Creating highly polished and responsive graphics in R

Sydney Users of R Forum (SURF)
June 2019

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I’m an information designer at data visualisation studio Small Multiples in Sydney

I’m not a data analyst, but learned R anyway

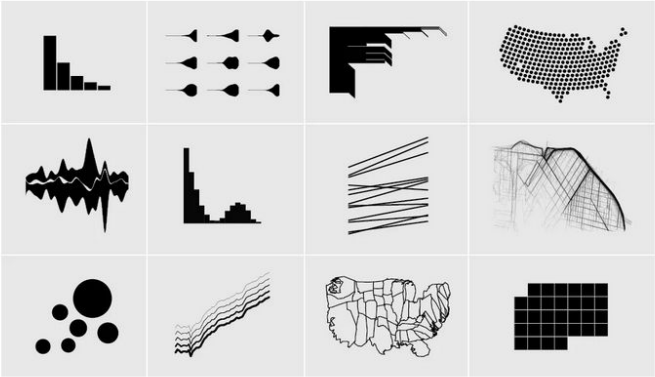
FLOWINGDATA

MEMBERS-ONLY COURSE

Visualization in R

Start from beginner and move up to advanced by the end of four weeks.

Start Learning Now



This four-week course walks you through the essentials of visualizing data in R. Familiarize yourself with the language, quickly make plots, and build your own. Exercises at the end of each section help you hone your skills.

Recommended Time

Four weeks, about 8 to 10 hours per week.

https://flowingdata.com/visualization-in-r/

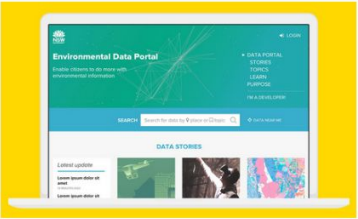
MULTI-OMICS VISUALISER
IGGY GET OUT

HOW TO PLAN A HOLIDAY USING DATA
SMALL MULTIPLES

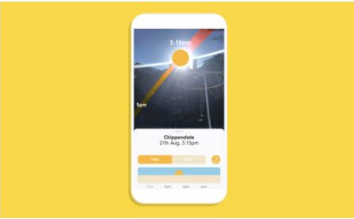
HANZI UNIVERSE
SMALL MULTIPLES

STANDING ON THE BORDERS OF GIANTS
COMPETITION: WORLD DATA VISUALIZATION PRIZE

SCHOOL PLANNING ASSISTANCE TOOL
DEPARTMENT OF EDUCATION



USER RESEARCH FOR NSW ENVIRONMENTAL DATA PORTAL SEED
NSW DEPARTMENT OF PLANNING AND ENVIRONMENT



HELLO, SUN. AUGMENTED REALITY APP
SMALL MULTIPLES

NOT A SINGLE ORIGIN
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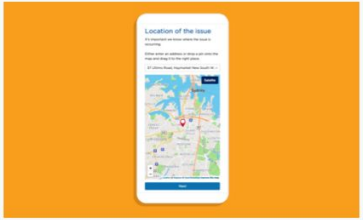

