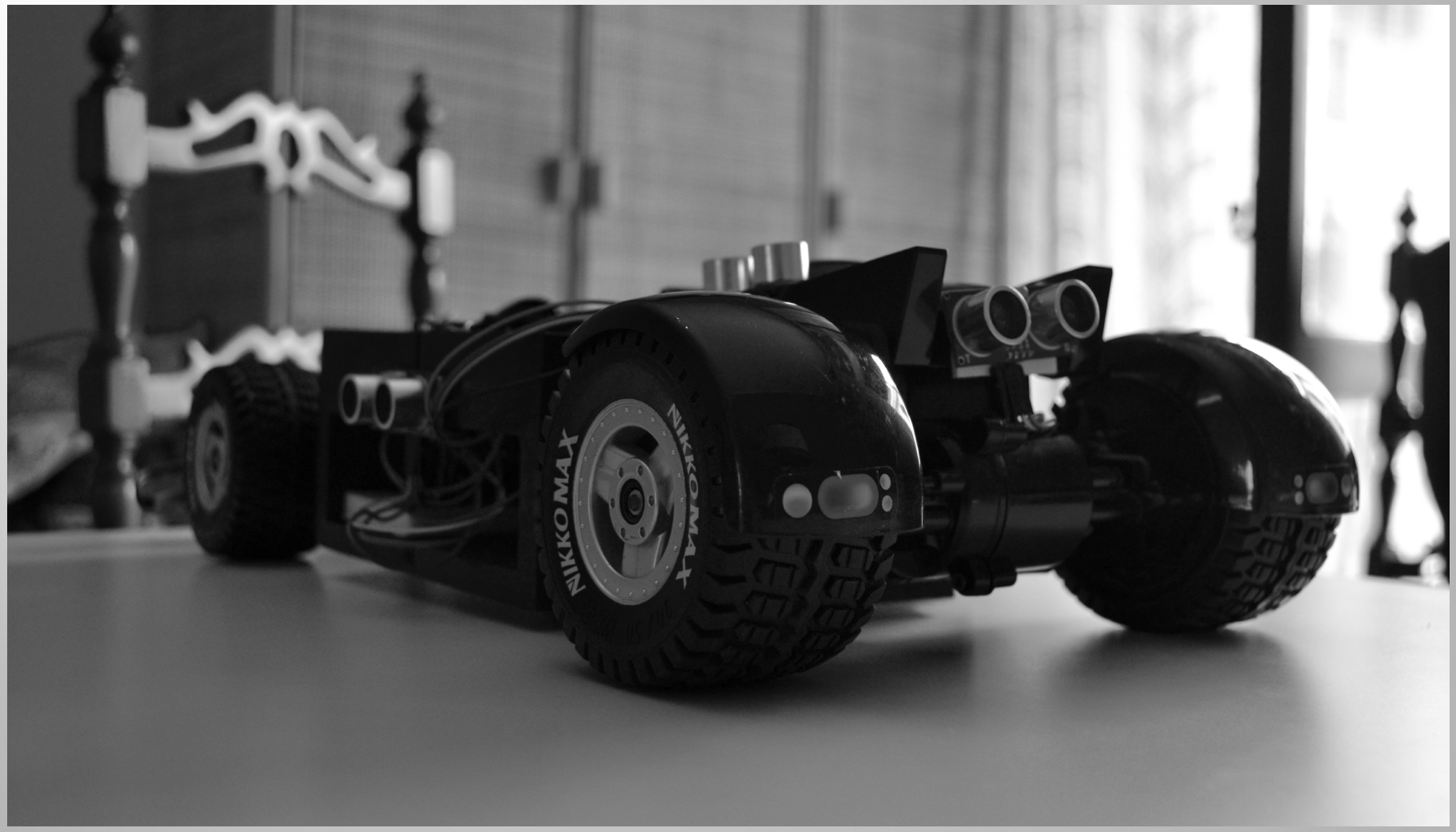
BATCAR



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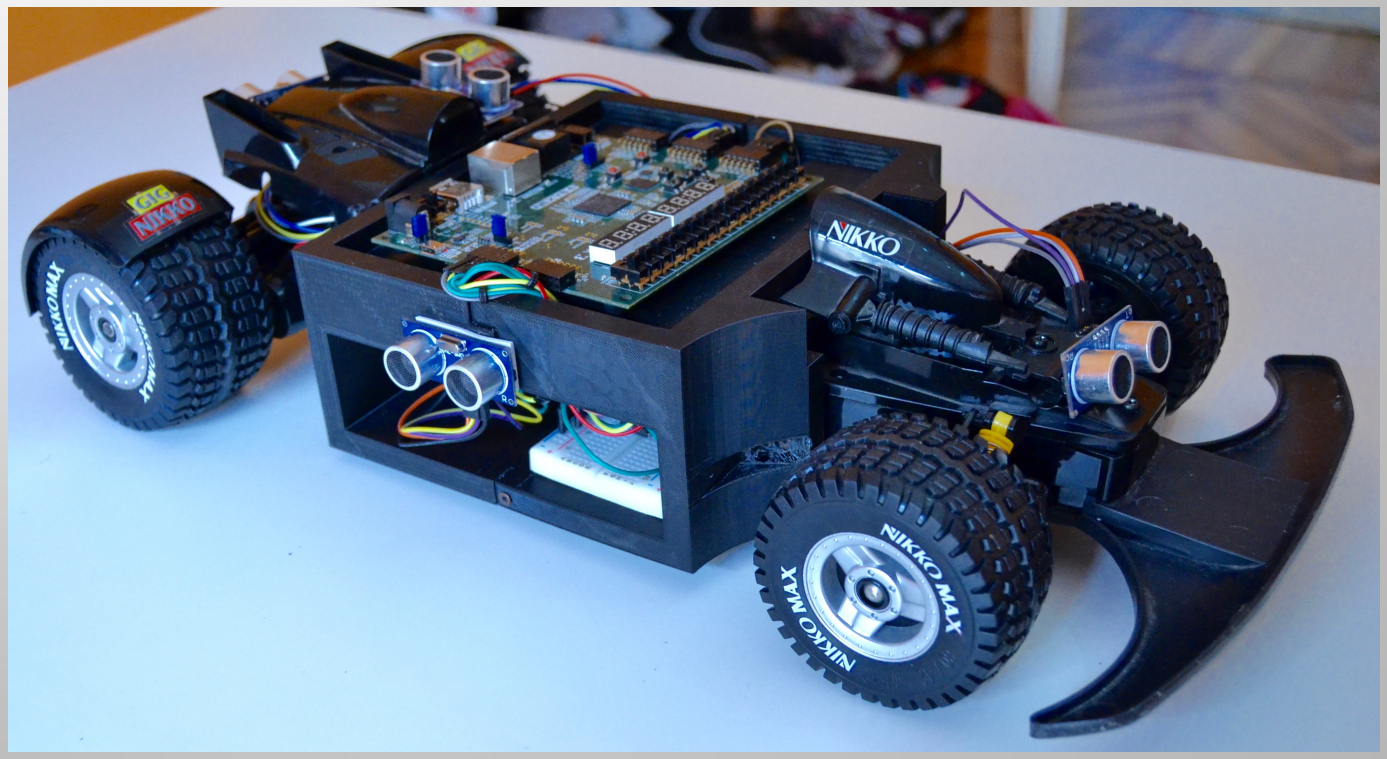
IDEA

- Design an automated car
- Able to avoid obstacles
- Capable of taking decisions in real situations
- Purpose: find a safe place



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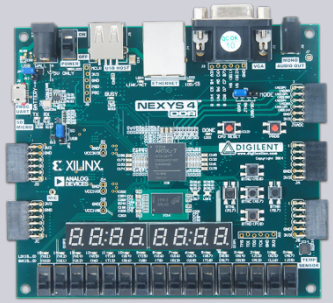
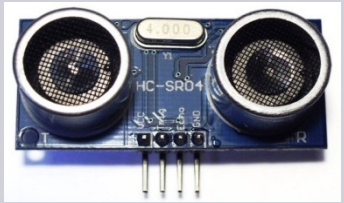
COMPONENTS

