Robotics & Autonomous Driving

May 1th, 2021 11:00 PM -12:20 AM PST
May 2nd, 2021 10:00-11:20 AM UTC+4

Elmar Abbasov

Chapter 3 | Session 09

Agenda Overview

10:00-11:20 am

Time	Topic
10:00-10:05 am	Kick-off
10:05-10:10 am	Introduction
10:10-10:40 am	Presentation
10:40-10:45 am	Break
10:45-11:15 am	Q&A Discussion
11:15-11:20 am	Wrap up

expertech organized by ATL

Hosted by:

Rasim Abdullayev, Community Leader @ GOUP

GoUp Community driven Open source accelerator!

- Building next generation community:
  egoless, collaborative, competent, decentralized,
  scalable, fun community culture.

- Structure and index the data flow within community.

goup

Co-hosted by:

Vurgun Hajiyev, Expertech

Expertech is a monthly tech meetup series organized by ATL Group to bring IT minds together.

The goal of this meetup series is a commitment to the development of the local IT ecosystem for professionals, students, and IT enthusiasts.

expertech

We want to know you, if you fit!

https://goupaz.slack.com

https://www.linkedin.com/company/goupaz

https://github.com/goupaz

https://youtube.com/goupaz

https://www.meetup.com/goupaz

Sponsors

https://www.allmytaxes.com

To reach for community event sponsorship contact us over Slack: slack.goupaz.com

Code of Conduct

Build with love, push with sugar, pull with caution

1. Language is **English**
2. We are here to **collaborate**: learn, benefit and contribute
3. We are here **equal**: despite our roles, accomplishments
4. **NO** marketing, selling, competing

Photo Shoot Time

Please turn on your camera :D

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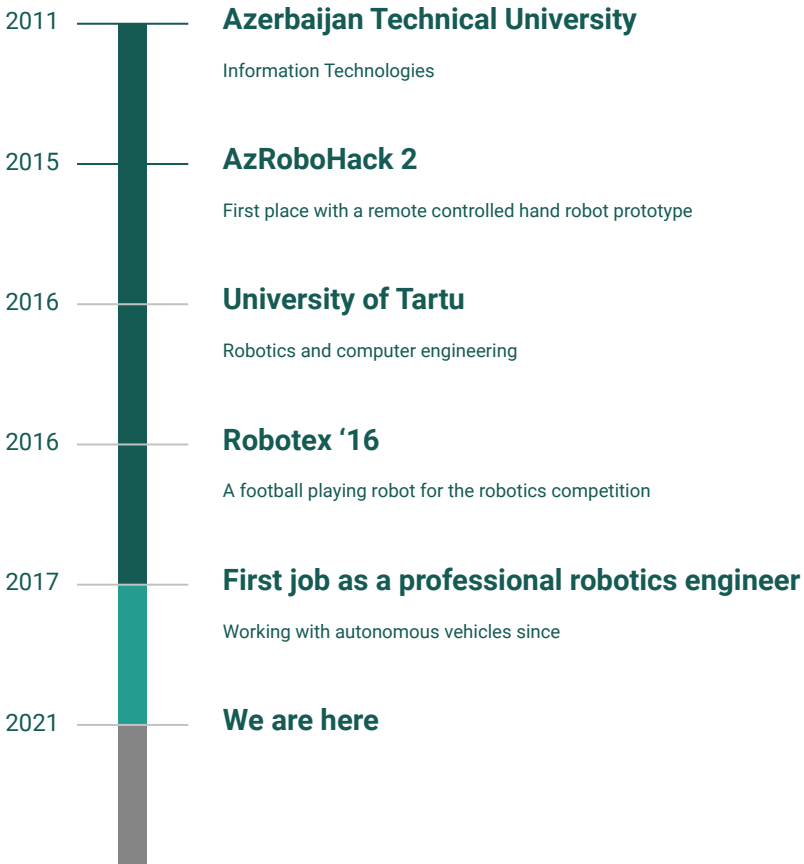
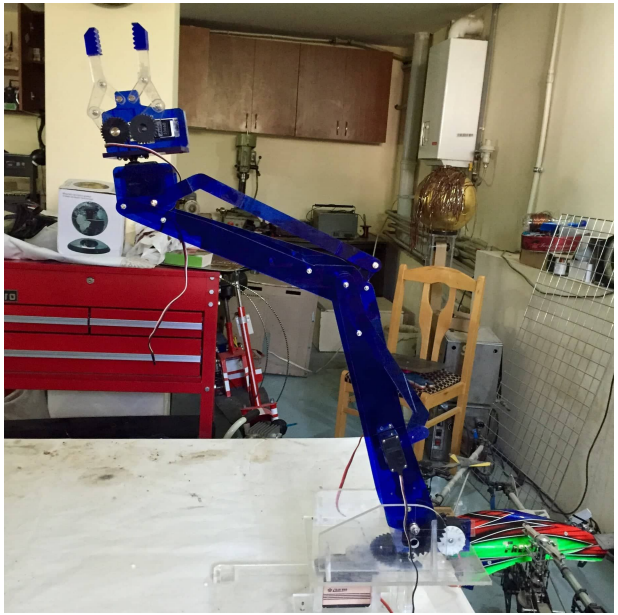
About me


