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SAWLTN – Automatic Motorcycle Oil Change

Background:
Motorcycles dominate transport in Vietnam, yet oil changes are often skipped due to long waits and inconvenient service. We pair IoT-enabled oil-pump machines with a mobile app so riders can find the nearest station, select the right volume, and pay digitally (OTP login, real-time data, NestJS + Postgres).

Objective:
Automate and standardize oil changes with a precise, traceable, and safe workflow: locate → scan QR → choose volume → pay → machine dispenses. ESP32 controls flow and waste handling while the backend logs transactions. Next steps: finalize ESP32 commands, complete integration, and run full-stack testing before launch.

Key Features:
1. **Secure login (Twilio OTP)**: Phone-number sign-in with one-time code.
2. **Smart machine control**: Find nearest station, scan QR, choose volume; App Server talks to ESP32 to read levels (OilSensor) and open valve (AutoValve).
3. **Cashless payment (Stripe)**: In-app checkout; on success the server authorizes dispensing.
4. **Data & logs (PostgreSQL)**: Users, machines, orders, and dispense records stored for auditability.
5. **Real-time monitoring**: Sensor data streams to backend for live machine status and receipts.
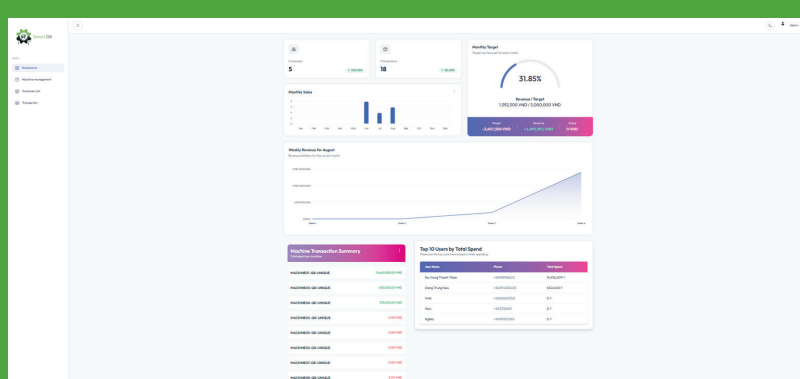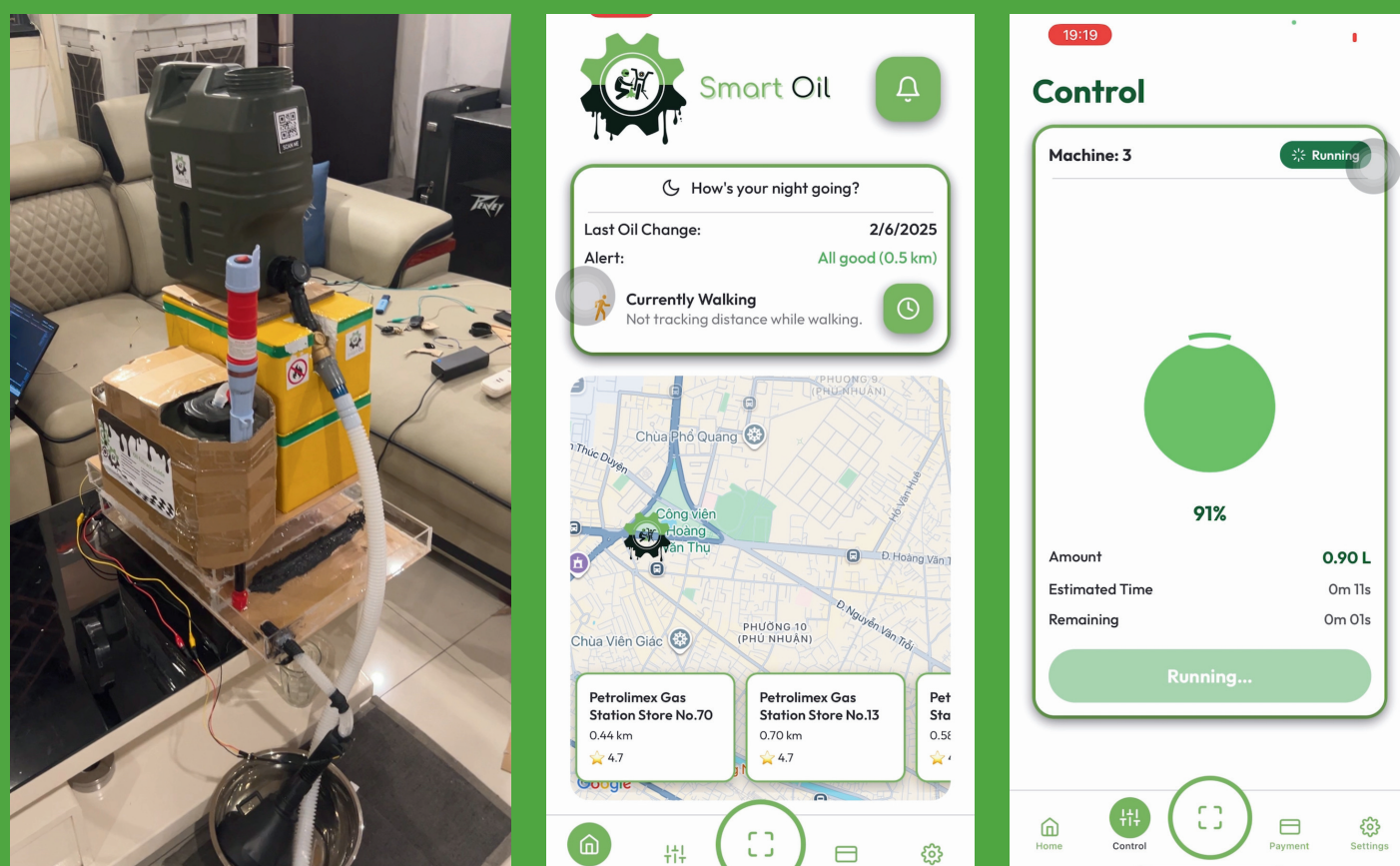
System Architecture

