

Implementation of an autonomous driving system in simulation software

Applicative project - Computer Science – Big Data



Contents

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Introduction

- Passionate about AI
- Personal formations
- Sigma Group & AI Racing



Specifications

Technical Specifications

- The car has to :
 - Have 4 contacts points with the track
 - Be 30x25x25 cm
 - Weight 4kg max
 - Have a max total battery power 7800 mAh
 - Have 2 motors maximum
 - Have a circuit-cutter for emergency purpose
 - Be autonomously controllable

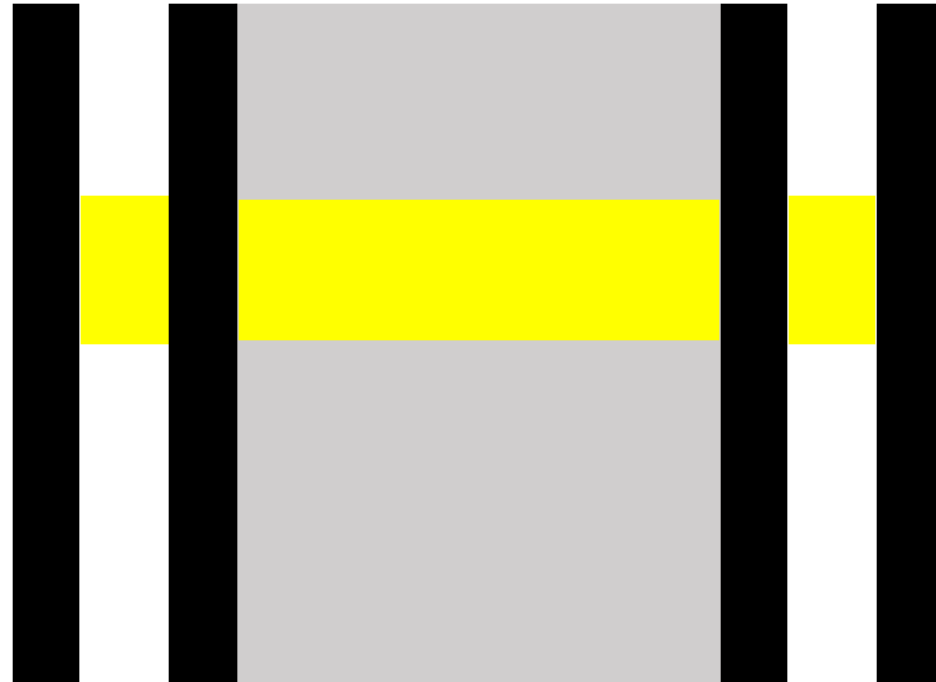
Specifications

Start & Finish

- Start :
 - Luminous countdown (red, yellow, green with 10x10 cm traffic light)
 - 2min max to start & false start will be penalysed
- Finish :
 - Car stop itself within 5s after crossing the finish line (15cm height yellow band accross the whole track width)