2011
Azerbaijan Technical University
Information Technologies
2015
AzRoboHack 2
First place with a remote controlled hand robot prototype
2016
University of Tartu
Robotics and computer engineering
2016
Robotex ‘16
A football playing robot for the robotics competition
2017
First job as a professional robotics engineer
Working with autonomous vehicles since
2021
We are here

First robots



Introduction to robotics

1

A robot may not injure a human being or, through inaction, allow a human being to come to harm.

2

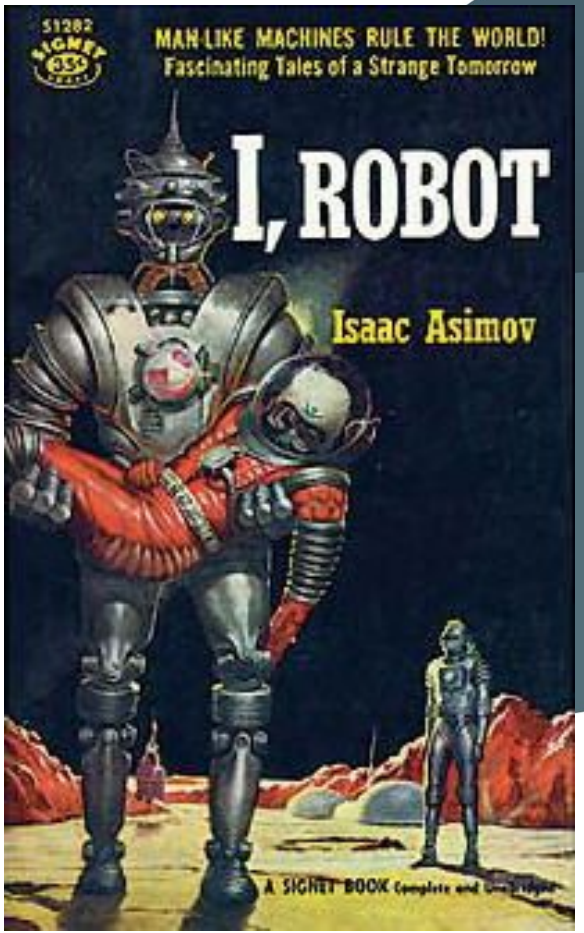
A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.

