## Update from Robot Sports





#### Update for VDL Robot Sports

- Team introduction
- Team status
- Outlook
  - Automotive vision
  - Two-wheeled platforms
  - MSL simulator
  - Indoor soccer fields

#### **The Robot Sports team**

An open team of ~ 40 volunteers of ~ 10 companies

- Good ole' Philips- and new team members
- (Early) retirees
- Students for internships & graduation projects
- Facilities provided for
  - VDL ETG main sponsor
  - Maxon motor
- Regular efforts
  - Wednesday evenings
  - Veldhoven location: Robotsports Arena
- Together with other Dutch MSL teams
  - Falcons, RIF, Tech United



ASML Bosch Rextroth DAF Maxon motor Philips PInS Rubytech TU/e Vanderlande VDL ETG





2016-2019



## Team status





#### Short overview of team status

- Soccer skills
  - Passing, goal shots improve accuracy → machine learning Q-batch? did not start
  - Ball pickup improve robustness various low-level skill adaptations
  - Response speed overall architecture adaptations new behavior
- New hardware required due to wear & tear (Portuguese open)
  - New frame 4 omnidirectional wheels
  - New ball handler & kicker more predictable ball control
  - New power electronics
- New challenges
  - Collaboration with Fontys to port their code on one of our robots

4 teams, 2 Raspberry Pi per team:

- Measure field & obstacles
- Make plan & program
- Test & improve
- Compete who's first to the ball?
- Many different strategies!







#### Maker Faire<sup>®</sup> Eindhoven







# Outlook





#### Team strategy

- Boundary conditions
  - Resource limitations (people, €)
  - We've hit a ceiling in improvements, need to make bigger step(s) change
- Choices
  - Leverage
    - Use industrial solutions e.g. vision, motion
    - Use from others e.g. Q-batch learning, obstacle filtering
  - Reduce cost
    - Use available fields sports hall / futsal field
    - Suitcase-transportable robots (for tournaments)
  - Increase speed of learning (teamplay)
    - MSL simulator
  - Pick-up new teams
    - MSL simulator

## sudo apt update sudo apt upgrade





#### Revision of robot hardware with limited updates

- Frame
- Kicker & ball handler
- Power electronics









### Automotive vision





#### Automotive vision components

- Collaboration with hardware supplier being planned
- Intel vision processing accelerator

## **Two-wheeled robots**





#### Two-wheeled platforms

- Small scale two-wheeled robot experiments
- Hoover board experiments
- Plans put on hold due to main team revision

# **MSL** simulator





#### MSL simulator

- First project changed
- Port Fontys robot code on our robot; based on joint team at Portugal and lack of hardware at Fontys
- Next step use each other's simulators

# Start using existing futsal- or indoor soccer fields





#### Futsal and indoor soccer fields

- Pending two-wheeled robot to be available
- Three- and four omni-directional wheeled robots are not suitable for the floor