Specifications

The track



Project management

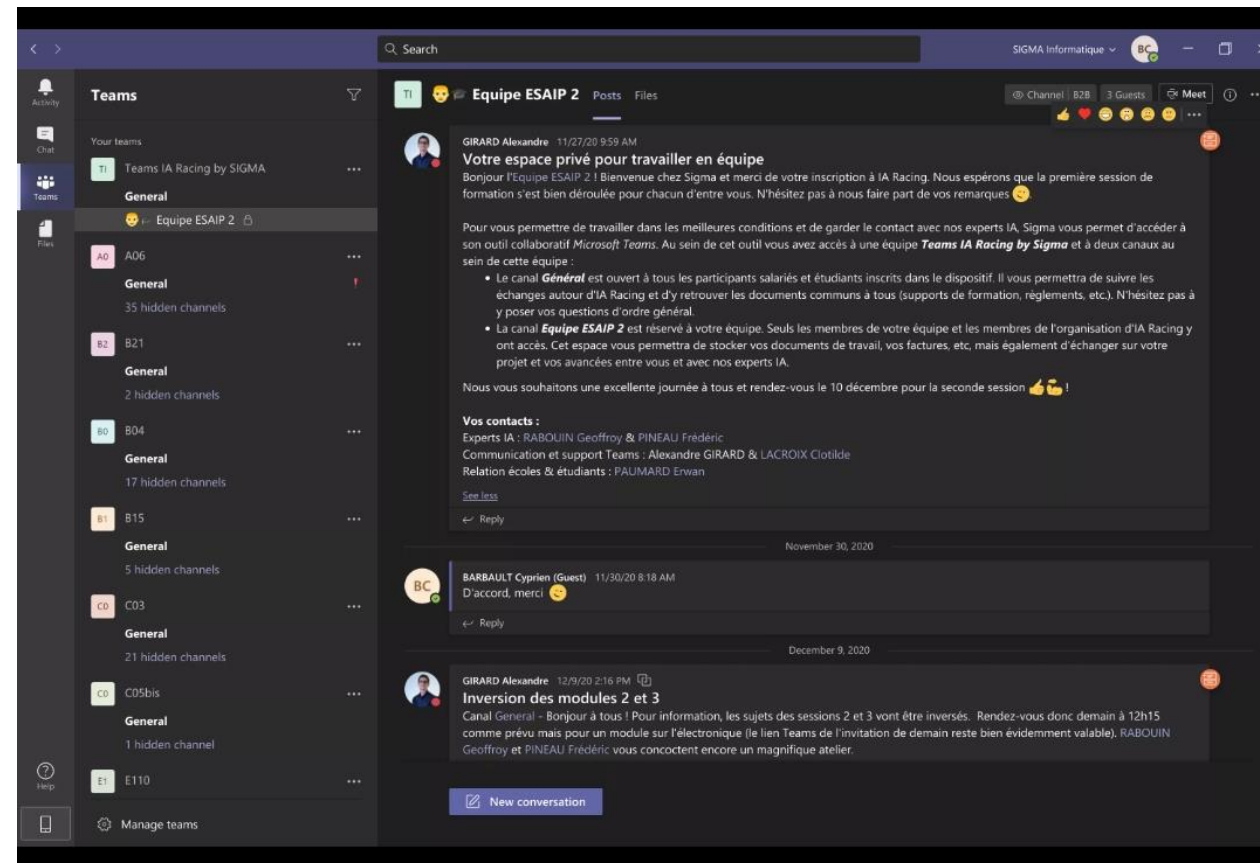
Azure DevOps

The screenshot displays the Azure DevOps web interface for a project named 'AI-Racing Team'. The interface is organized into a Kanban board with three columns: 'To Do', 'Doing', and 'Done'. The 'To Do' column contains six items (9-14), all in 'To Do' state. The 'Doing' column contains three items (6, 7, 8), all in 'Doing' state. The 'Done' column contains five items (1-5), all in 'Done' state. The left sidebar provides navigation options for the project, including Overview, Boards, Backlogs, Sprints, Queries, Repos, Pipelines, Test Plans, and Artifacts. The top navigation bar shows the project name and a search bar.

Column	Item ID	Item Name	State
To Do	14	Test & Debug	To Do
	13	Train the car for real	To Do
	12	Set up the car	To Do
	11	Train virtually the model	To Do
	10	Selecting final type of model	To Do
	9	Buy car kit	To Do
Doing	6	Selection of the car kit	Doing
	7	Testing models virtually	Doing
	8	Deep learning formation	Doing
Done	5	Set up development environment	Done
	4	Attempt meeting #2 - Electronic -	Done
	3	Attempt meeting #1 - Raspberry PI -	Done
	2	Sign up to AI-Sigma Racing	Done
	1	Team creation	Done

