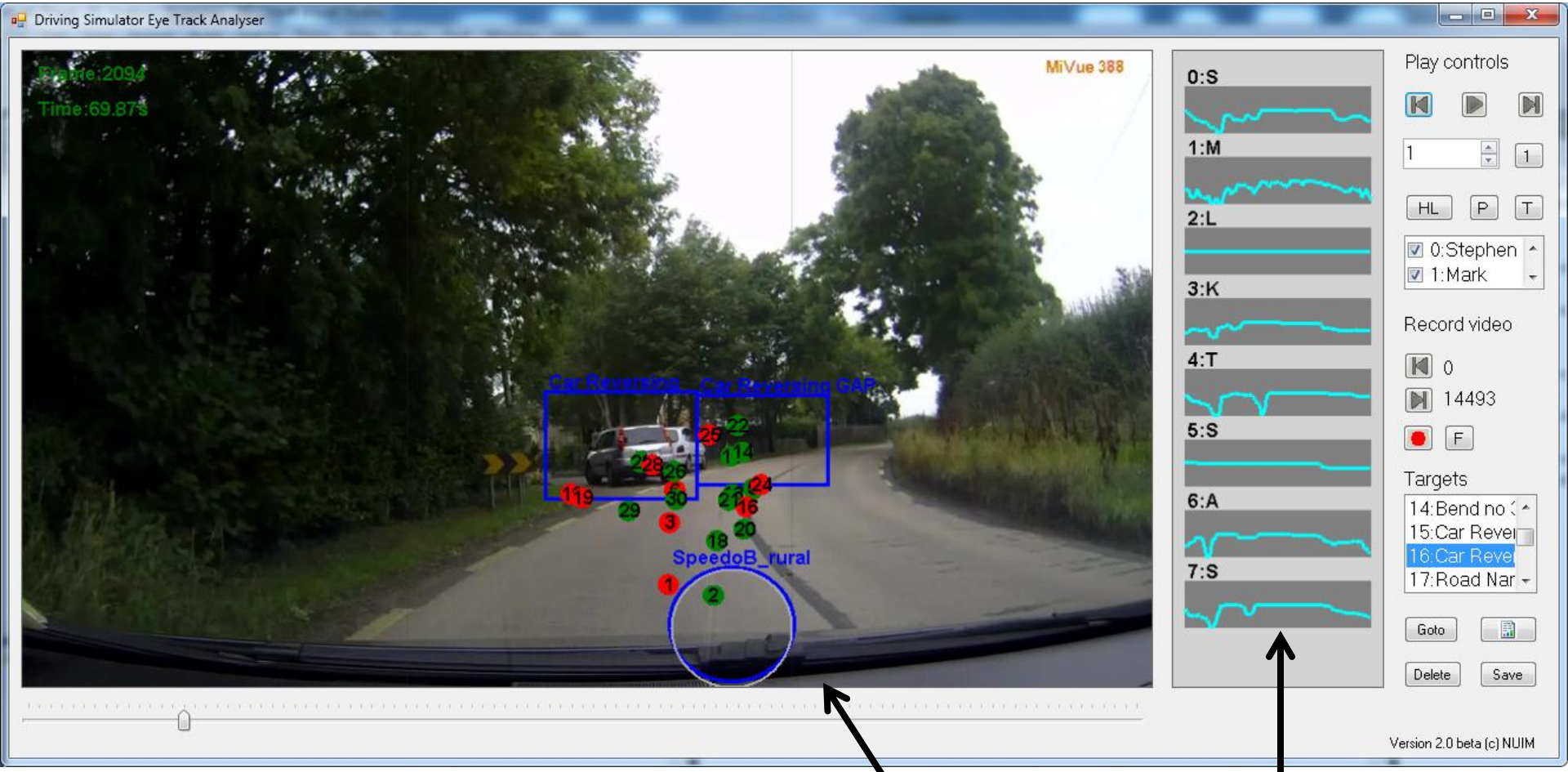
Naive approach: Did they look at a ...?" e.g. car reversing and gap



