POLITECNICO
MILANO 1863

Fast Communication Learning Through Asymmerical Multiplayer Videogames

Relatore:

Marco Gribaudo

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Jacopo Grandi

Serious Games

Serious game definition:
"Any piece of software that merges a non-entertaining purpose (serious) with a videogame structure (game)"

Introduction

Design and implemetation of a videogame that trains the communication skills of the players.

Contents

- Game Design
- Level Design
- Traffic Simulation
- Player movement: Bycicle model
- UDP Infrastructure
- State Synchronization
- Audio: Radio and Sounds
- Tests: TDD

Contents

- Game Design
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- **Traffic Simulation**
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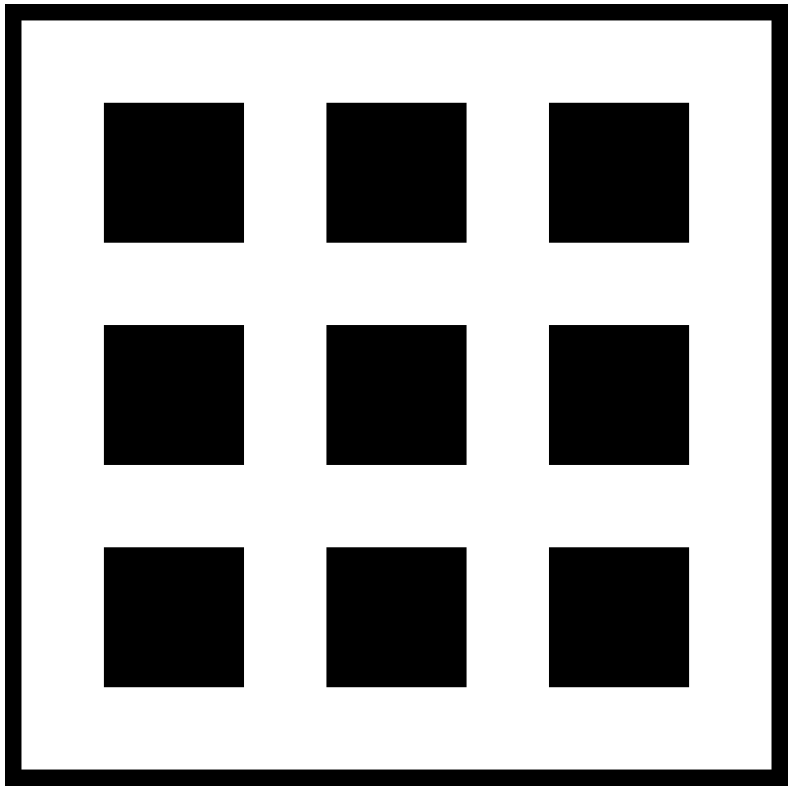
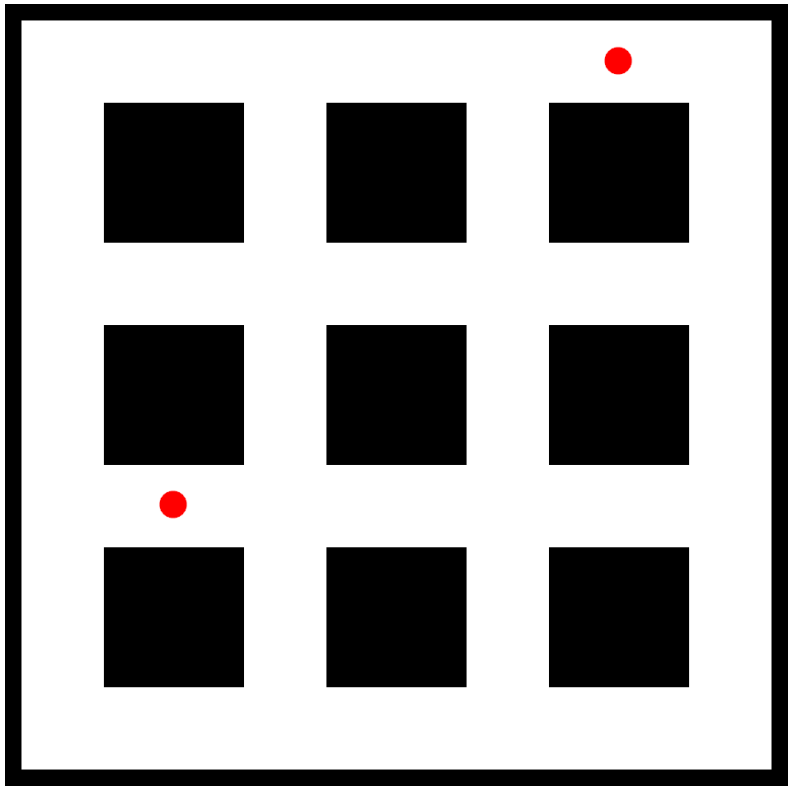
Game Design