NEXYS4	HC-SR04	RC-280 SA	SERVO	L293D
				
FPGA board	Ultrasonic sensor 5x	DC motor	Servomotor	Double H-bridge

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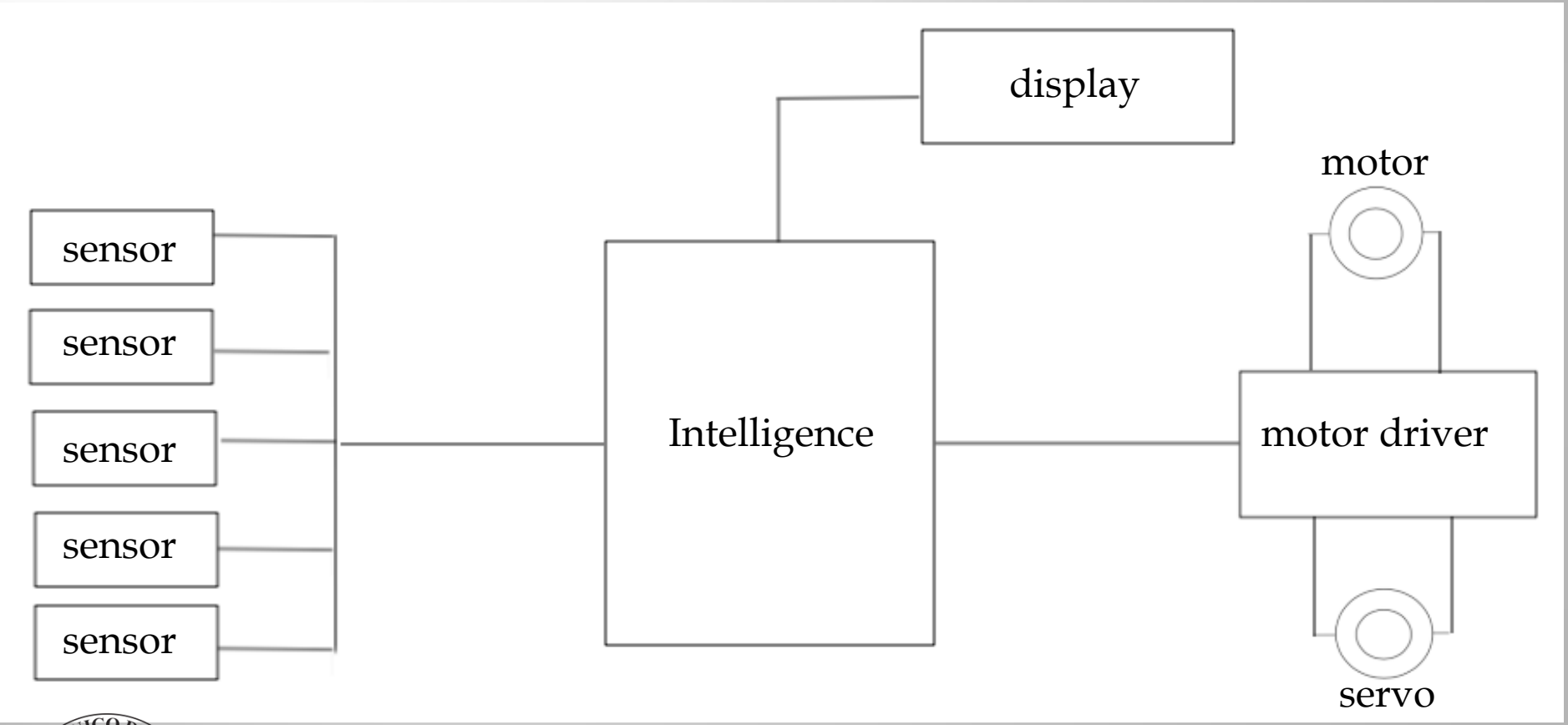
SCHEMATIC