Target area

1 Low attention

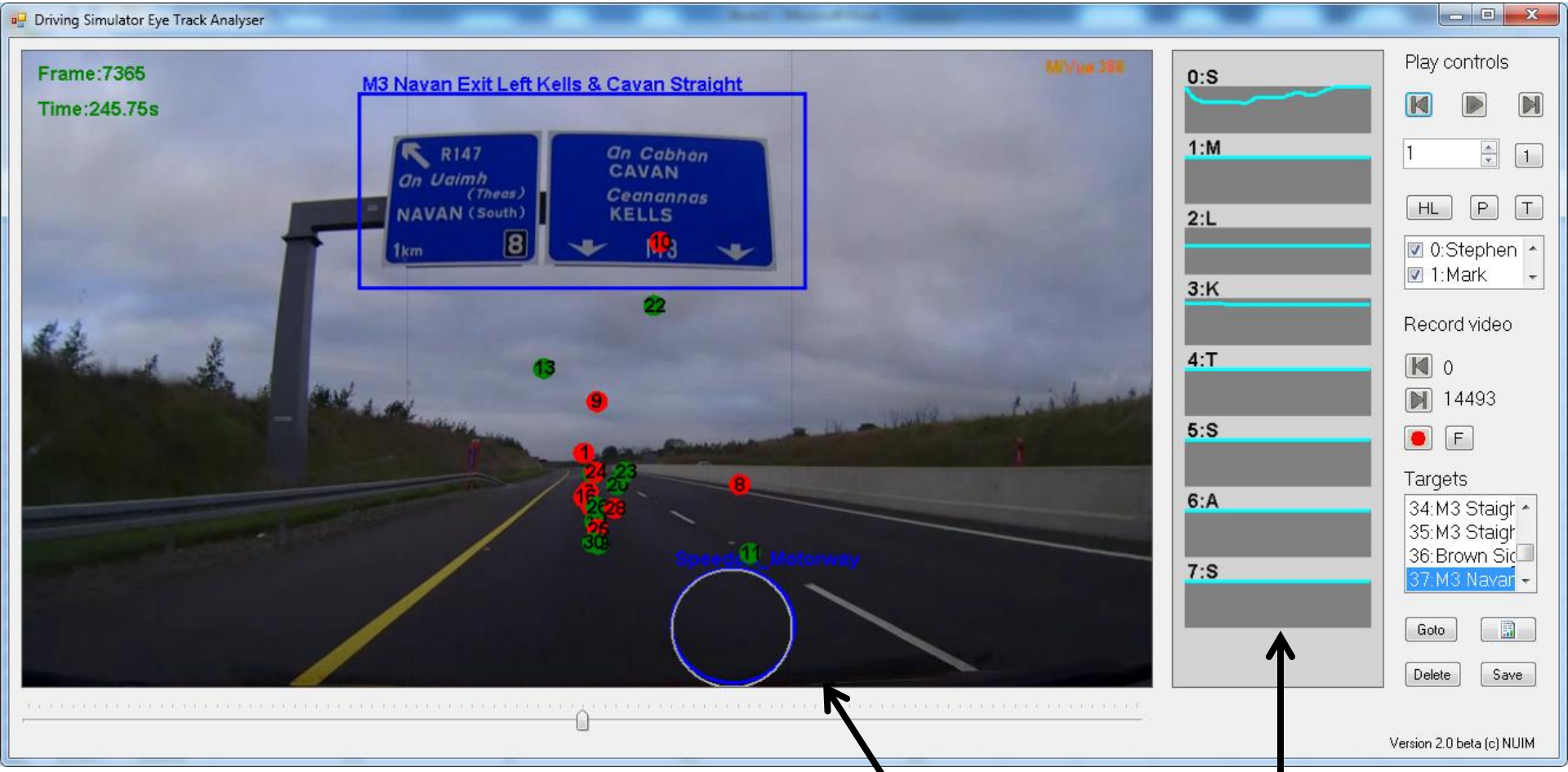
2 High attention

Driver view and eye-gaze

Pedal position

31 Subjects, 11 High, 13 Low

Targets: Motorway road sign



Target area

1 Low attention

2 High attention

Pedal position

Driver view and eye-gaze

31 Subjects, 11 High, 13 Low

Individual response to an individual events

Target view counted in terms of frames

Index	Name	Car Rev.	Gap	M3 Navan
0	St...	0	0	51
...	...	...	...	...
6	Ai...	10	0	17
7	Sh...	1	0	56
8	Da...	5	0	49
9	Al...	16	1	0
10	Do...	20	0	33
11	Ne...	10	6	82
...	...	...	...	...
27	Pa...	2	15	4
28	Pe...	7	2	10
29	Ra...	7	0	9
30	An...	0	0	0

Accelerator pedal position (Car Reversing)

Index	Name	Before	During	After
0	St...	0.25	0.32	0.7
...	...	...	...	...
6	Ai...	0.45	0.26	0.44
7	Sh...	0.39	0.24	0.45
8	Da...	0.21	0.07	0.38
9	Al...	0.21	0.09	0.23
10	Do...	0.31	0.21	0.35
11	Ne...	0.45	0.32	0.49
...	...	...	...	...
27	Pa...	0.42	0.44	0.49
28	Pe...	0.21	0.13	0.38
29	Ra...	0.31	0.24	0.39
30	An...	0.72	0.79	0.97

Group response to an event or target

Mean view per driver (frames)

Name	Mean frame count
HorseNCart A	29.8
HorseNCart B (GAP)	9.6
Car Reversing	7.3
Car Reversing GAP	2.8
Road Narrowing Sign A	0.2
Dog Walkers	5.1
Dog Walkers- GAP	9.2
Big Bend RIGHT	4.3
Brown Sign (Services) vs M3 Staight Line Target Box 2	1.2
M3 Navan Exit Left Kells & Cavan Straight	29.6
NAVAN Exit Immediate Left	11.5
Exit 8 Left	0.0
Caution Signs M3	0.2
Speed Sign M3 120 KM	0.0
Speedo_Rural	271.8
Speedo_Motorway	375.7