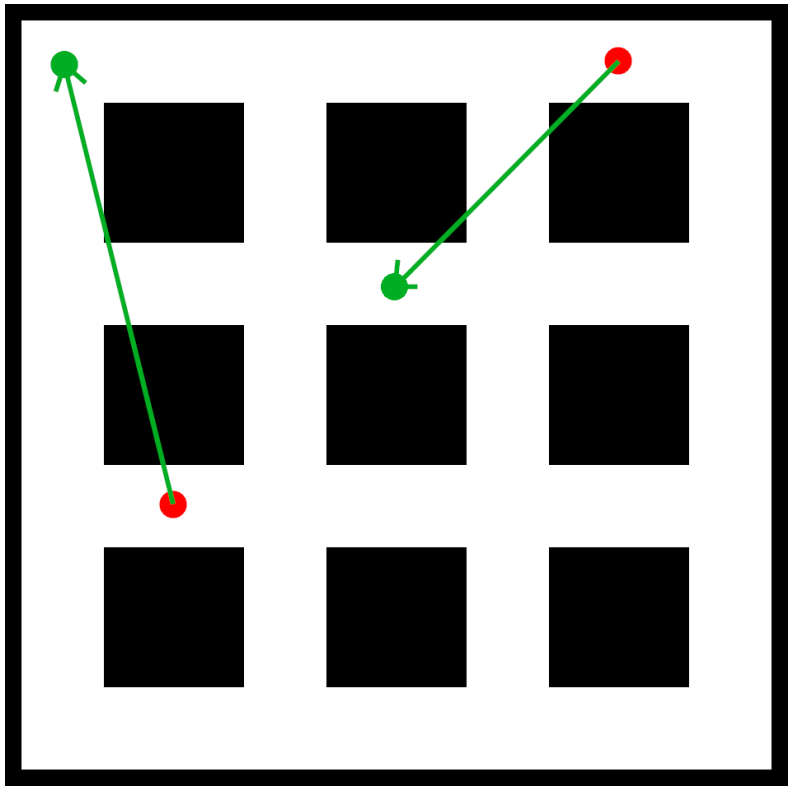
The game is set in a city with a manhattan road layout



There are items scattered on the roads



Items have to be carried to their destination



The city is filled with car traffic and it's subdivided by drawbriges.

The players are either Couriers or Radio Operators:

- Couriers bike through the city and carry the items
- Radio Operators have a map of the city

Players can communicate by an half duplex radio.

Couriers and Radio Operators have different information:

- The item location and destination is known by the Radio Operators
- The Radio Operators don't know the location of the Couriers
- The traffic levels are known to the Radio Operators
- The drawbridges state (open/close) is not known by the Radio Operators

The players win if they can carry all items to their destination within a time limit.

Level Design

Library 3D models

Assembled into city blocks

Placed to form a city

Road layout is inferred and a Road Graph is produced

Roads are named and details are placed (street signs)

Traffic Simulation

Traffic Simulation

Deterministic agent based simulation.
Each car is simulated as a train following the Rail Graph