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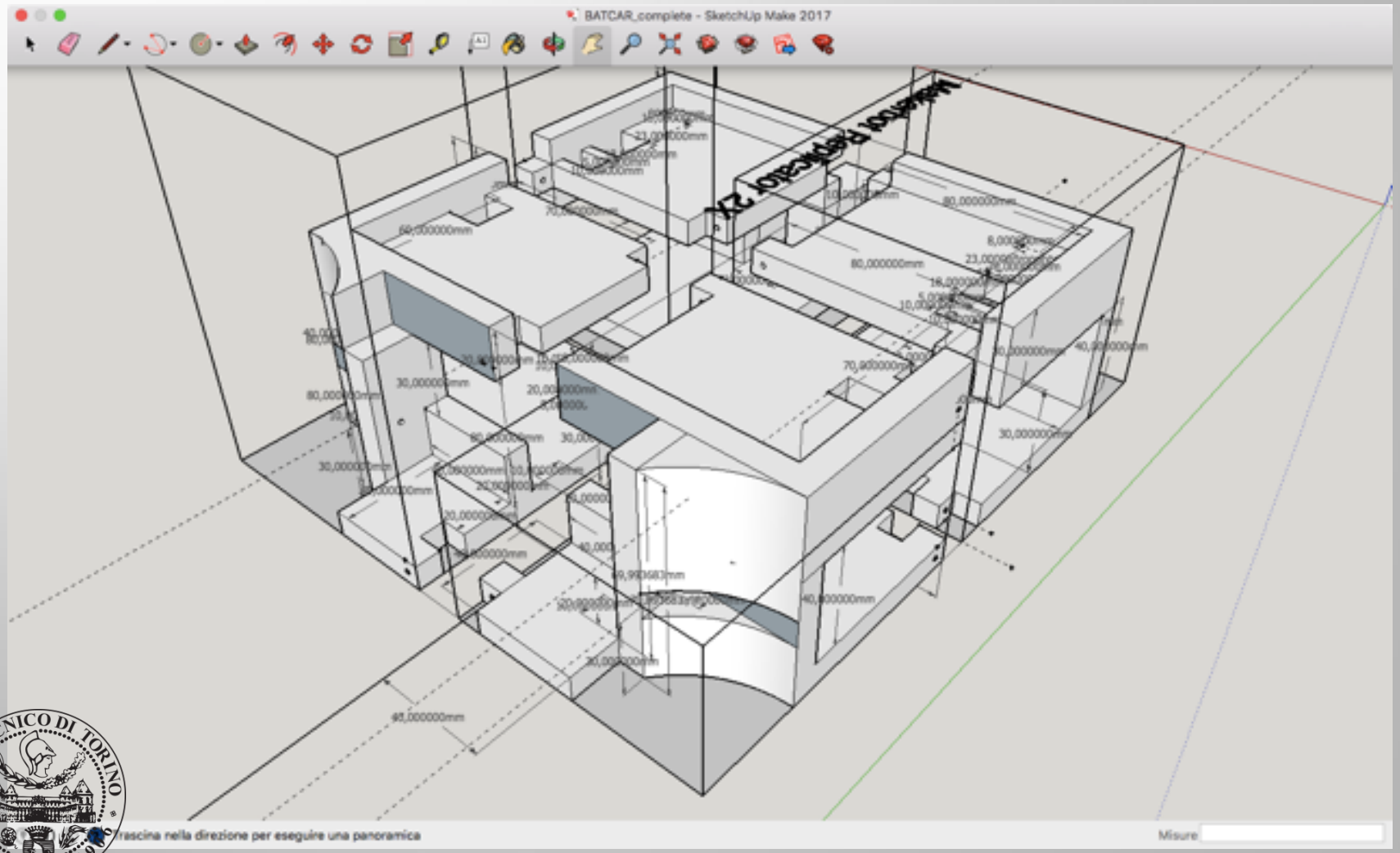
3D PRINTED DESIGN