Individual overall response to the route

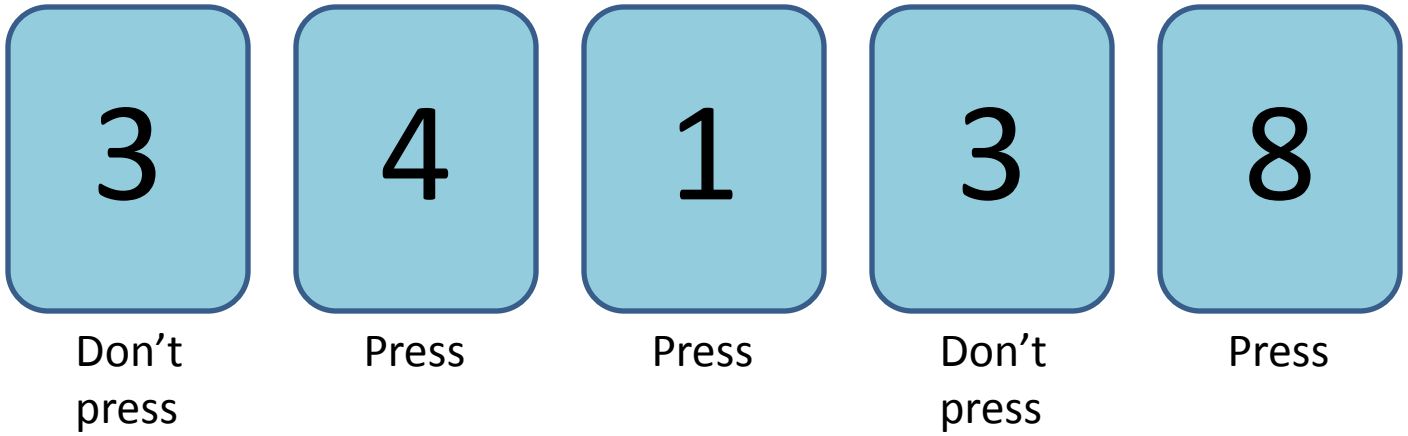
Time to drive route

Index	Name	Rural (S)	Motorway (S)
0	St..	291.4	273.9
...	...	...	...
6	Ai..	276.5	275.4
7	Sh..	244.7	275.2
8	Da..	387.2	174.4
9	Al..	414.9	586.4
10	Do..	305.6	495.9
11	Ne..	272.5	428.7
...	...	...	...
27	Pa..	329	278.5
28	Pe..	345.3	433.4
29	Ra..	365.3	555.9
30	An..	139	269

Count of speedo. “looks”

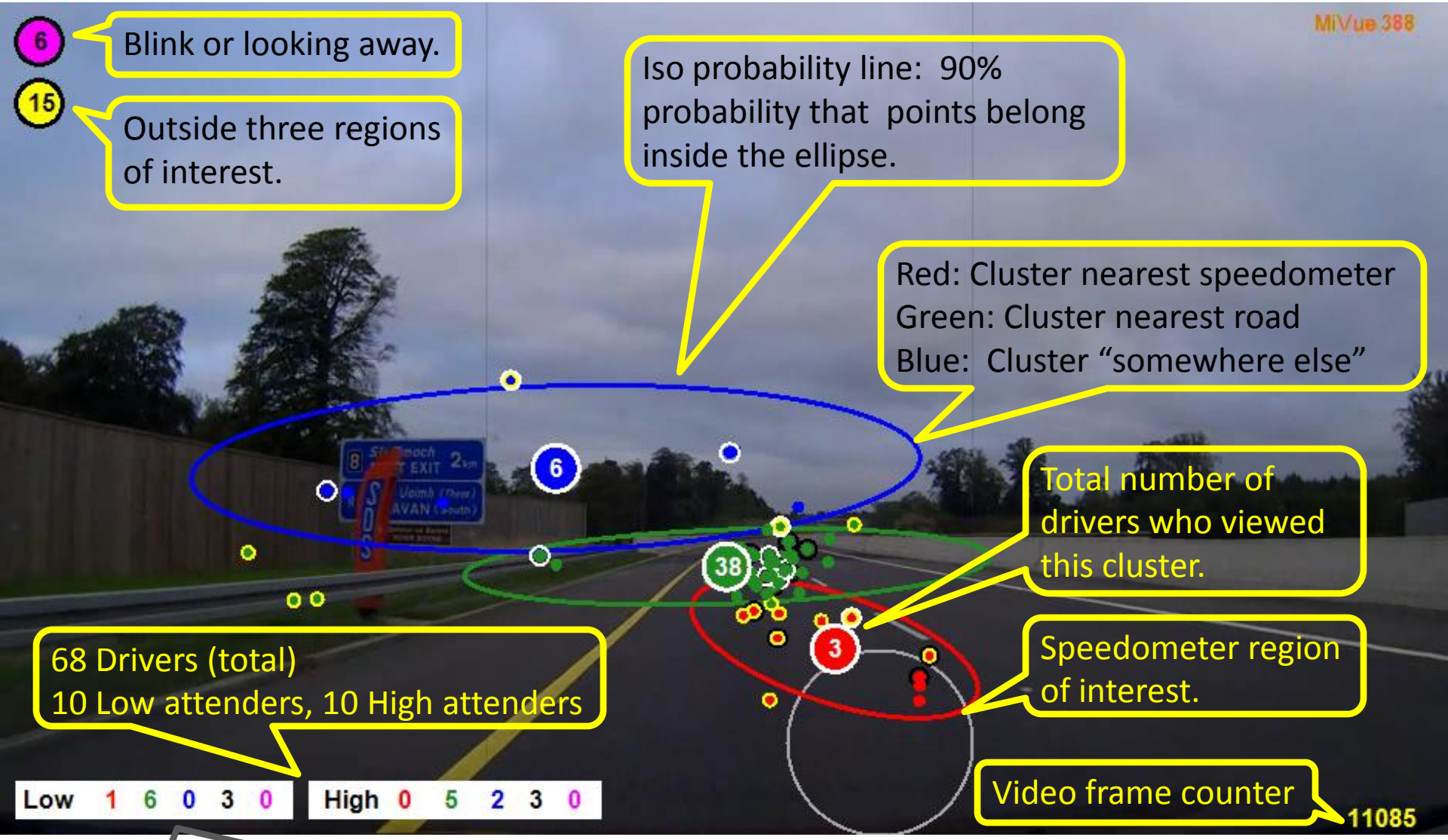
Index	Name	Rural	Motorway
0	St..	39	44
...	...	...	...
6	Ai..	65	42
7	Sh..	51	21
8	Da..	31	63
9	Al..	65	27
10	Do..	94	79
11	Ne..	46	49
...	...	...	...
27	Pa..	11	91
28	Pe..	95	149
29	Ra..	76	39
30	An..	6	10

Psychology test: Sustained Attention to Response Task (SART)



In the standard version of the task, participants are presented with the digits 1 to 9 in random order at a rate of one every 1.15 s. Each digit is presented for 250 ms followed by a 900 ms mask and participants are required to respond to each digit as rapidly as possible by clicking the mouse, apart from when they see the number 3 when they must withhold the response. The task consists of a total of 225 trials (25 of eac h of the 9 digits) and lasts approximately 4.3 min.

