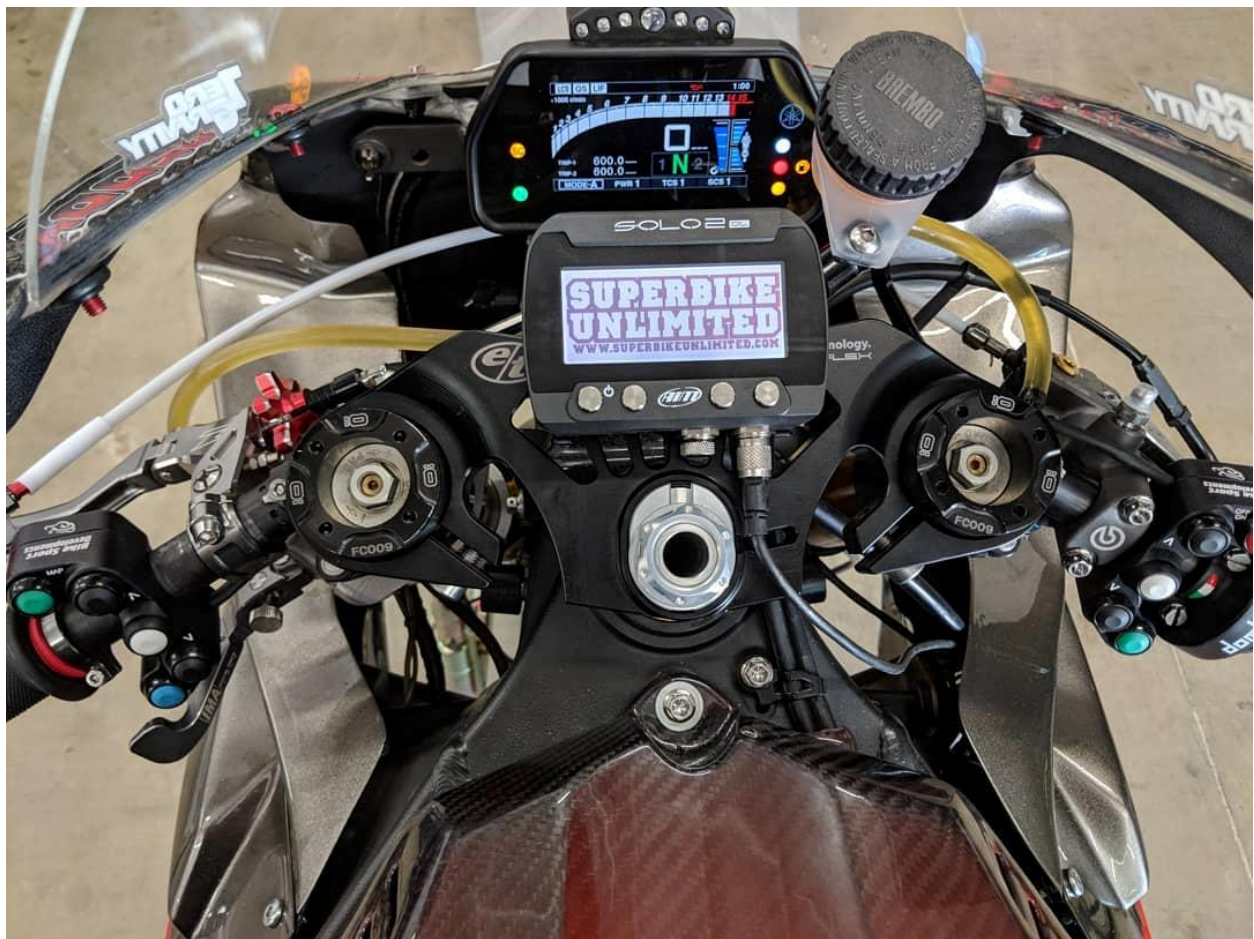


HEAT MAP – edgomez@itba.edu.ar

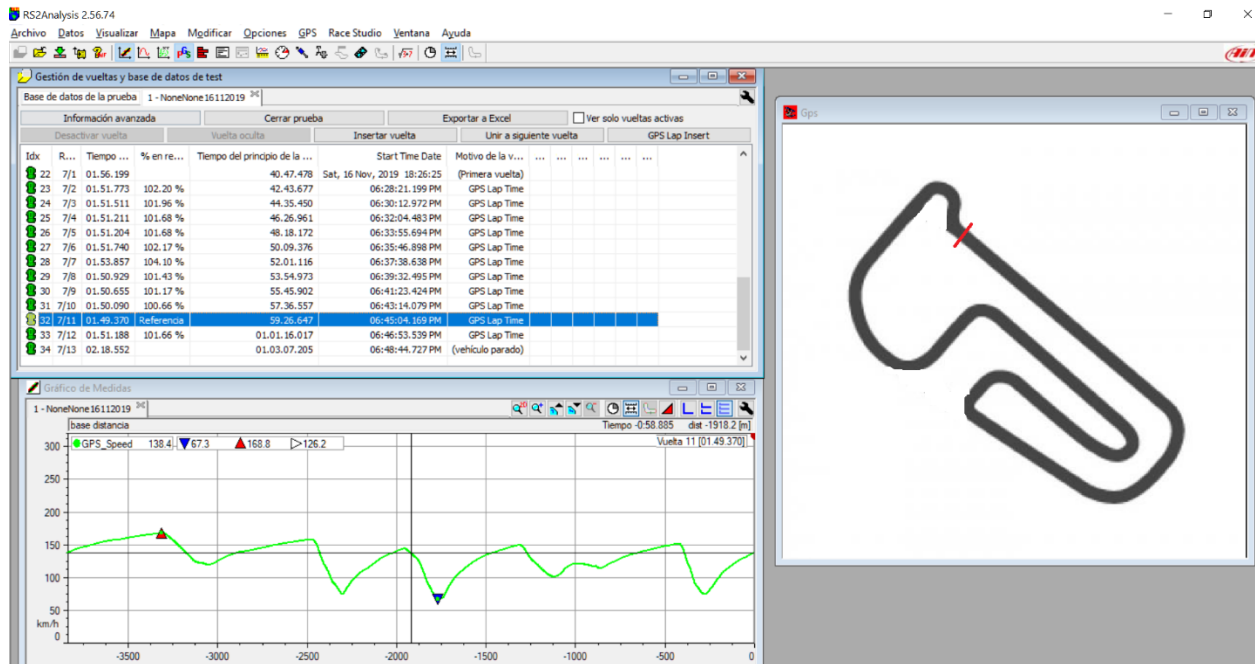
DELTA VELOCIDAD

COMPARACION ENTRE DOS VUELTAS

EN DEPORTES A MOTOR



Dispositivo AIM-Solo. Barre posición GPS y velocidad