3

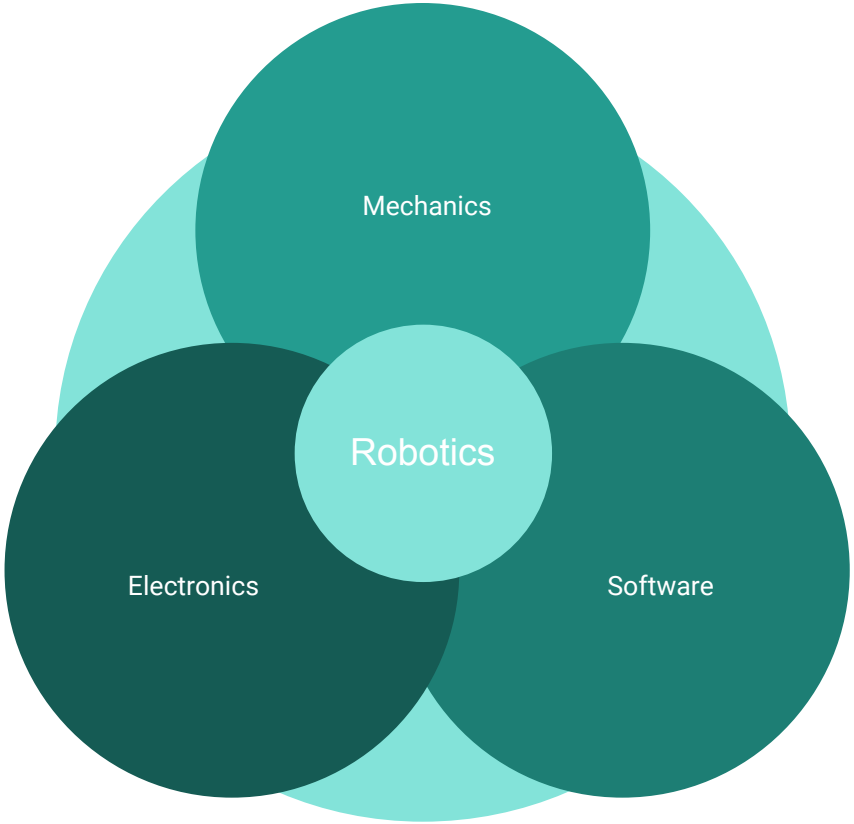
A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.

1942 - When Isaac Asimov used the word “robotics” in Science-Fiction

1956 - First robot released in Industry



Let’s get technical


Mechanics
Robotics
Electronics
Software

Programming languages

	Fast development	High performance	
Python	✓	✗	• Fast development and high performance are both valuable commodities for robotics software • Both are popular languages with huge communities around them • Both have first class ROS support
C++	✗	✓	