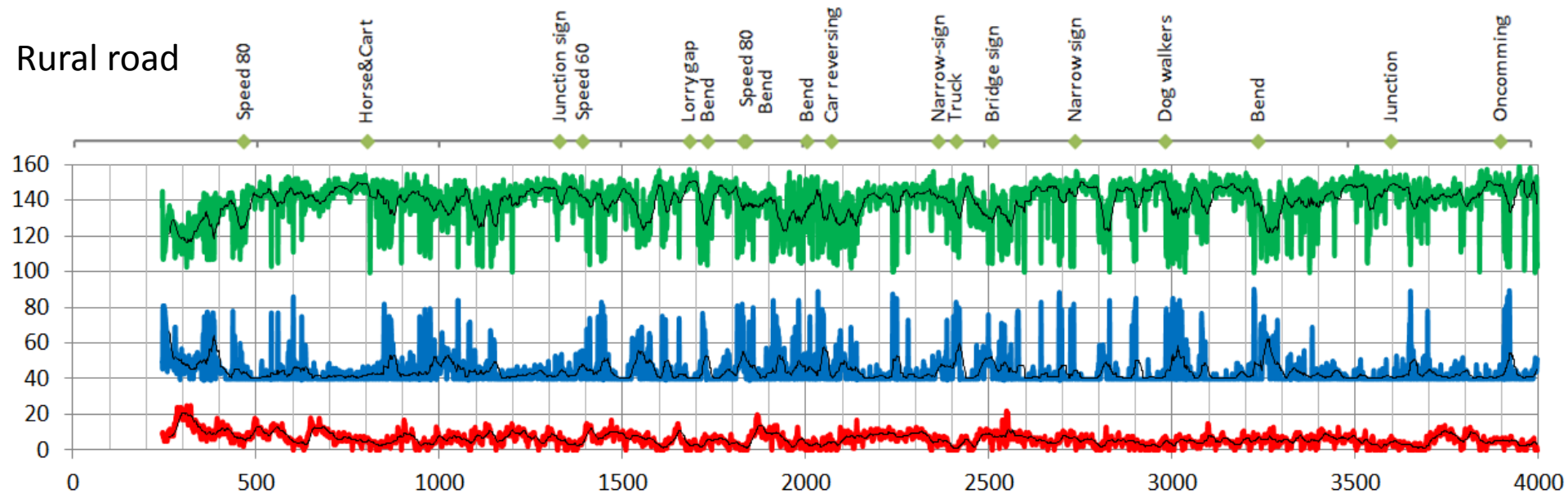
Advanced analysis – Where did they look?



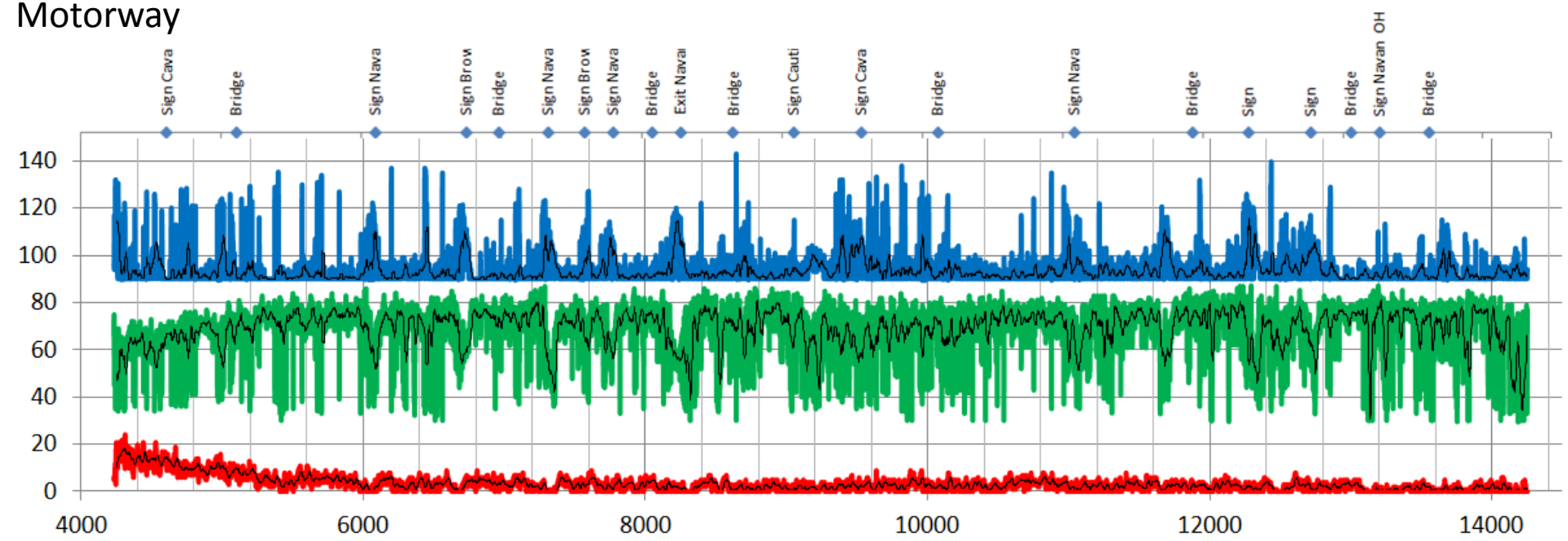
Eye gaze count per frame
Speedometer, Road, Other, Outside cluster, Eyes shut

