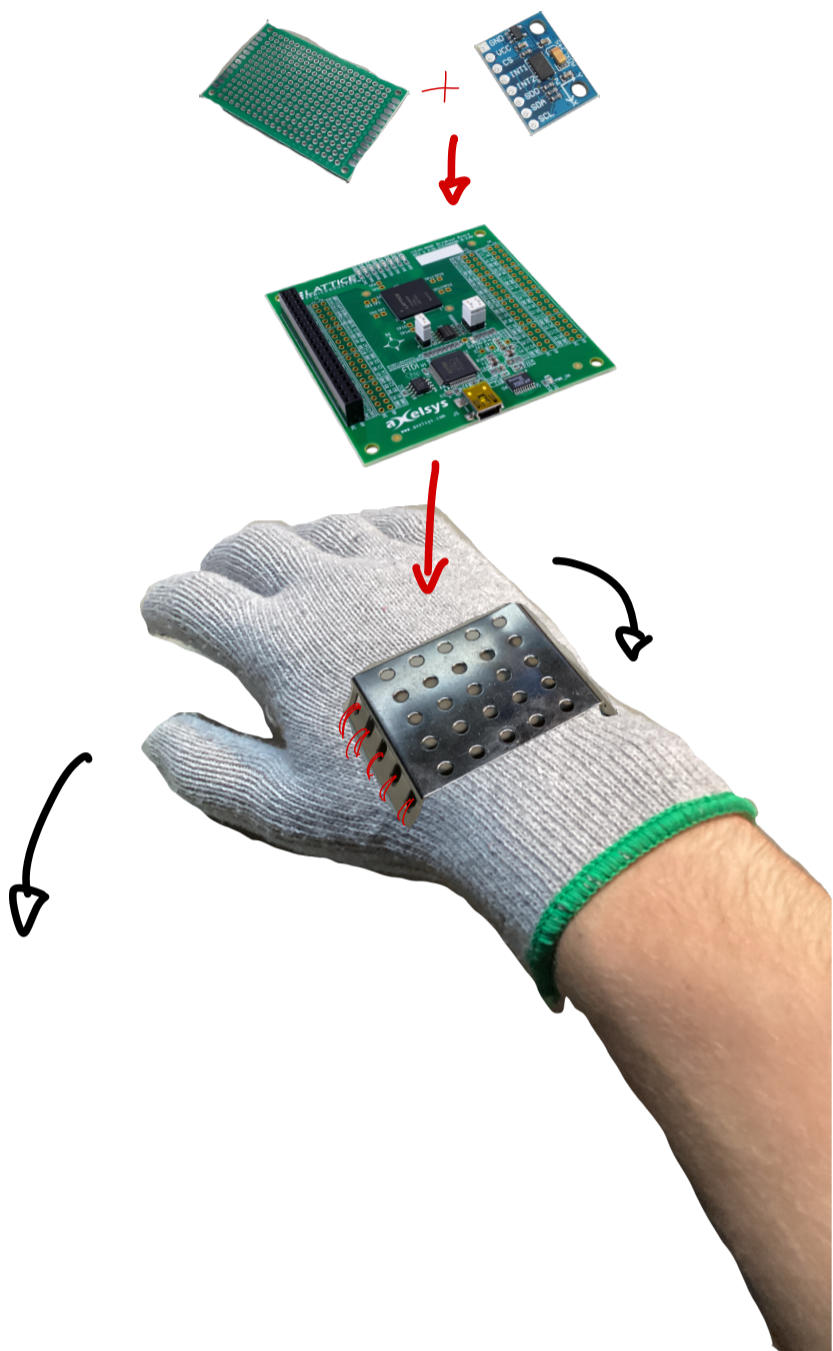


NITRO CLONE

Hardware



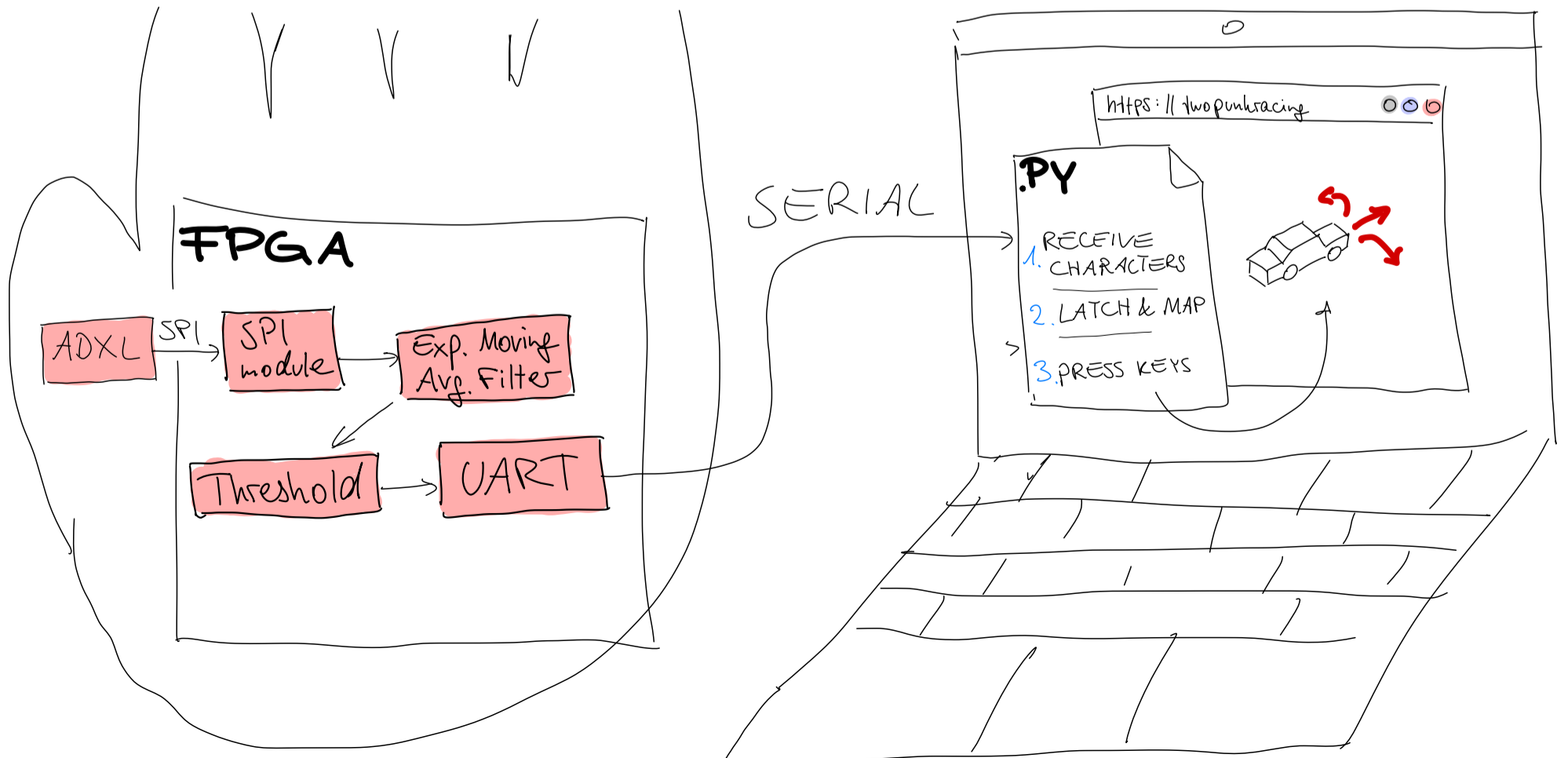
Controls

Action	Gesture	Threshold	Keyboard
Steer left ⤴		$X < -50$	A
Steer right ⤵		$X > 50$	D
Accelerate ⤴		$Y > 50$	W
Break (backward) ⤵		$Y < -50$	S
Do nothing x		else	-
Nitro ⚡	Single Tap	Tap Thres. > 50	N

Software

- Tilting: Exp. moving avg. filter (hold corresponding keys while tilting)
- Tap detection: On-sensor interrupt (toggle nitro on tap → use latch)

Implementation



Algorithms

```
if (($signed({spi_data_out, .y0}) -- y_axis_filtered > .100) || (y_axis_filtered -- $signed({spi_data_out, .y0}) > .100))  
  y_axis_filtered <= $signed({spi_data_out, .y0});  
else  
  y_axis_filtered <= y_axis_filtered + (($signed({spi_data_out, .y0}) -- y_axis_filtered) >>> .1);
```

alpha = 0.5 ←

Challenges

1.

0xFE8F 0004 012C	0x007B 000C 0129
0xFE8F 0004 012E	0x007B 0008 0129
0xFE8F 0005 012B	0x0075 001A 0128
0xFE8F 0004 012C	0x007D 000B 012A
0xFE8F 0004 012C	0x007C 000A 0127
0xFE8F 0004 012C	0x007B 000B 0129
0xFE8F 0004 012C	0x007C 000B 012B
0xFE8F 0004 012C	0x007B 000C 012A
0xFE8F 0004 012C	0x007B 000B 012A
0xFE8F 0004 012D	0x007D 000A 012A
0xFE8F 0004 012D	0x007B 000B 0128

x-axis offset → without offset

- Nitro mode stuck high & False Triggers
- Filtering vs. Latency Tradeoff
- Threshold Tuning

Result

