detection
* Sustainability and Food Waste Management

**Slide 3: Objectives**

* **Enhance Ingredient Recognition:** Improve accuracy with advanced image recognition models.
* **Personalize Recipe Suggestions:** Adapt recommendations based on individual dietary preferences and restrictions.
* **Detect Allergens:** Identify allergens from ingredient lists and product labels.
* **Promote Sustainability:** Suggest recipes that reduce food waste by utilizing leftover ingredients.

**Slide 4: Literature Survey**

**Key Findings:**

* **Ingredient Recognition:** Current methods often lack precision with partial occlusions and varying conditions.
* **Personalized Recommendations:** Existing systems may not fully integrate user dietary needs with recipe suggestions.
* **Sustainability:** Many apps suggest recipes based on leftovers but lack comprehensive guidance on reducing food waste.
* **AI Chatbots:** Existing chatbots may lack advanced contextual understanding for real-time cooking assistance.

**Summary:** Existing research provides a foundation but leaves gaps in accuracy, personalization, and comprehensive sustainability features.

**Slide 5: Referred Research Work**

1. **Title:** AI Based Recipe Generator and Cook Assistant  
   **Link:** https://ijcrt.org/papers/IJCRT2405710.pdf
2. **Title:** RecipeIS—Recipe Recommendation System Based on Recognition of Food Ingredients  
   **Link:** https://www.semanticscholar.org/reader/70d00862c84890f37e9e676fa3caccb597fb98c9
3. **Title: A Cooking Recipe Multi-Label Classification Approach for Food Restriction Identification  
   Link:** https://www.semanticscholar.org/paper/A-Cooking-Recipe-Multi-Label-Classification-for-Britto-Pacífico/0269762b317f68cb7c186f9efdb082cc2e91c62d

**Slide 6: Gap Analysis**

* **Ingredient Recognition:**
  + **Current Gaps:** Limited accuracy with partially obscured ingredients.
  + **Proposed Solution:** Enhanced models trained on diverse datasets.
* **Personalization:**
  + **Current Gaps:** Insufficient integration of personal dietary restrictions.
  + **Proposed Solution:** Adaptive recommendation engine incorporating user preferences.
* **Sustainability:**
  + **Current Gaps:** Limited features for extensive waste reduction.
  + **Proposed Solution:** Comprehensive suggestions and tips for sustainability.
* **AI Chatbots:**
  + **Current Gaps:** Lack of real-time, context-aware assistance.
  + **Proposed Solution:** Improved AI chatbot capabilities for personalized guidance.
* **Allergen Detection:**
  + **New Feature:** Analysis of ingredients and product labels to identify allergens.

**Slide 7: Research Methodology**

* **Data Collection:**
  + **Ingredient Images:** Gather diverse images of various ingredients.
  + **Recipe Texts:** Collect recipes with detailed ingredient lists and instructions.
  + **Product Labels:** Acquire labels from food products to identify allergens and nutritional information.
* **Pre-Processing:**
  + **Image Pre-Processing:** Normalize and augment images (resize, crop, adjust brightness).
  + **Text Pre-Processing:** Clean and tokenize recipe texts, extract ingredient lists.
  + **Label Pre-Processing:** Extract and format allergen information from labels.
* **ML Model Development:**
  + **Model Selection:** Choose and fine-tune models for image recognition (CNNs, YOLO, U-Net).
  + **Training:** Train models with collected datasets; validate and test accuracy.
  + **Algorithm Integration:** Develop algorithms for allergen detection and dietary restriction matching.
* **Integration:**
  + **Backend Development:** Set up a server to handle model inference and user requests.
  + **Frontend Development:** Create a user-friendly interface for ingredient scanning and recipe recommendations.
* **Testing and Deployment:**
  + **Testing:** Conduct unit testing, integration testing, and user acceptance testing.
  + **Deployment:** Deploy the application on cloud platforms or mobile devices; ensure scalability and performance.

**Slide 8: Proposed Solution**

* **Ingredient Recognition:**
  + **Models:** CNNs, YOLO, U-Net.
  + **Approach:** Train models on extensive datasets, optimize for real-time use.
* **Personalized Recommendations:**
  + **Models:** Machine learning models for personalized suggestions, rule-based systems.
  + **Approach:** Incorporate user-specific data and preferences.
* **Sustainability:**
  + **Features:** Recipe suggestions using leftovers, tips for reducing waste.
* **AI Chatbot:**
  + **Capabilities:** Real-time assistance, context-aware guidance.
* **Allergen Detection:**
  + **Models:** NLP for text extraction, knowledge graphs for allergen mapping.
  + **Approach:** Identify and alert for potential allergens.

**Slide 9: Tools, Libraries, and Frameworks**

* **Development Tools:**
  + **IDE:** Visual Studio Code, Android Studio.
  + **Version Control:** Git, GitHub.
* **Libraries:**
  + **Image Recognition:** TensorFlow, PyTorch, OpenCV.
  + **NLP:** SpaCy, NLTK, BERT.
  + **Data Processing:** Pandas, NumPy.
* **Frameworks:**
  + **Backend:** Node.js, Express.js.
  + **Frontend:** React, Flutter.
* **Deployment:**
  + **Cloud Platforms:** AWS, Azure, Google Cloud.
  + **Database:** MongoDB, Firebase.

**Slide 10: Gantt Chart**

**Project Phases:**

* **Week 1-2:** Data Collection & Literature Review
* **Week 3-4:** Machine Learning Model Development
* **Week 5:** Recipe Recommendation Algorithm Design
* **Week 6:** System Integration and Backend Development
* **Week 7-8:** User Interface Design and User Testing
* **Week 9:** Deployment and Integration of All Features
* **Week 10:** Final Review, Documentation, and Presentation

**Slide 11: Conclusion**

* ChefMate provides personalized recipe suggestions based on ingredient recognition, dietary preferences, and allergen detection.
* Promotes sustainability by creatively utilizing leftovers to reduce food waste.
* Combines AI-driven cooking recommendations with a user-friendly interface for a seamless kitchen experience.
* ChefMate enhances meal preparation, making it convenient, safe, and enjoyable.