Inner: Cluster, Red, Green, Blue
Middle: Yellow outside ellispe
Outer: Black – Low, White - High

Rural road



Motorway

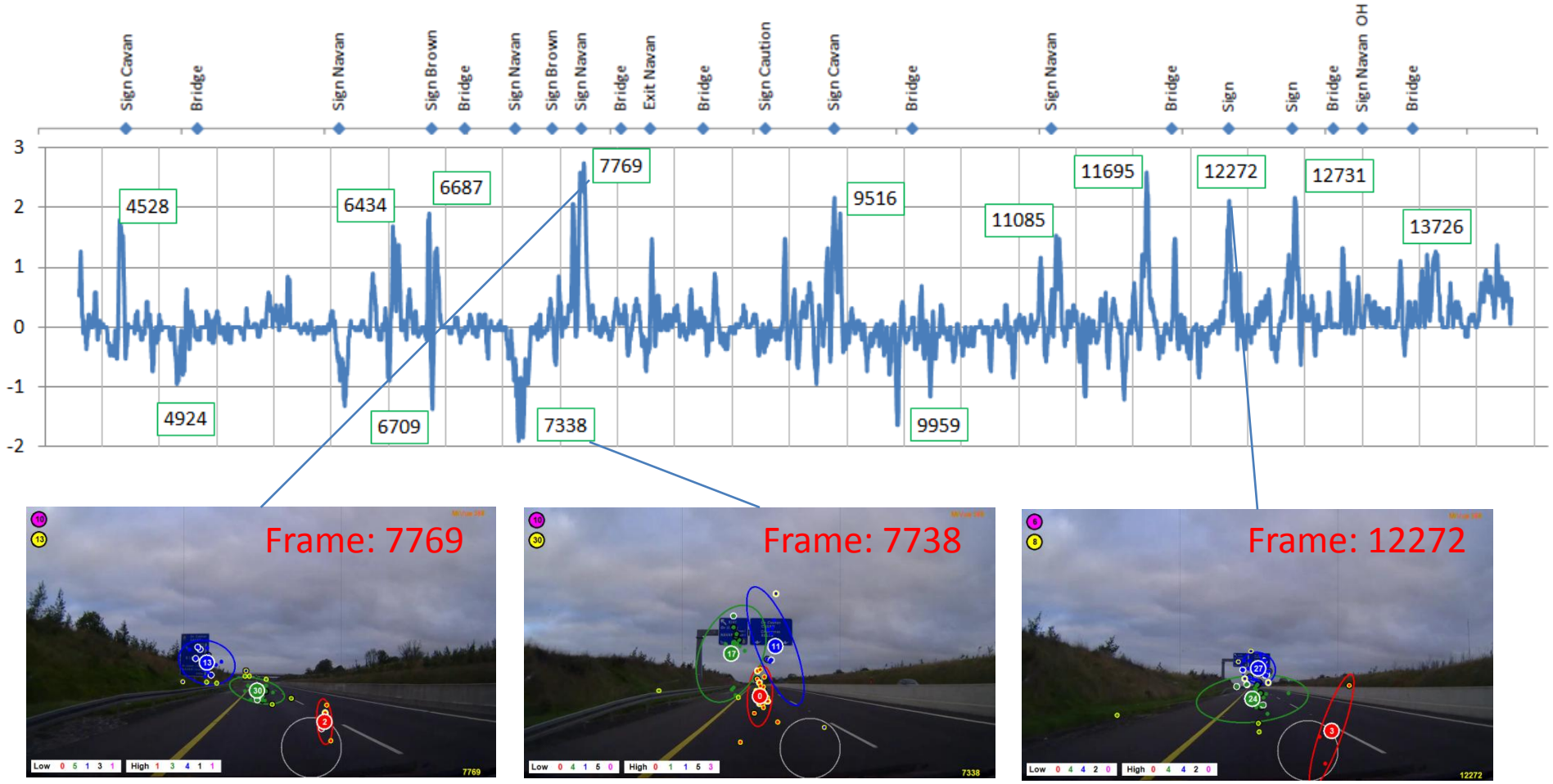


68 drivers, Red “speedo”, Green “road”, Blue “something else”