del dispositivo cada 0.1 segs.



Aplicación Race Analysis

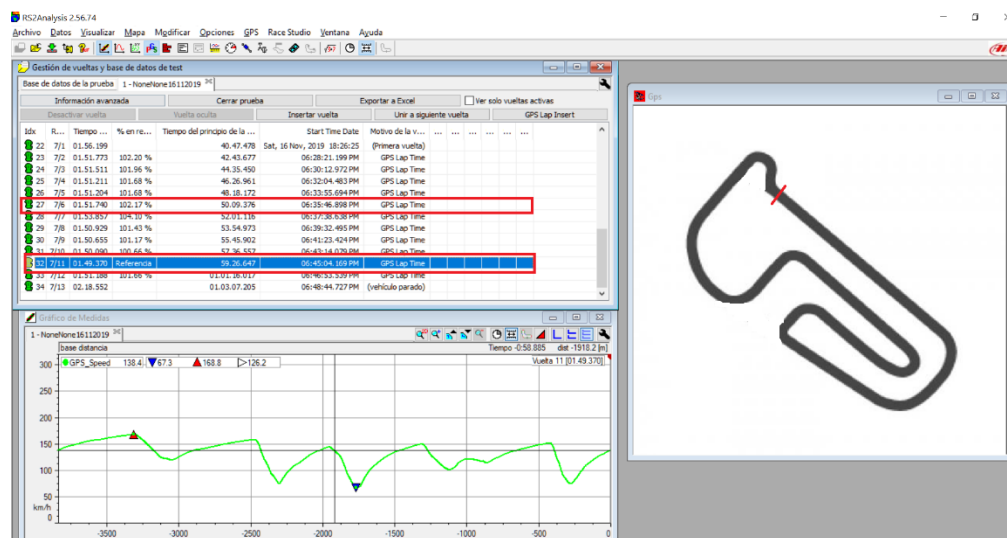
Muy limitada y difícil de interpretar.

Especialmente para comparar 2 vueltas.

Pésima UX.

Pensada en 1990 y nunca actualizada.