Technologies

NestJS   Twilio Service   postgreSQL database   Stripe   ESP32
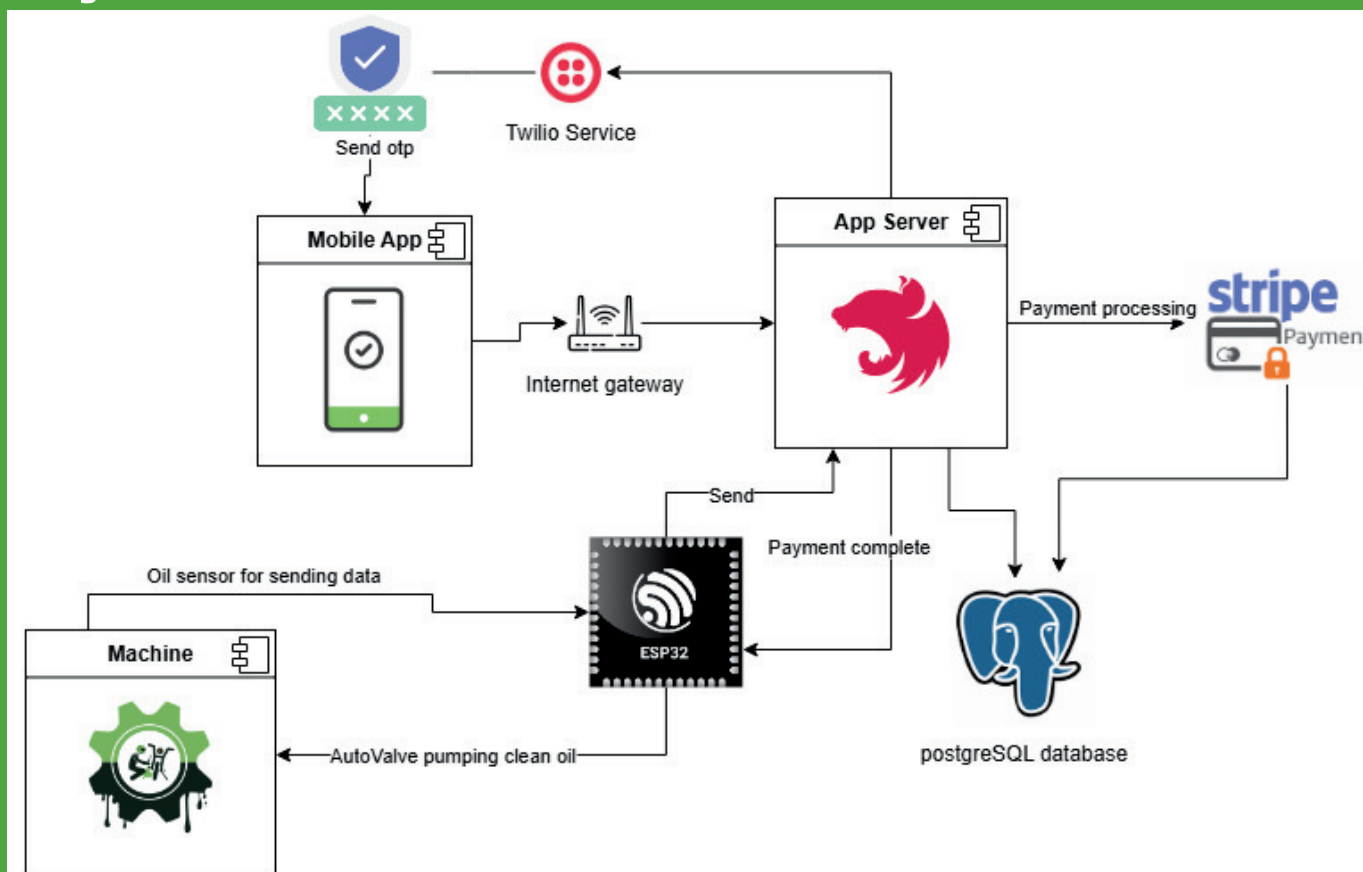
Results

Acknowledgement

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Future Works:
- Allow multiple payment options like e-wallet(momo) and internet banking.
- Integrate sensor onto the auto valve to improve the precision of the oil dispensing process.
- Use AWS for database.