REAL TIME IoT FOR DISTRIBUTED MACHINE LEARNING

Electrical Engineering

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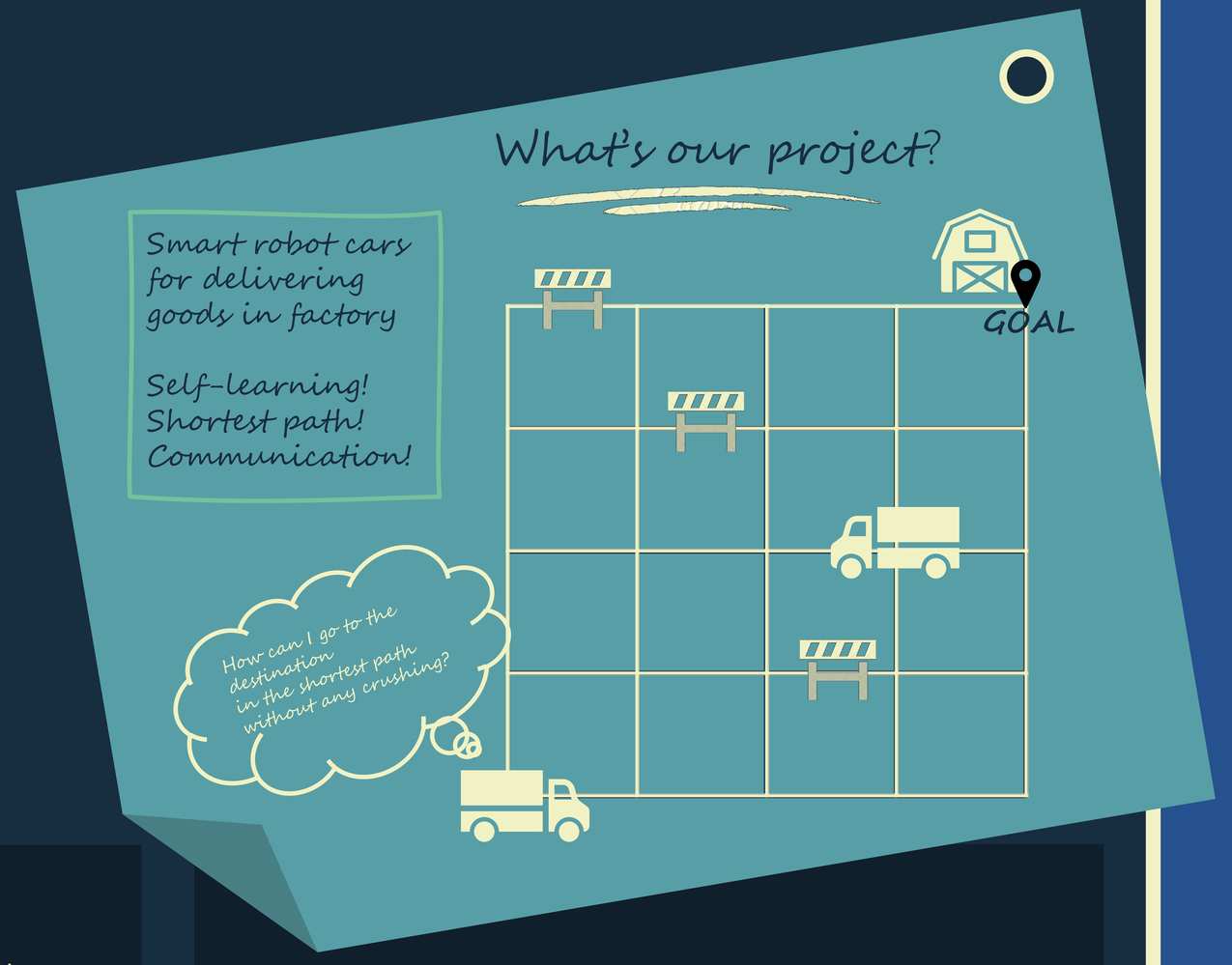
INTRODUCTION

An intelligent good-delivering IoT system for industry

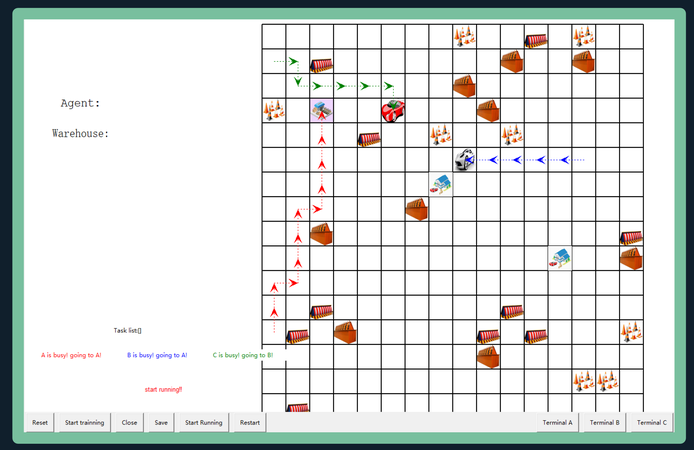
- Multiple robotic cars that can learn the maps by themselves and choosing the shortest path without any crushing
  ------reinforcement learning (Q-learning and DQN algorithm)
- Real-time information exchanging between robotic cars
  ------ communication by WIFI
- Simulations of algorithms
  ------ visualization simulation tool (grid world)
- Prototype of multi-agent intelligent warehouse distribution system
  ------ multi-agent DQN algorithm



ALGORITHMS

- Classic Q-learning
  single agent with static environment
  q values store in Q table
  need less time to train
- Classic DQN
  single agent with static environment
  q values store in deep neural network
  more accurate
- Multi-agent Q-learning
  multi agent with dynamic environment
  reduce of state
  need less time to train
- Multi-agent DQN
  multi agent with dynamic environment
  can handle 'state explosion'
  more accurate
  over-train

A prototype of
multi-agent intelligent warehouse distribution system



Training the model using reinforcement learning
& A prototype of multi-agent intelligent warehouse distribution system

SIMULATION

On our laptop!!

FUNCTIONS

- Line Following
  Grid map with path and using triple reflectance sensor to make cars follow the line
- Real-Time Communication
  TCP WebSocket with WIFI connection between server and clients
- Real-Time QR Scan
  QR code as path guide for localization
- Self-decision Making
  Upload the trained Q-table for routing

Look at the floor!!

A simple realistic model with two GoPiGo&Raspberry Pi cars

TESTS ON HARDWARE