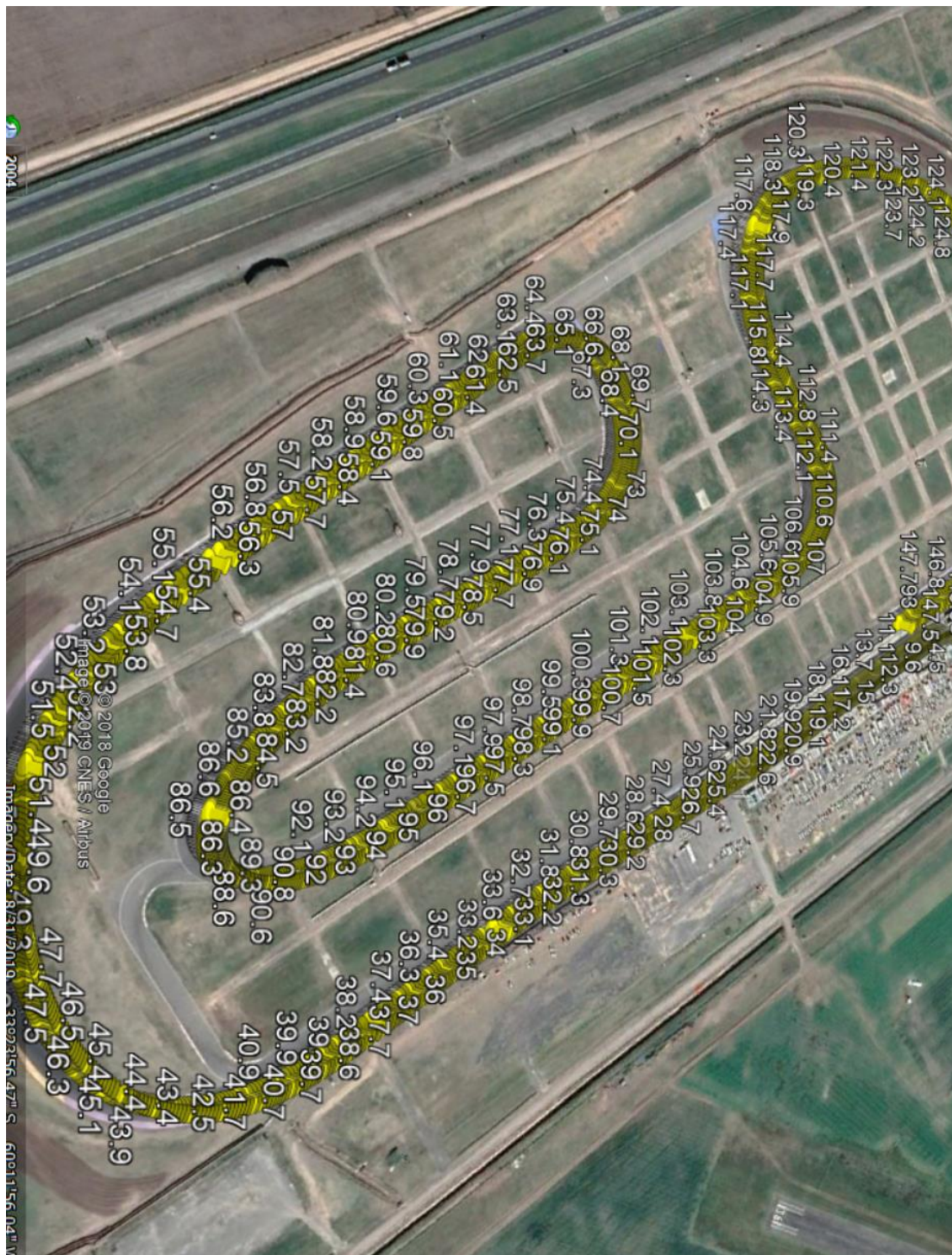
PASO 1 – EXPORTACION DE DATOS



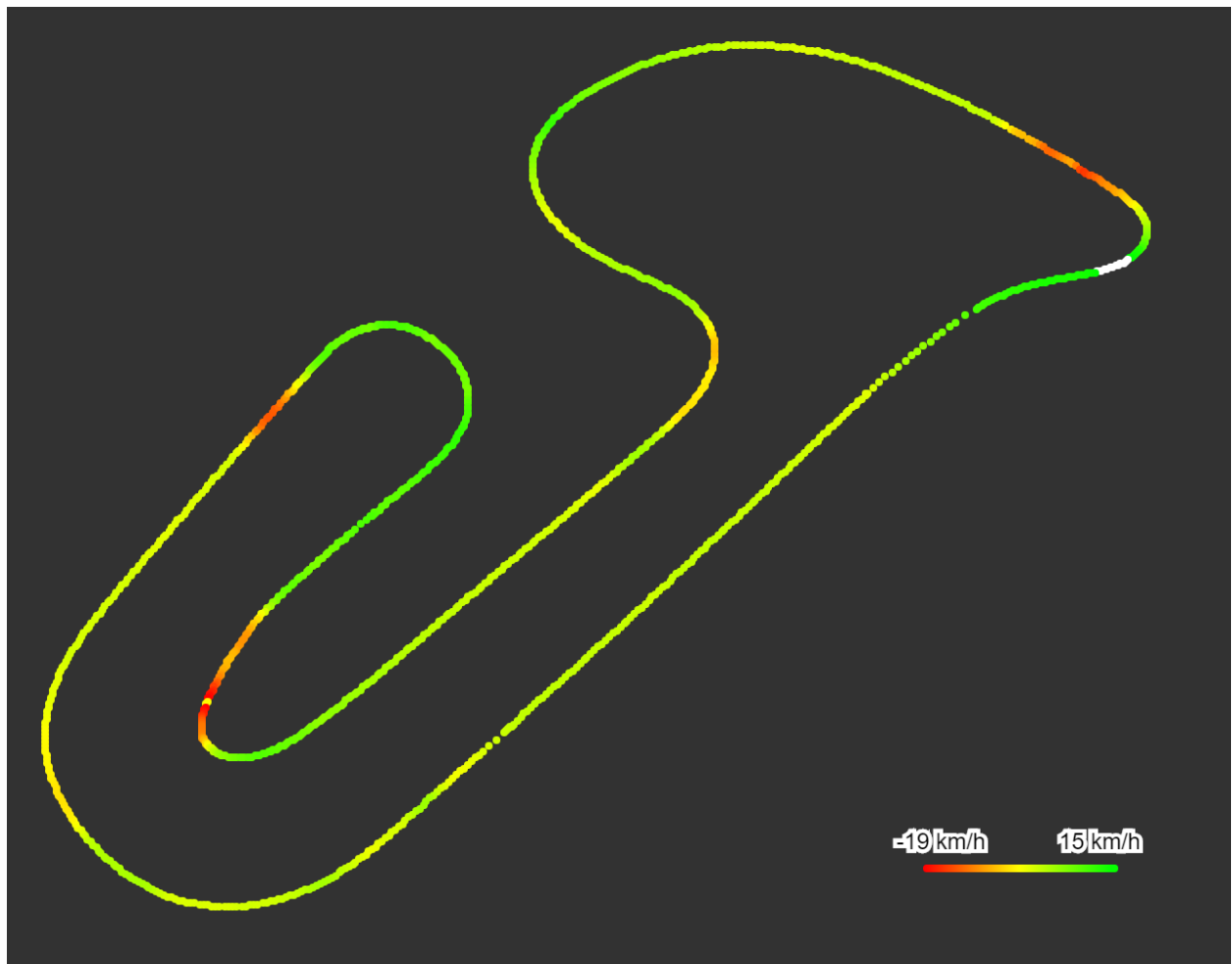
Base de datos de la prueba 1 - NoneNone16112019 ³⁶									
Información avanzada				Cerrar prueba		Exportar a Excel		<input type="checkbox"/> Ver solo vueltas activas	
Desactivar vuelta		Vuelta oculta			Insertar vuelta		Unir a siguiente vuelta		GPS Lap Insert
Idx	R...	Tiempo ...	% en re...	Tiempo del principio de la ...	Start Time Date	Motivo de la v...			
22	7/1	01:56.199		40:47.478	Sat, 16 Nov, 2019 18:26:25	(Primera vuelta)			
23	7/2	01:51.773	102.20 %	42:43.677	06:28:21.199 PM	GPS Lap Time			
24	7/3	01:51.511	101.96 %	44:35.450	06:30:12.972 PM	GPS Lap Time			
25	7/4	01:51.211	101.68 %	46:26.961	06:32:04.483 PM	GPS Lap Time			
26	7/5	01:51.204	101.68 %	48:18.172	06:33:55.694 PM	GPS Lap Time			
27	7/6	01:51.740	102.17 %	50:09.376	06:35:46.898 PM	GPS Lap Time			
28	7/7	01:53.857	104.10 %	52:01.116	06:37:38.638 PM	GPS Lap Time			
29	7/8	01:50.929	101.43 %	53:54.973	06:39:32.495 PM	GPS Lap Time			
30	7/9	01:50.655	101.17 %	55:45.902	06:41:23.424 PM	GPS Lap Time			
31	7/10	01:50.090	100.66 %	57:36.557	06:43:14.079 PM	GPS Lap Time			
32	7/11	01:49.370	Referencia	59:26.647	06:45:04.169 PM	GPS Lap Time			
33	7/12	01:51.188	101.66 %	01:01:16.017	06:46:53.539 PM	GPS Lap Time			
34	7/13	02:18.552		01:03:07.205	06:48:44.727 PM	(vehículo parado)			