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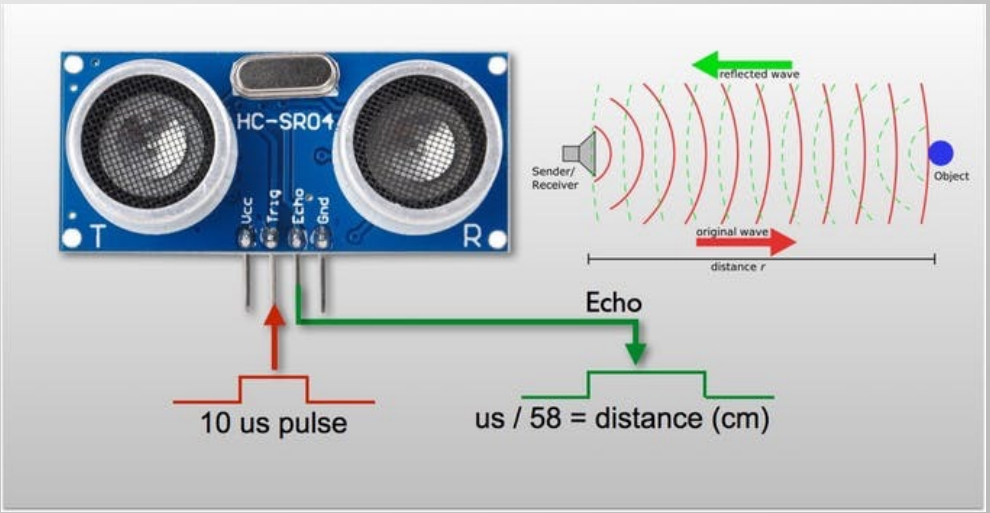
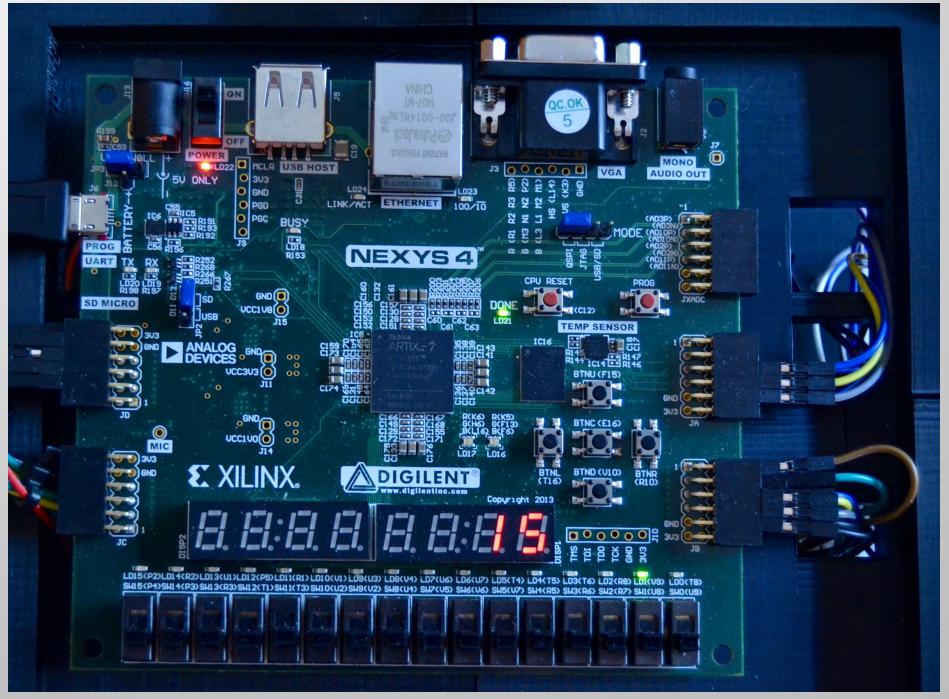
SENSOR DETECTION

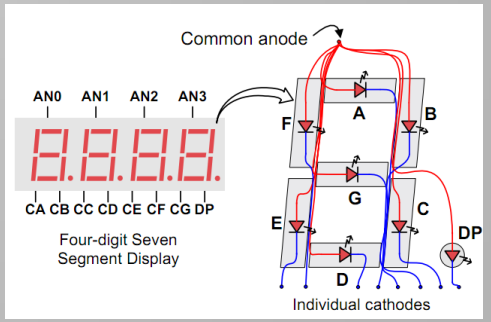
- 5 sensors working in series
- Each sensor receives a signal proportional to the obstacle detected
- All signals are collected into a single output managed by the intelligence



DISTANCE

- Computation of distance covered
- Assuming constant speed
- Shown on the 7-digit display





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MOVEMENTS

- Interpretation of obstacles

DETECTED OBSTACLE	MOVEMENT
Safeplace	STOP
Right	↖
Left	↗
Behind(- : right : left) , left and right	↑
On the front(- : right : left)	↓
Behind and on the front	↙

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MOVEMENTS

- Decision based on surroundings and previous choices

I	MOVEMENT
1	↖
2	↑
3	↗
4	↙
5	↓
6	↘

ISSUES

PROBLEM	SOLUTION
Motor control and operating conditions	Oscilloscope + H-Bridge
Ultrasonic sensor configuration	Clock synchronization and power supply(power bank)
_____	_____
Power supply	Use of an H-bridge with an higher operational current (the stall requires 9.1 A)

CREDITS

- Prof. Sterpone: technical support
- Prof. Montrucchio: 3D printing
- Prof. Montuschi: contacts and opportunity
- All professors for availability