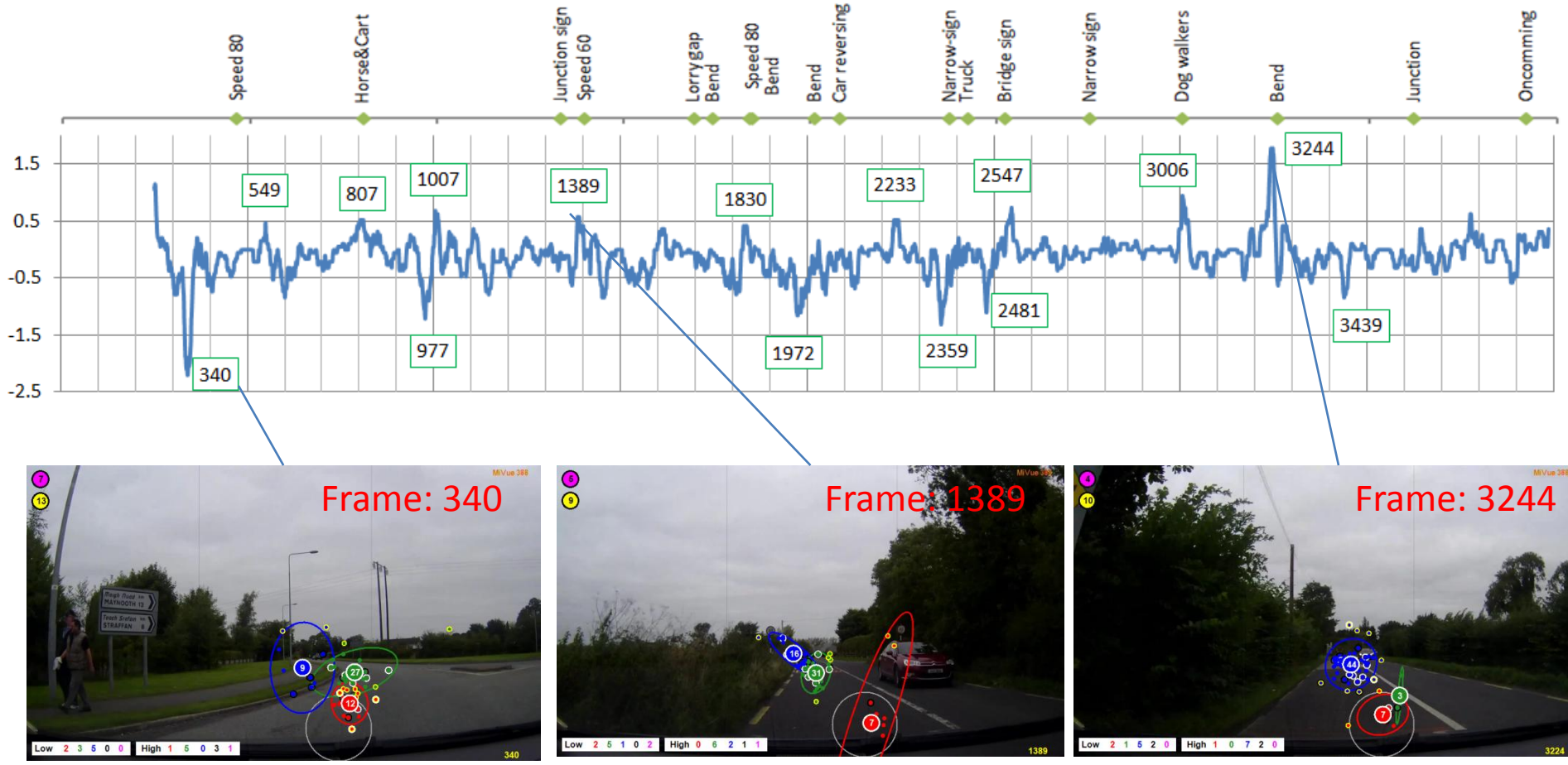
Rural road summary
High attenders check speedometer 10% more
Both look at road equally
Low attenders look around 18% more

Motorway summary
High attenders check speedometer 6% more
Both look at road equally
Low attenders look around 20% more

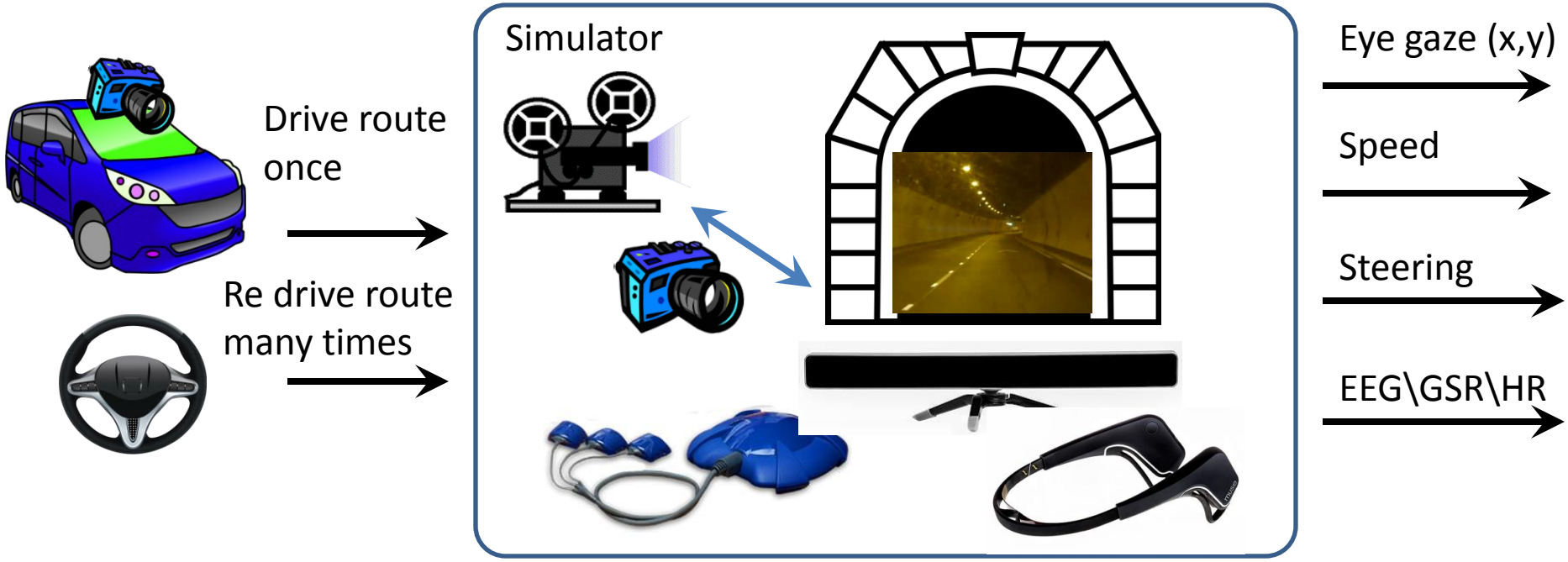
Motorway – difference between high and low (20pt moving average)