1	Format	AIM CSV File		
2	Venue	None		
3	Vehicle	None		
4	User	None		
5	Data Source	AIM Data Logger		
6	Comment			
7	Date	11/16/2019		
8	Time	18:26:25		
9	Sample Rate	10		
10	Duration	367.818		
11	Segment	Session		
12	Beacon Marke	147.793, 258.448, 367.818		
13	Segment Time	02:27.8	01:50.7	01:49.4
14				
15	Time	Distance	GPS_Speed	GPS_Latitude GPS_Longitude
16	Time	Distance	GPS_Speed	GPS_Latitude GPS_Longitude
17	sec	km	km/h	* *
18			1	2 3
19				
20	0	0	2.6	-33.395597 -60.201699
21	0.1	0	2.6255	-33.395598 -60.201699
22	0.2	0	2.651	-33.395599 -60.2017
23	0.3	0	2.6765	-33.3956 -60.201701
24	0.4	0	2.732	-33.3956 -60.201702
25	0.5	0	3.14	-33.395601 -60.201702
26	0.6	0	3.640	-33.395602 -60.201702

PASO 2 – VERIFICACION DE DATOS



PASO 3 – PROCESAMIENTO DE DATOS Y CREACION DEL HEAT MAP



CODIGO FUENTE

<https://editor.p5js.org/enicolasgomez/sketches/M2YGUyliy>

EXPLICACION CODIGO FUENTE

Carga de dos vueltas (rápida, lenta)

```
function preload() {  
  fast_lap = loadTable('16112019_2.csv', 'csv', 'header');  
  lap = loadTable('16112019_1.csv', 'csv', 'header');  
}
```

Creación de nuevo data set con diferencia de velocidad para cada coordenada

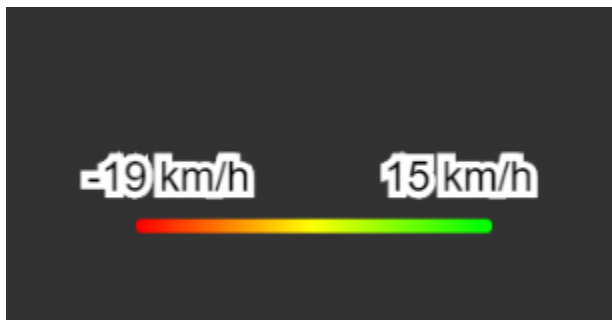
```
function create_dif_lap() {  
  dif_lap = lap;  
  for (let i = 1; i < 20; i++)  
    dif_lap.removeRow(dif_lap.getRowCount() - i);  
  for (let r = 0; r < lap.getRowCount(); r++) {  
    let dif = fast_lap.getNum(r, "GPS_Speed") - lap.getNum(r, "GPS_Speed");  
    dif_lap.set(r, 'GPS_Speed', dif);  
  }  
  print(dif_lap.getColumn('GPS_Speed'));  
}
```

Calculo del color para un punto dado

```
function perc2color(perc, min, max) {
```

Creación de la barra de referencia

```
function reference_graph(max_speed, min_speed, x_loc, y_loc) {  
  for (let x = 1; x < 100; x++) {  
    let hex = perc2color(x, 1, 100);  
    stroke(hex);  
    point(x_loc + x, y_loc);  
  }  
  stroke("#FFFFFF")  
  text(parseInt(min_speed) + " km/h", x_loc - 15, y_loc - 10);  
  text(parseInt(max_speed) + " km/h", x_loc + 70, y_loc - 10);  
}
```



Ploteo del grafico

```
function speed_graph(table, max_speed, min_speed, start_y) {
  let max_x = max(table.getColumn('GPS_Latitude'));
  let min_x = min(table.getColumn('GPS_Latitude'));

  let max_y = max(table.getColumn('GPS_Longitude'));
  let min_y = min(table.getColumn('GPS_Longitude'));

  for (let r = 0; r < table.getRowCount(); r++) {
    let xpos = table.getNum(r, "GPS_Latitude");
    let ypos = table.getNum(r, "GPS_Longitude");
    xpos = normalize(xpos, width * 0.9, min_x, max_x);
    ypos = normalize(ypos, graph_height * 0.9, min_y, max_y);
    let speed = table.getNum(r, "GPS_Speed");
    let speed_percent = ((speed - min_speed) / (max_speed - min_speed)) * 100;
    let hex = perc2color(speed_percent, 1, 97);
    stroke(hex);
    point(xpos + 20, start_y+ypos + 20);
  }
}
```