Project Plan: Elder Care Monitoring Rover with Voice Assistant

This document outlines the comprehensive project plan for the 'Elder Care Monitoring Rover with Voice Assistant.' It includes hardware tools, AI models, task breakdowns, and a suggested timeline.

# 1. Hardware and Tools

- Raspberry Pi 4 (4GB/8GB): Main controller and processor  
- Pi Camera Module: Facial recognition and video feed  
- Microphone Module: Voice assistant and speech recognition  
- Speaker Module: Voice assistant output  
- Motor Driver (L298N): Controls wheels  
- Wheels & Chassis Kit: Mobility  
- Battery Pack: Power supply  
- Ultrasonic Sensors: Obstacle detection

# 2. AI Models and Libraries

- Facial Recognition: dlib + OpenCV  
- Speech Recognition: Vosk  
- Wake Word Detection: Picovoice Porcupine  
- Text-to-Speech: eSpeak  
- (Optional) Conversational Assistant: Mycroft AI or Rasa

# 3. Tasks and Timeline

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| Task | Description | Timeline |
| Hardware Assembly | Assemble chassis, wheels, motor driver, and connect sensors to Raspberry Pi. | Week 1 |
| Install OS and Libraries | Set up Raspberry Pi OS, Python, and required libraries. | Week 2 |
| Facial Recognition Module | Implement dlib + OpenCV face recognition; test with live feed. | Week 3-4 |
| Speech Recognition Module | Integrate Vosk speech recognition for offline usage. | Week 5 |
| Text-to-Speech Module | Set up eSpeak for voice assistant output. | Week 6 |
| Wake Word Detection | Implement Picovoice Porcupine for wake word. | Week 7 |
| Medication Reminder System | Develop medication schedule and voice reminders. | Week 8 |
| Emergency Alert System | Implement Discord/SMS notification system. | Week 9 |
| Integration and Testing | Combine all modules and test end-to-end functionality. | Week 10-11 |
| Documentation and Report | Finalize documentation, presentation, and demonstration. | Week 12 |

# 4. Notes and Next Steps

- The timeline is indicative and can be adjusted based on progress.  
- Future improvements may include more advanced models (e.g., TensorFlow Lite) and health monitoring sensors.  
- Additional testing should be conducted to ensure robustness and reliability.