CASE STUDY

AI School Bus Route Optimization

Client	Industry	Solution
Large School District in Orlando, Florida	Student Transportation Public Education	Intelligent School Bus Routing Student Safety Management System

Challenge

Orlando school district operating 320 buses serving 48,000 students experienced 85-minute average route times, $12.8M annual fuel costs, 23% of buses running overtime causing late arrivals, complex routing around construction and weather delays, and parent complaints about inconsistent pickup times affecting 34% of families.

AI Consulting Approach

• Transportation Network Analysis: AI consultants mapped student addresses, school locations, traffic patterns, and safety constraints to optimize routing across Orlando's sprawling suburban and urban areas.

• Student Flow Optimization: Machine learning models balancing route efficiency with student safety, ride time limits, and capacity constraints.

AI Solution

• Smart Route Generation: AI creating optimal bus routes considering student locations, school start times, traffic patterns, and safety zones

• Dynamic Weather Adaptation: Real-time route adjustments for Florida weather conditions, flooding, and road closures

• Capacity Optimization: Machine learning balancing bus loads while minimizing student ride times and maintaining safety protocols

• Parent Communication AI: Automated notifications with accurate pickup times and delay alerts through mobile app integration

Implementation (26 weeks total)

- Discovery (4 weeks)
- Route Mapping (8 weeks)
- AI Development (10 weeks)
- Pilot Testing (4 weeks)

Key Results

Route Efficiency:
- 52-minute average route time (vs. 85), 73% reduction in overtime routes, 34% fewer total route miles, 89% on-time performance improvement

Cost Savings:
- $4.6M annual fuel reduction, $2.8M labor savings, 28% improvement in bus utilization, ability to serve same students with 45 fewer buses

Family Satisfaction:
- 94% parent satisfaction with pickup reliability (vs. 66%), 67% reduction in transportation complaints, 156% improvement in communication scores

Technologies:
- GIS mapping
- optimization algorithms
- machine learning
- mobile applications