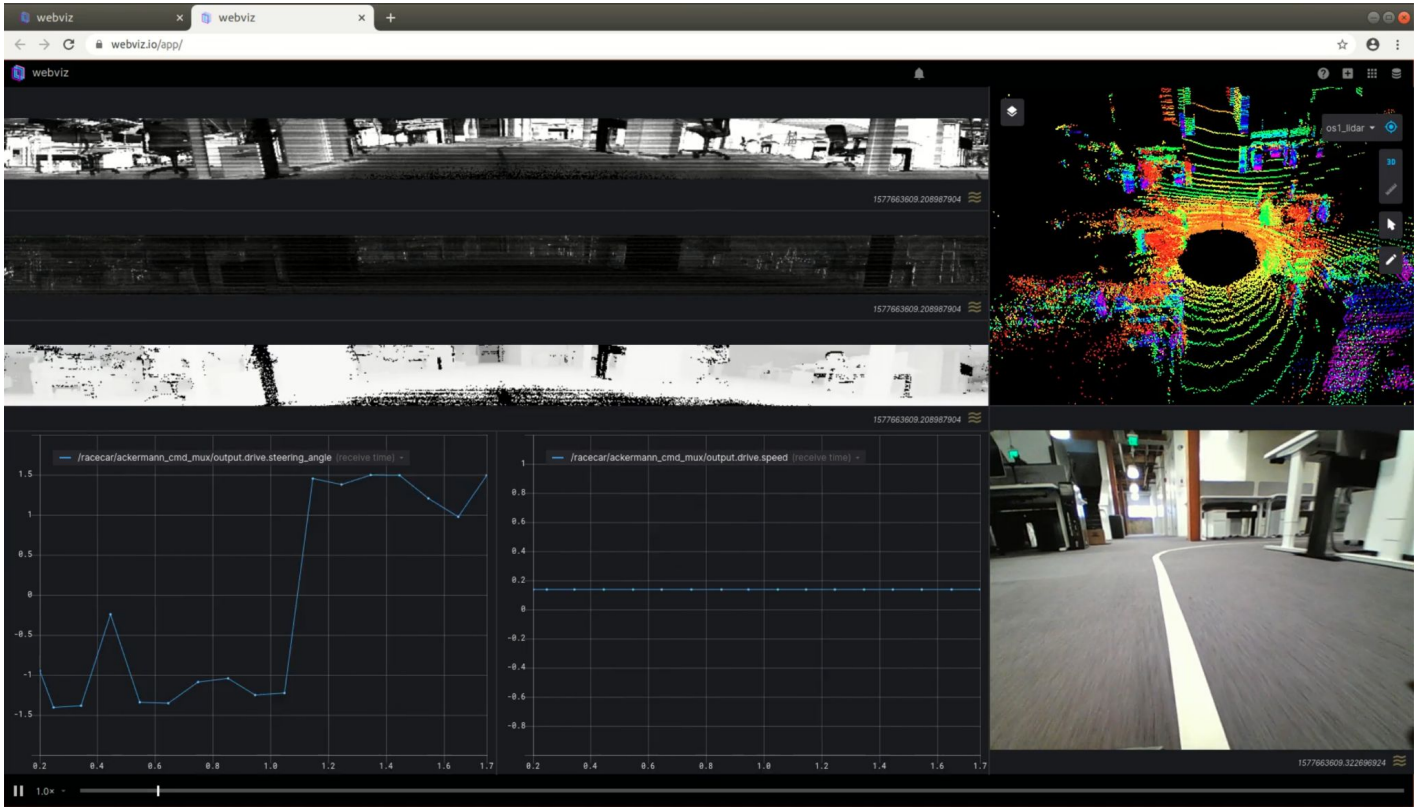
Robotics before ROS

- Lack of standards
- Little code reusability
- Having to reinvent device drivers, access to robot's interfaces, management of onboard processes, inter-process communication protocols etc.
- Keeping re-coding standard algorithms
- Working on a new robot means starting re-coding (mostly) from scratch

Robot Operating System

- ROS is an open-source robot operating system
- A set of software libraries and tools that help you build robot applications that work across a wide variety of robotic platforms
- Originally developed in 2007 at the Stanford Artificial Intelligence Laboratory and development continued at Willow Garage
- Since 2013 managed by OSRF (Open Source Robotics Foundation)

Webviz demo


webviz
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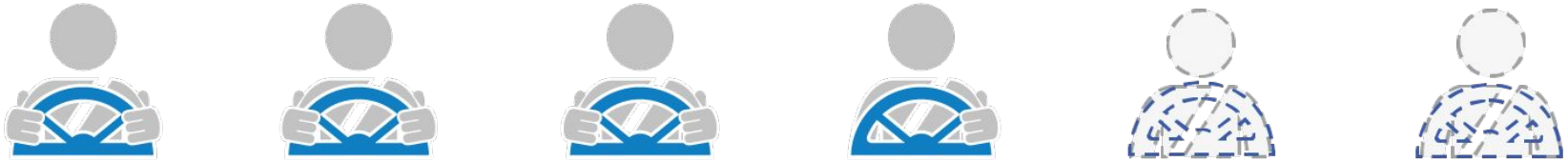
ROS works great as a part of a university curriculum

Autonomous driving

Which company produces and sells the most robots in the world?


