# ðŸš¦ Adaptive Traffic Signal Control

This project implements an AI-powered traffic light controller using Reinforcement Learning in SUMO.

## ðŸ“‚ Project Structure

- `agent.py` â€“ DQN Agent

- `simulation.py` â€“ Main training loop

- `reward.py` â€“ Reward calculation

- `state.py` â€“ State representation

- `api.py` â€“ FastAPI backend

- `dashboard/` â€“ React frontend

- `net.net.xml` â€“ SUMO network

- `input\_routes.rou.xml` â€“ Traffic routes

- `cross3ltl.sumocfg` â€“ SUMO configuration

## ðŸ›  Setup

```bash

# 1. Install Python deps

pip install -r requirements.txt

# 2. Run simulation

python simulation.py

# 3. Start API

uvicorn api:app --reload

# 4. Run frontend

cd dashboard

npm install

npm run dev