Project management

Teams meeting with Sigma

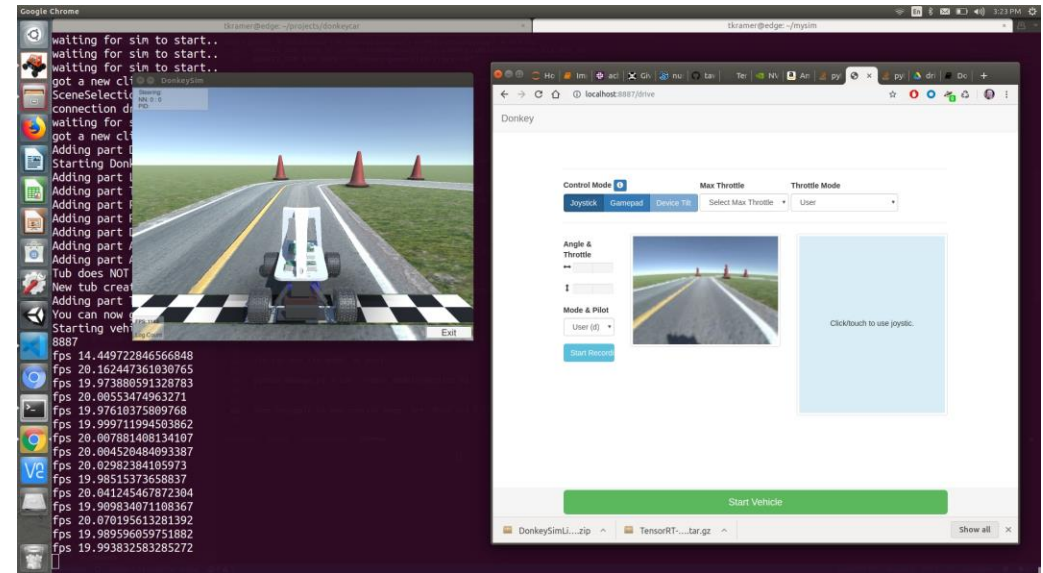


Technical overview

Donkey vs Udacity Simulators



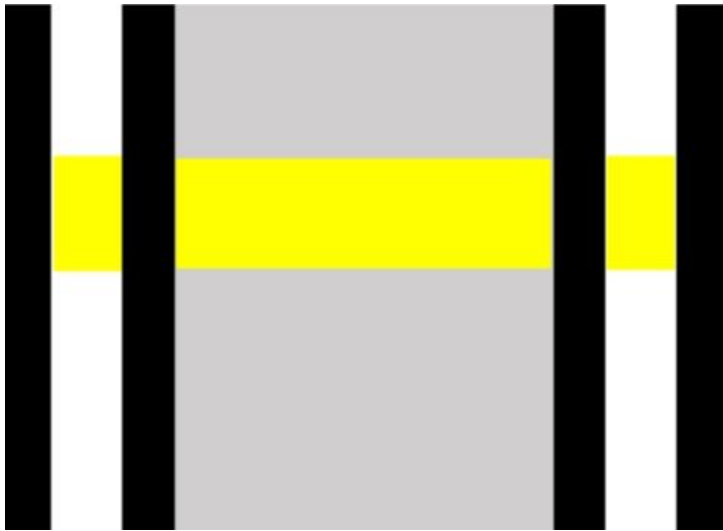
Udacity simulator



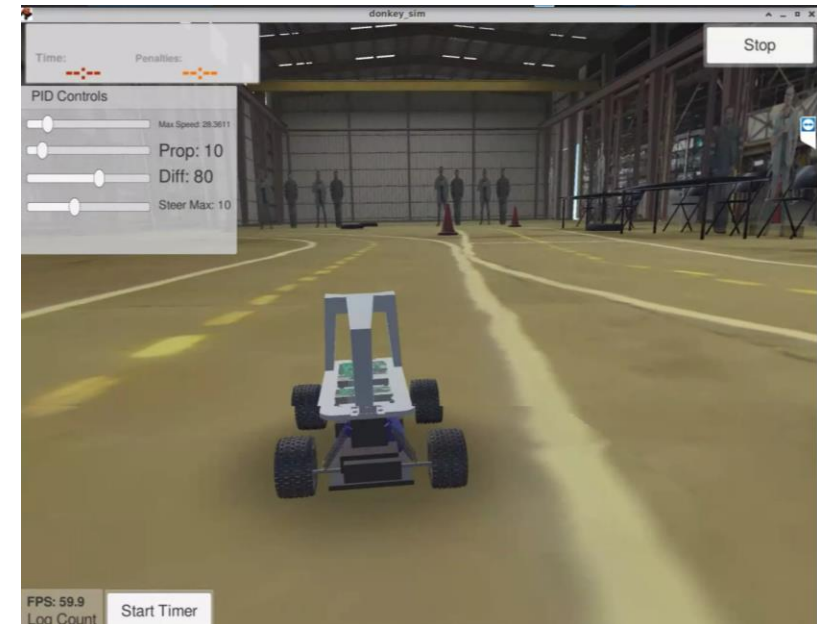
DonkeySimulator

Technical overview

Donkey vs Udacity Simulators