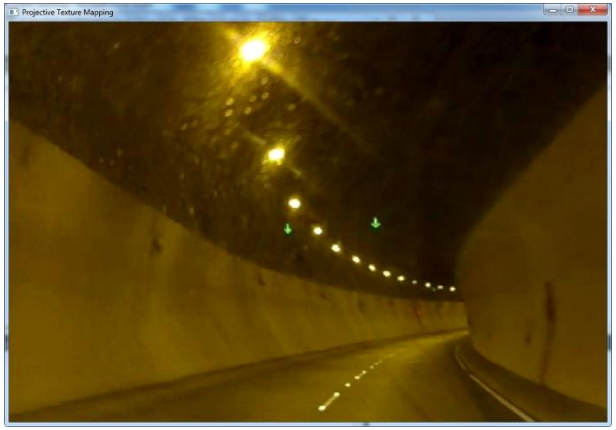
Rural– difference between high and low (20pt moving average)



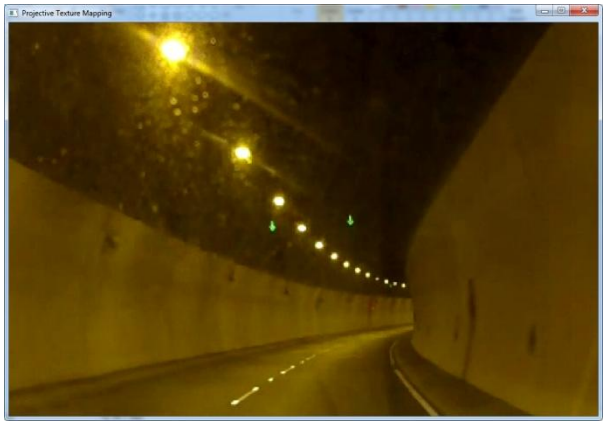
Dublin Port Tunnel – steering, new eye-tracker



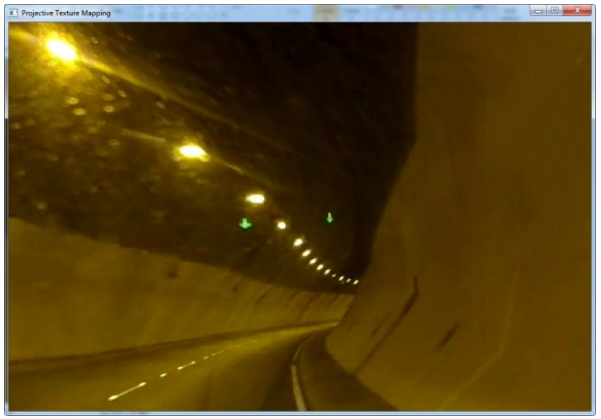
Video frames projected onto a white model estimate of the tunnel. Driver point of view adjustable using steering wheel on playback. Frame rate set by accelerator pedal position.