TESLA

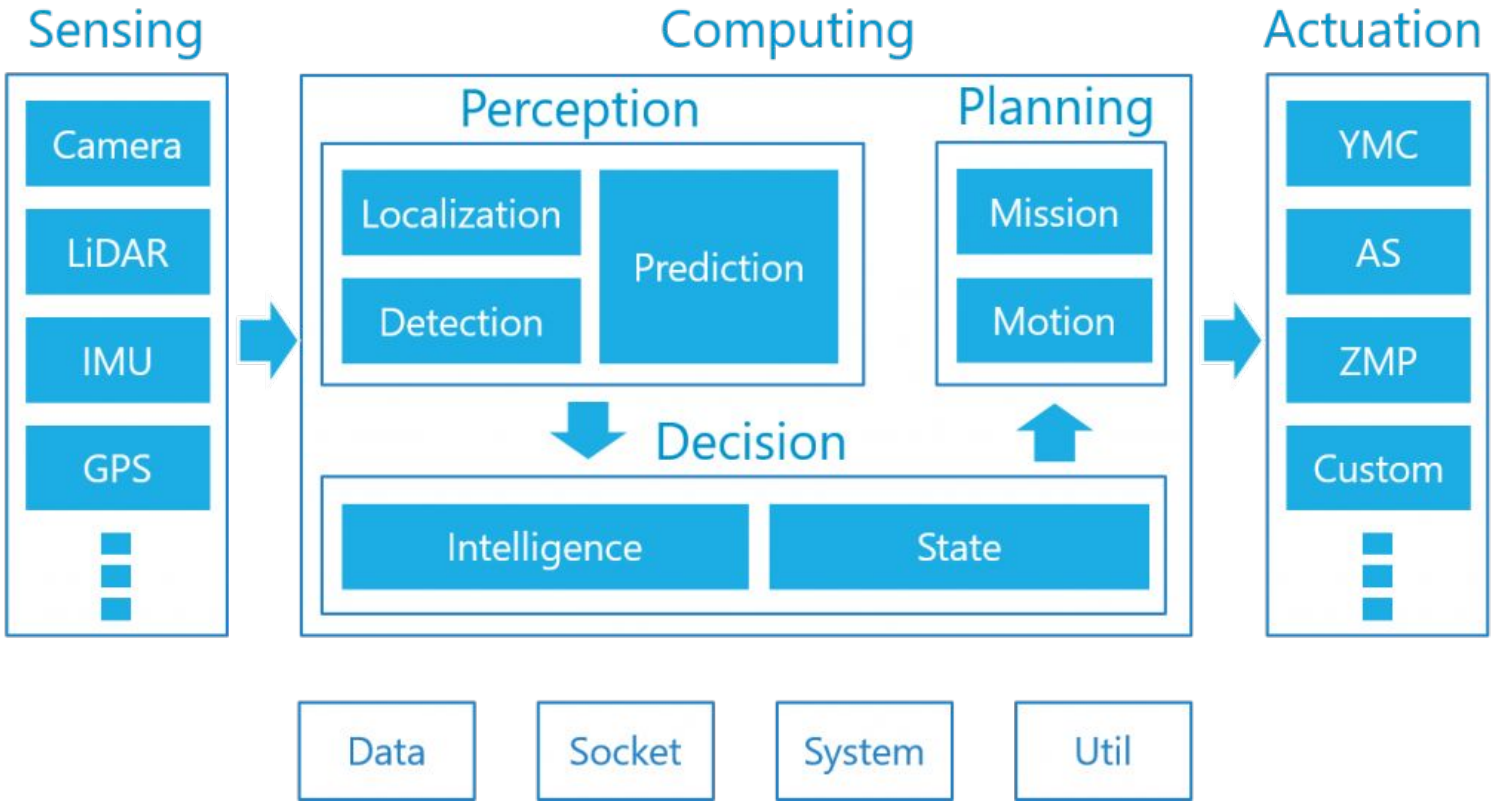
SOCIETY OF AUTOMOTIVE ENGINEERS (SAE) AUTOMATION LEVELS



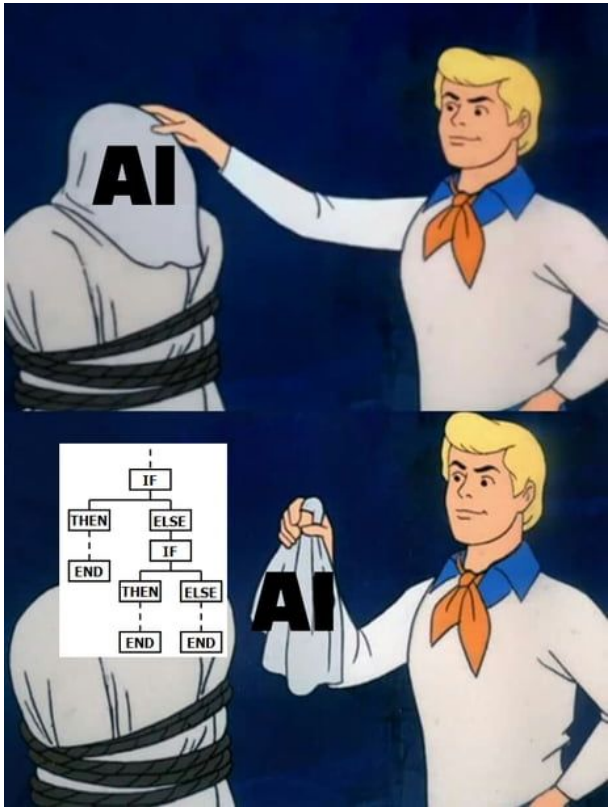
0	1	2	3	4	5
No Automation	**Driver Assistance**	**Partial Automation**	**Conditional Automation**	**High Automation**	**Full Automation**
Zero autonomy; the driver performs all driving tasks.	Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times.	Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