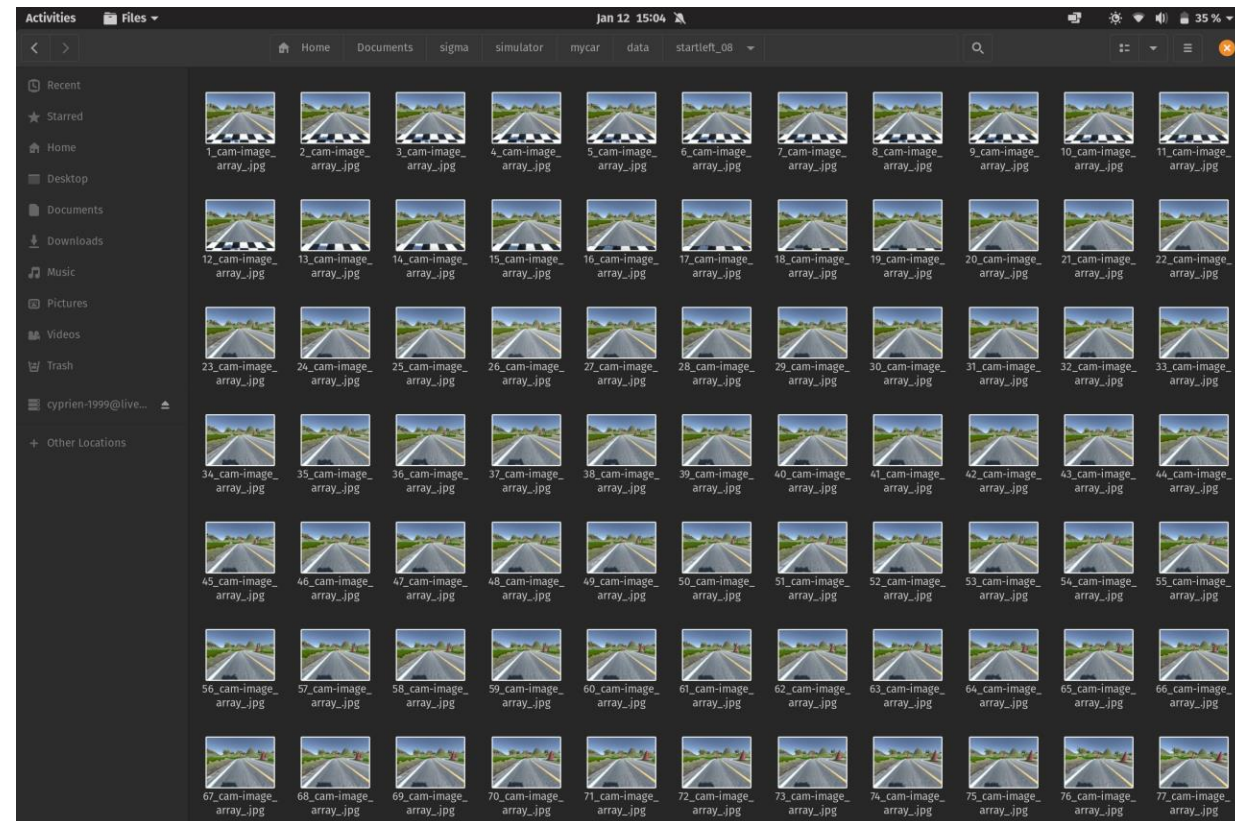
Our track



DonkeySimulator

Technical overview

Dataset



Technical overview

Our model

- Video

Conclusion

- Next steps :
 - Build the car
 - Build our own custom track for training & testing
 - Implement PID Controller
 - Tune our model
 - Implement visual odometry

Conclusion

Thanks for listening !!