Left

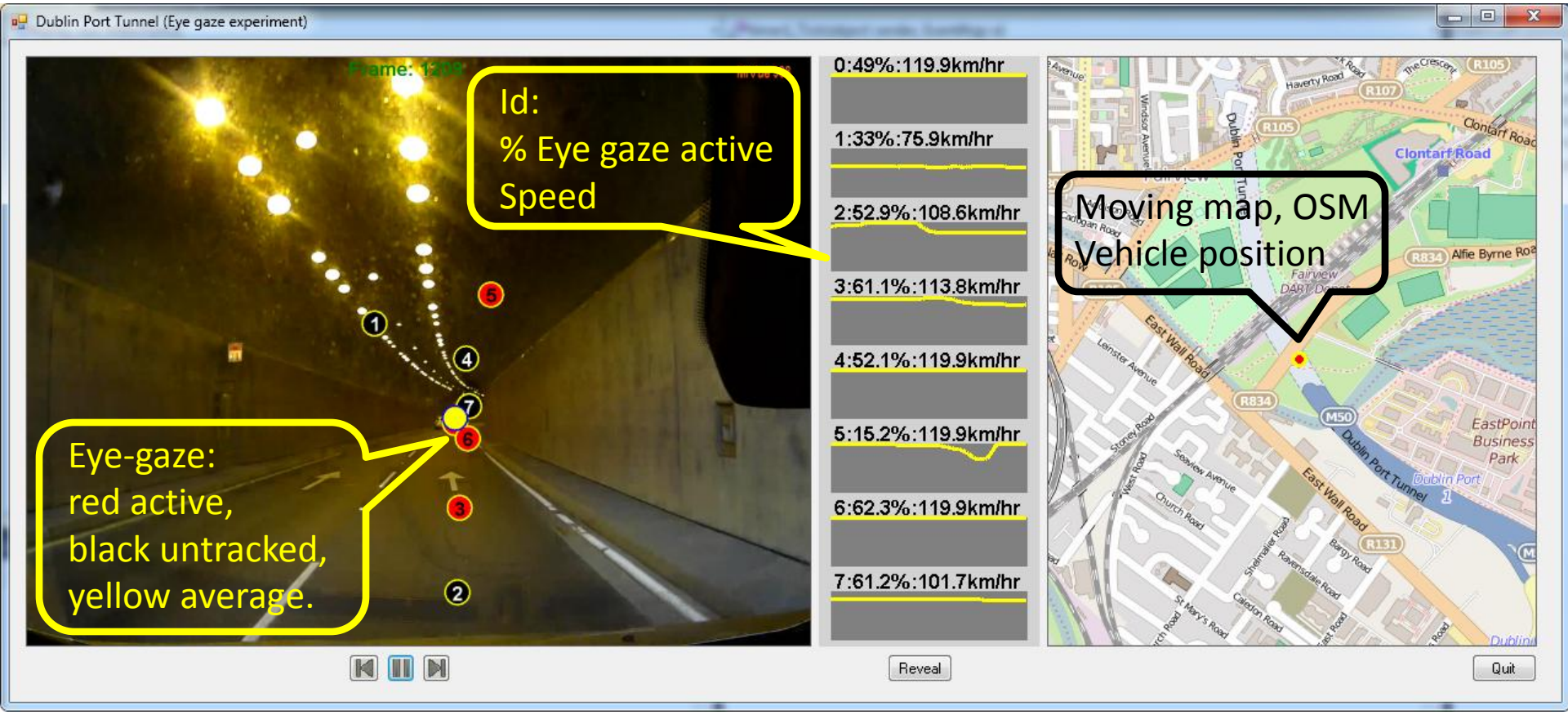


Straight

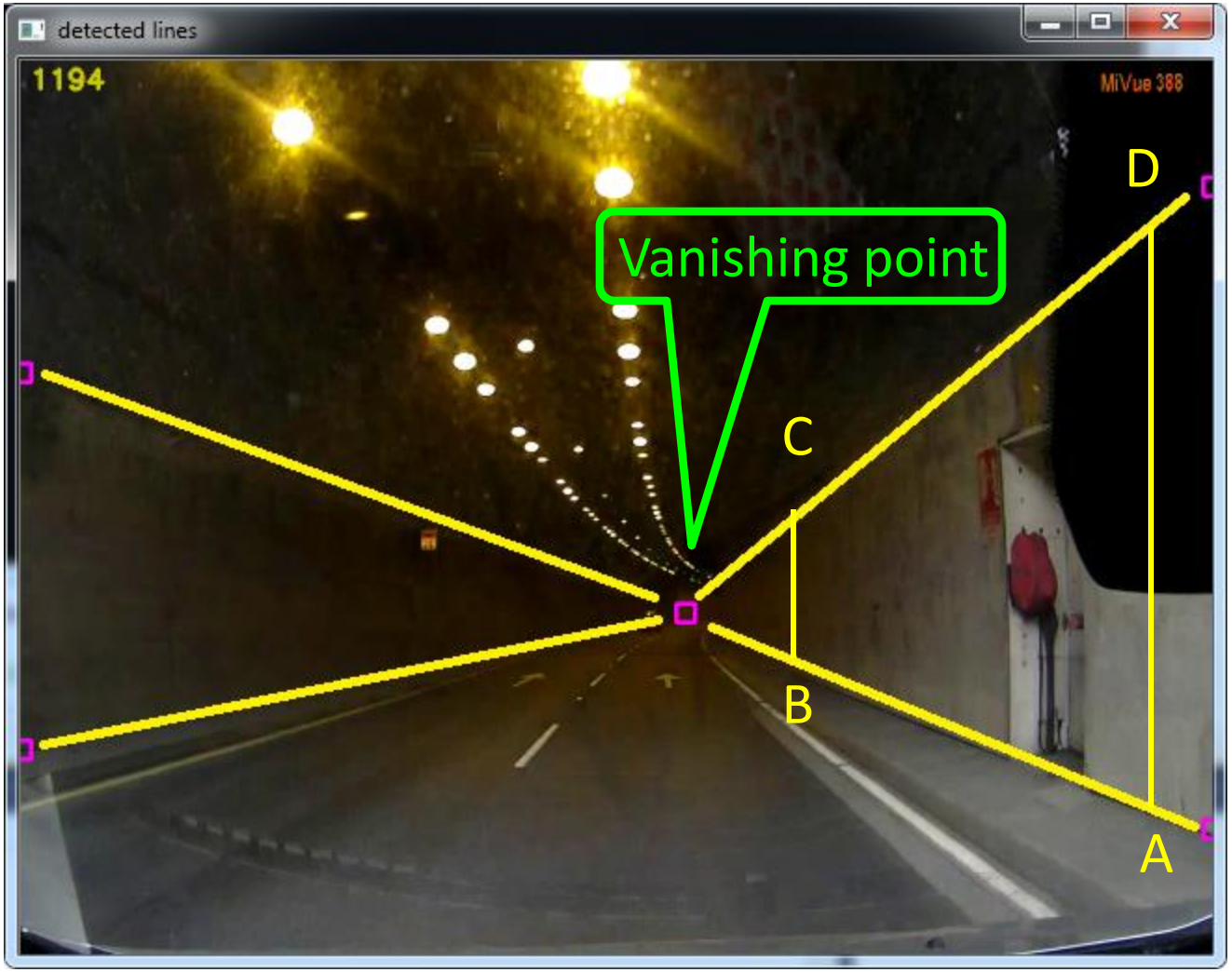


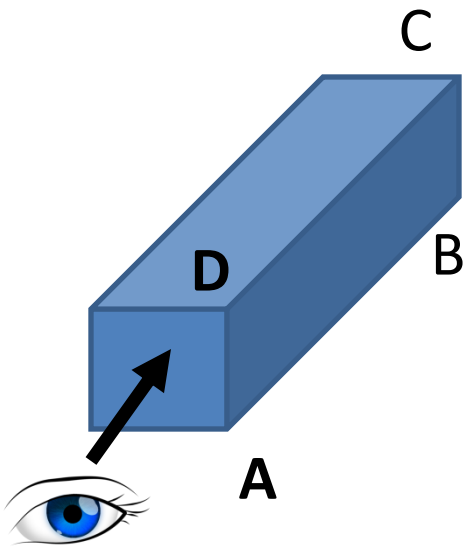
Right

Dublin Port Tunnel – steering, new eye-tracker



Dublin Port Tunnel – reconstruction of tunnel geometry (update)





To reduce distortion when steering, machine vision methods are being developed to accurately position the viewing camera (driver), tunnel model and point (and method) of texture projection.