Autonomous driving middlewares

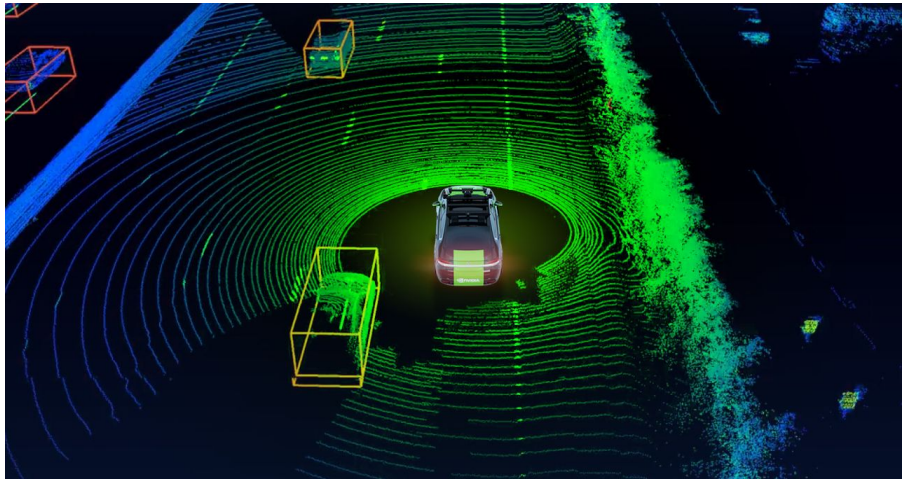
What are middlewares for



What is an AI



AI for autonomous driving



YOLO v5

The future of driverless cars

Skills you definitely need if you want to become a robotics engineer in autonomous driving field

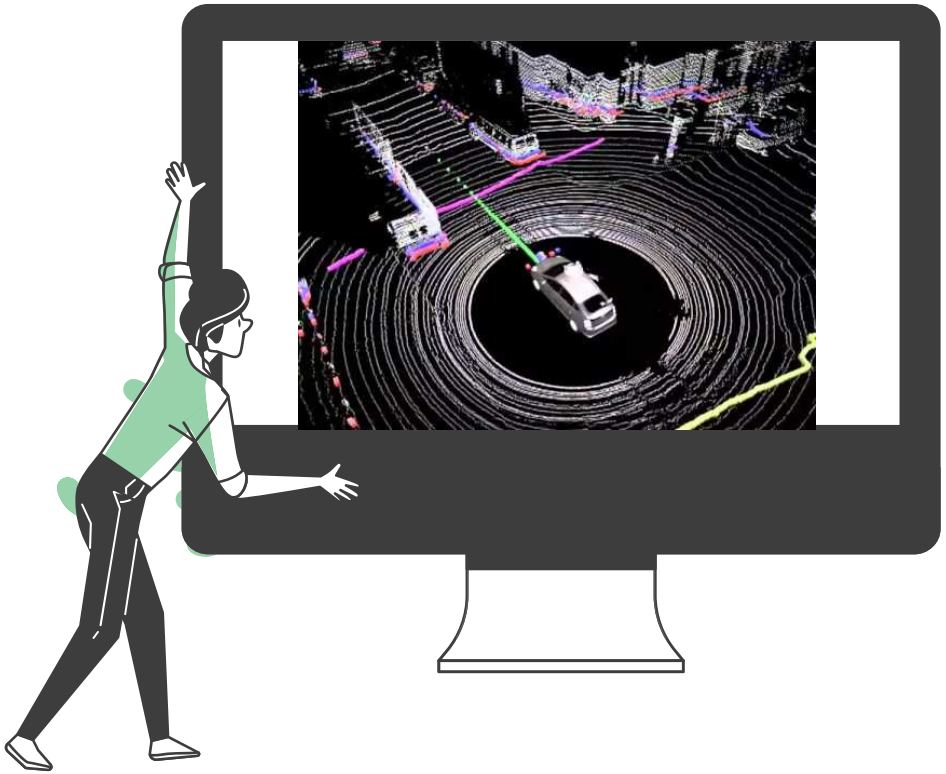
- C++ or Python - Ideally some experience with both
- Experience in Linux - Nobody wants their car to ask for updates in the middle of driving
- Some hardware related projects - Play with Arduinos, Raspberry Pis etc.
- Experience with ROS - It’s a robotics engineer’s bread and butter
- Hackathons, robotics competitions etc. - Great for improving skills and networking
- Degree? - Depends, but definitely not obligatory