Generation of the Rail Graph from the Road Graph

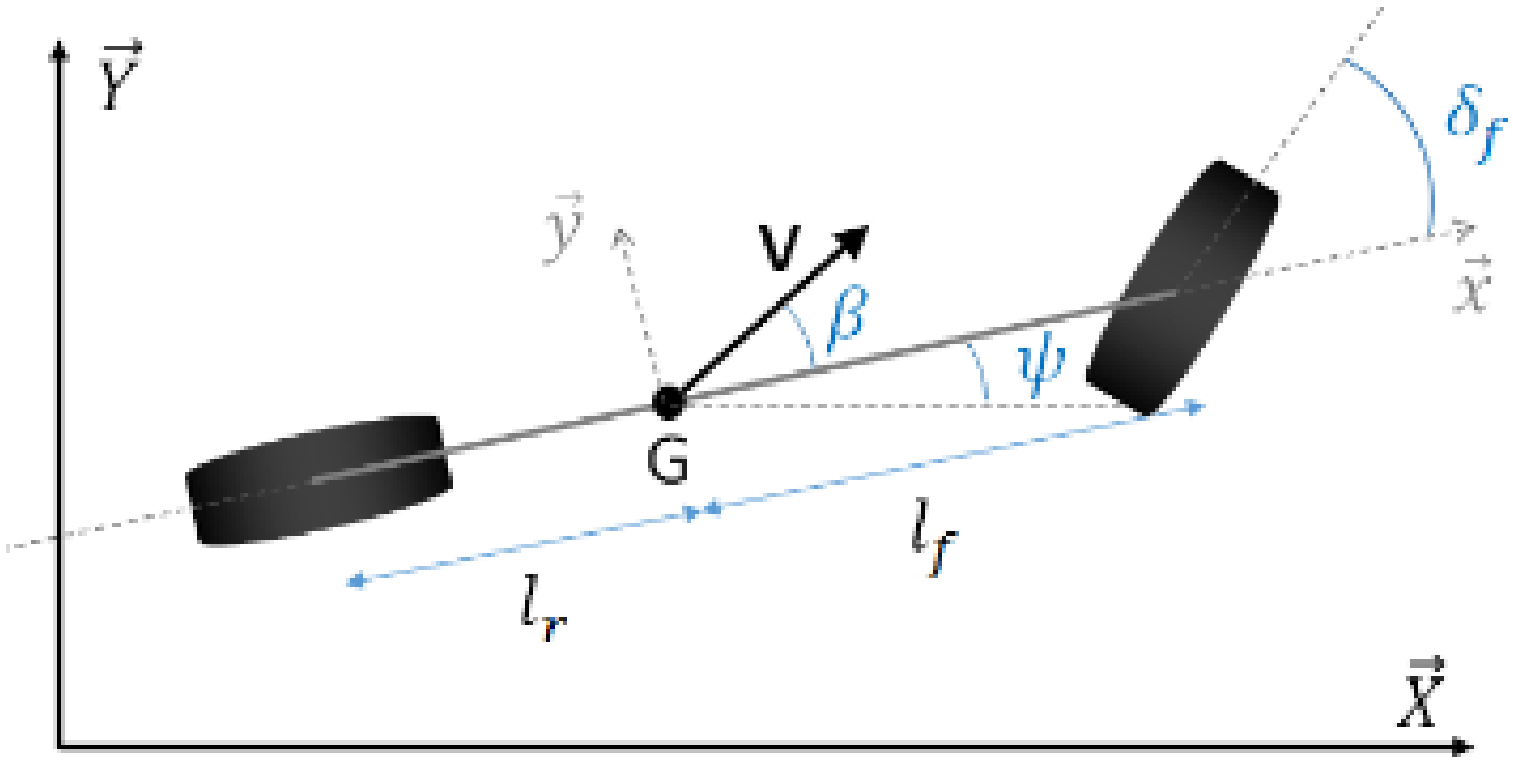
Traffic lights placement

Integration:

Optimization:

- Collision Detection: Lookahead dictionary
- Lookup Optimization on graphs and precalculation
- Minimize allocations
- Grid indexing
- Parallelization
- Stopped car linking

Kinematic Bycicle Model



UDP Infrastructure

UDP with reliability:

- optional retransmission
- message fragmentation
- integrity check

Synchronization

State sync vs Input sync
Stability
Extrapolation (Dead reckoning)

Audio

Half duplex communication
No loopback
Buffers
Resampling
White noise Hi-pass filter

Testing

TDD: Test Driven Development
Multiplayer testing
Clumsy