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كلية علوم الحاسب
FCS-BNU
Faculty of Computer Science

GRADUATION PROJECT PROPOSAL

PROJECT NAME	CarWare	
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SUMMARY	This project aims to develop an **Integrated Vehicle Service and Management System** composed of two interconnected platforms — a **client-facing Android application** for vehicle owners and a **web-based management system** for service centers. The system will enable users to monitor vehicle health in real time, track expenses, and manage service appointments, while service centers will benefit from tools that handle customer relations, diagnostics, and workflow automation. By integrating real-time telemetry, AI-driven diagnostics, and digital record-keeping, the project seeks to improve transparency, operational efficiency, and predictive maintenance in the vehicle service industry.
PROBLEM STATEMENT	Vehicle owners often lack digital solutions for monitoring vehicle health, managing maintenance schedules, or tracking expenses. As a result, maintenance is often delayed or unorganized. Simultaneously, service centers struggle with manual workflows, poor appointment management, and limited visibility into customer vehicle histories. This separation between car owners and service centers results in inefficiency, poor communication, and reduced customer satisfaction.
EXPECTED CHALLENGES	-Integrating **real-time OBD-II telemetry** with the Android application. -Maintaining **data consistency and synchronization** between client and backend systems. -Ensuring **data privacy, scalability, and security** across both components. -Developing an **AI-based anomaly detection** model that accurately identifies vehicle issues. - Managing **large datasets** from multiple vehicles and users efficiently.
PROPOSED SOLUTION	**Client-Facing Android Application** o Real-time OBD-II data visualization and diagnostics. o Service scheduling and expense tracking. o Maintenance reminders and vehicle logs. o AI-driven anomaly detection for proactive maintenance. **Service Center Management System** o Appointment and workflow management dashboard. o Diagnostic report analysis and job tracking. o Spare part inventory monitoring and low-stock alerts. o Customer communication and automated notifications.

COMPETITORS/MAIN WORK DONE IN THE LITERATURE	Existing solutions such as **Carfax**, **Torque Pro**, and **AutoCare** provide partial features like vehicle diagnostics, service history tracking, or OBD monitoring. However, they lack a unified system integrating **real-time diagnostics**, **expense tracking**, and **service center management**. Academic literature also highlights the growing importance of IoT-based vehicle monitoring and AI-driven predictive maintenance, which this project builds upon by offering a **dual-platform integrated solution**.
DESIRED OUTCOME	The desired outcome is a **fully functional integrated system** that: -Empowers vehicle owners to maintain and monitor their vehicles proactively. -Help service centers automate workflows and manage customer relations efficiently. -Demonstrates a scalable architecture suitable for real-world adoption by automotive service providers.
WHAT DO YOU NEED TO LEARN IF ANY	Understanding **OBD-II protocols** and real-time telemetry processing. Implementing **AI-based anomaly detection** using vehicle data. Developing **secure RESTful APIs** and managing **Android–.NET integration**. Designing scalable **database and authentication systems** (Firebase / ASP.NET Identity)
EXPECTED TOOLS/TECHNOLOGIES NEEDED	**Frontend:** React. **Backend:** ASP.NET Core, SQL Server. **Android app**: Kotlin, Jetpack Compose **UI/UX:** Figma **APIs & Services:** REST APIs, Firebase Authentication. **Hardware:** OBD-II Bluetooth/Wi-Fi adapter for telemetry testing.
PROJECT SCHEDULE/TIME PLAN	**Phase 1** Month 1–2 Requirement analysis, research, and system design **Phase 2** Month 3–6 Development of Android client and backend system **Phase 3** Month 7 Integration testing, debugging, and optimization **Phase 4** Month 8 Deployment, evaluation, and project documentation
RESOURCE REQUIREMENTS IF ANY	OBD-II diagnostic device (Bluetooth/Wi-Fi). Development systems with Android Studio & Visual Studio. Cloud hosting services for backend deployment. Access to sample vehicle diagnostic datasets for testing.