5 mins break


Q
A

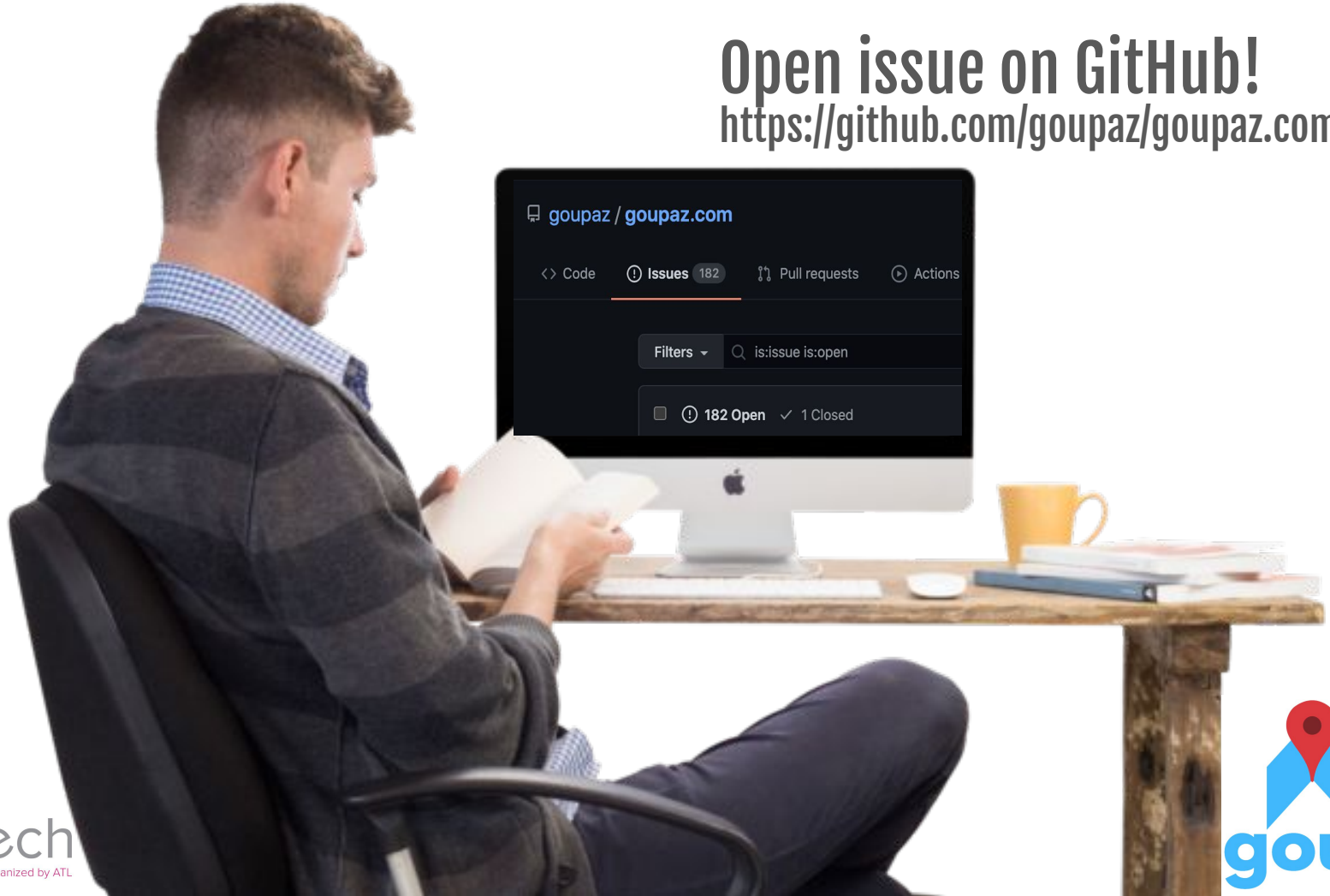
Wrap-up

https://www.linkedin.com/in/eabbasov/



Open issue on GitHub!

https://github.com/goupaz/goupaz.com



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Thank you!