Project Portfolio: Workforce AI Optimization Control Center

Executive Summary

This project provides a production-ready solution for the 2027 Mexican labor reform. By moving from rigid 48-hour "bricks" to a fluid 40-hour "demand-driven" engine, the system achieves 8.39% net payroll savings while maintaining 100% legal compliance. The Aivena Control Center isolates the impact of dynamic customer demand, allowing for real-time simulation of new traffic patterns across a fixed 50-store network.

1. Evolution of the Workforce Engine (Phase Summaries)

These links summarize the methodology, logic, and data architecture developed throughout the project.

- **Phase I Baseline Diagnostic & Operations Architecture:** Establishing the mathematical baseline, calibrating demand against role-specific productivity, and deploying the initial diagnostic engine to identify overtime leakage.
- **PhaseII Methodology & Strategic MVP Report:** Defining core assumptions for the 2027 standards, including productivity ratios, Sunday premiums, and the multitasking "Strike Force" strategy.
- **PhaseIII Executive Control Center Logic:** Detailed breakdown of the real-time pipeline, from demand generation to the deep optimization solver.

2. Performance Comparison (Legacy vs. AI)

WebApp Link : https://ps-score-agent-dbxrp6xdmkoinemapp65gzu.streamlit.app/

This analysis demonstrates the impact of the AI engine using identical traffic and employee data to isolate the efficiency gains.

- **Traditional Legacy Planning (48hr Model):** Characterized by rigid 8-hour blocks that result in "clopenings," excessive 200% overtime penalties, and significant overstaffing during morning lulls.
- **Aivena AI Optimization (40hr Model):** Utilizes Google OR-Tools CP-SAT to "hug" the demand curve with flexible shift slots (5h, 6h, 8h). This model eliminates illegal overtime and enforces mandatory 12-hour rest periods.

Key Results:

- Net Payroll Savings: 8.39% reduction in labor costs.
- Efficiency Gain: +10.6% increase in network labor utilization.
- Service Level Security: 98.1% coverage during critical peak hours.

3. Final Deliverables (The Aivena Application)

The primary output is the live production-ready application and its auditable data provisions.

- **Aivena Executive Control Center:** An interactive dashboard for simulating demand waves and generating optimized schedules. This app can be run independently without manual intervention from me.
- WebApp Link: https://workforce-ai-executivecontrolcenter.streamlit.app/
- Presentation Link: Aivena_AI_Workforce_Optimization_Blueprint.pdf

Automated Audit Outputs:

- Optimized Network Schedule: Hour-by-hour operational instructions for 4,000+ unique employees.
- Optimized Store Audit: Granular store-level performance metrics.
- Compliance Ledger: A high-level audit trail proving 100% legal compliance.
- Link for documents: Documents

Technical Repository

The underlying code architecture built for national scalability.

- **Workforce-AI Engine:** The core repository containing the data pipeline (demand_gen.py, solver_engine.py, etc.) and the Streamlit UI.
- Repo Link: https://github.com/sdhruvil2610-ai/workforce-ai