DIGITAL CONNECTIVITY - INTERACTIVE MAP
DEPARTMENT OF PREMIER & CABINET

SCHOOLS WEATHER AND AIR QUALITY WEBSITE
UNSW CLIMATE CHANGE RESEARCH CENTRE

AEROTROPOLIS - AN INTERACTIVE TOUCHSCREEN
DEPARTMENT OF PREMIER & CABINET

LOCAL GOVERNMENT REPORTING
AUDIT OFFICE OF NSW

MAPPING KEY INFRASTRUCTURE PROJECTS IN AUSTRALIA
INFRASTRUCTURE AUSTRALIA

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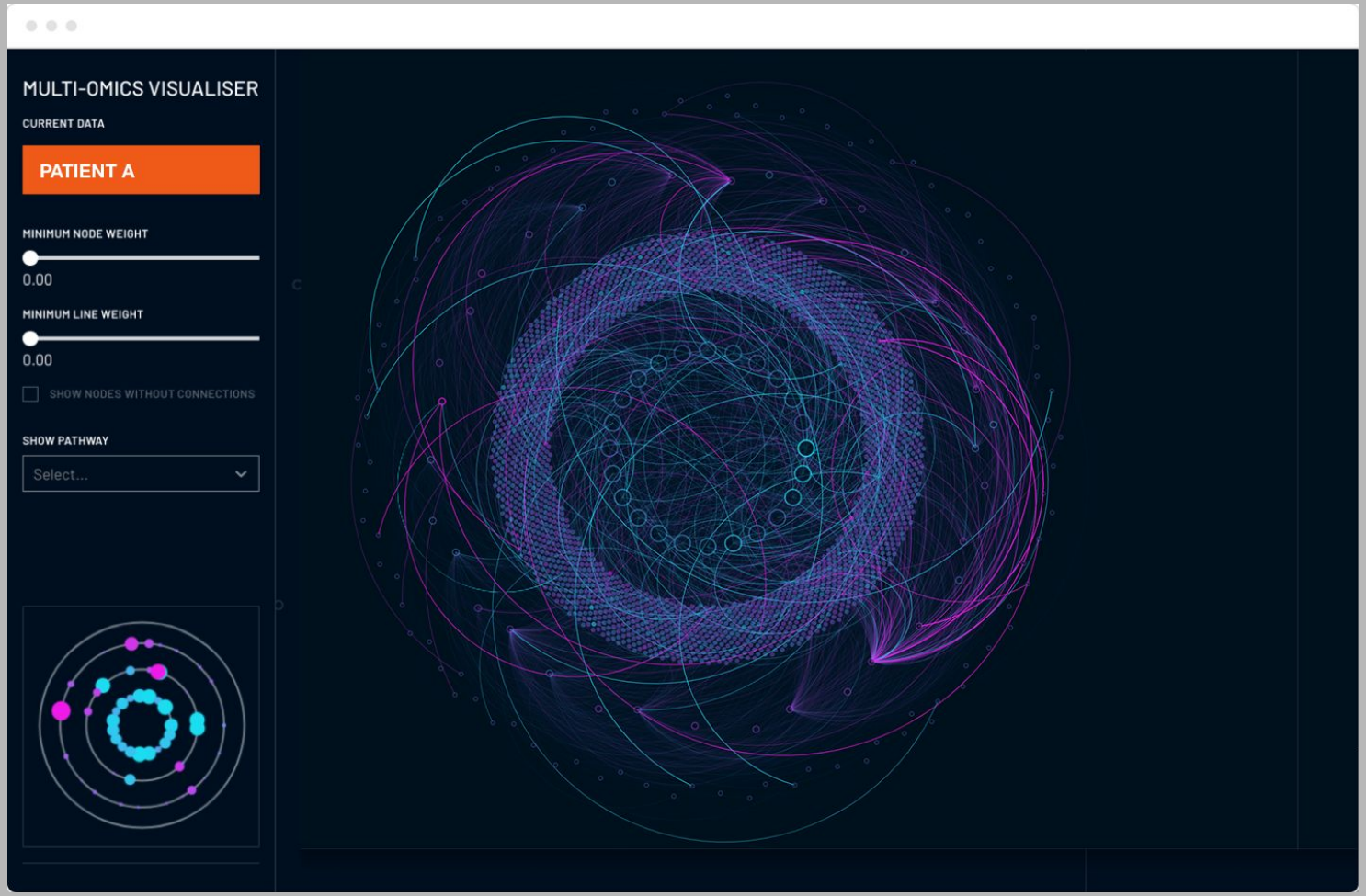
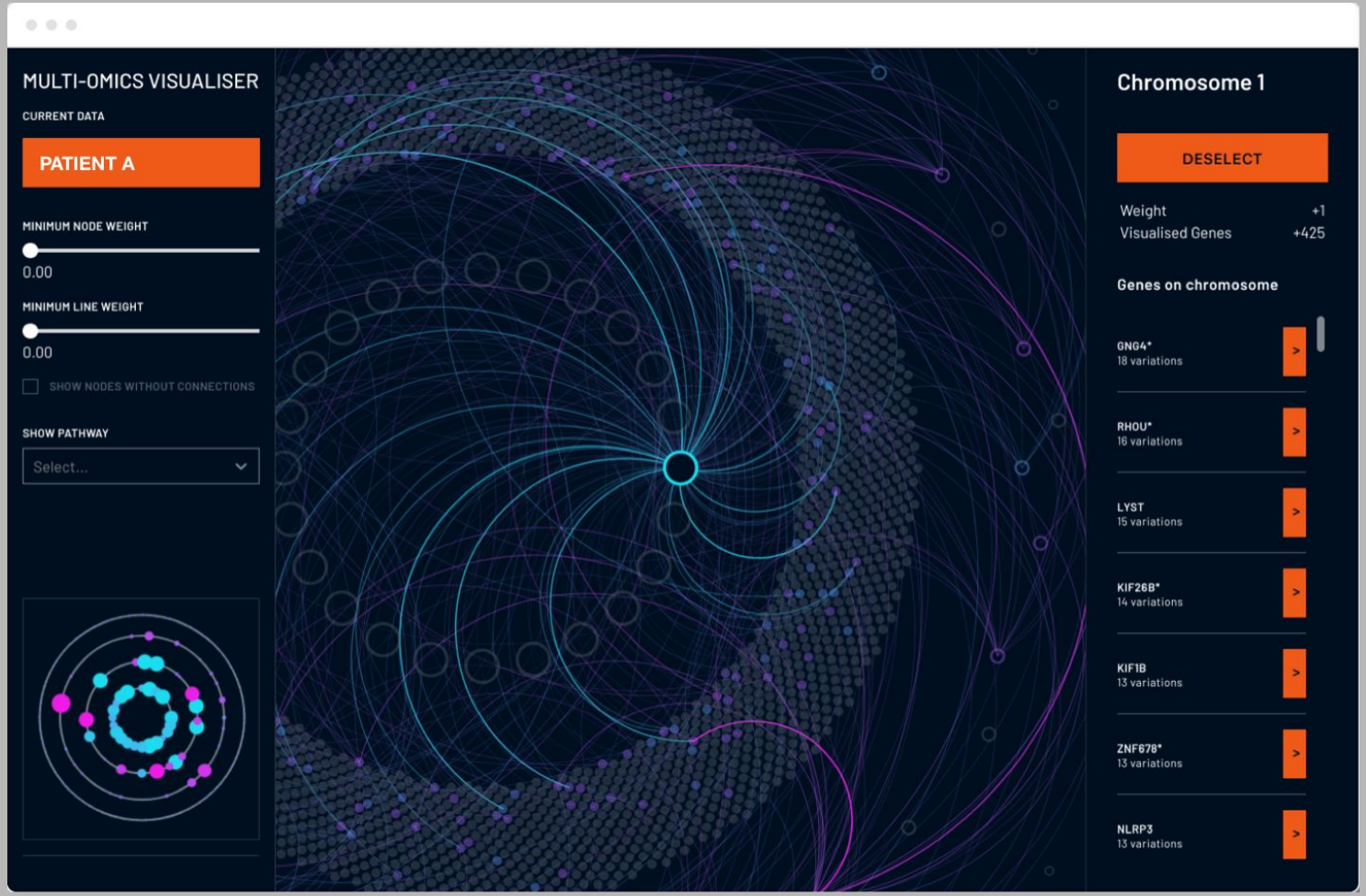
VISUALISING DIGITAL PROJECTS IN NSW
DEPARTMENT OF FINANCE, SERVICES & INNOVATION



https://smallmultiples.com.au/projects/multi-omics-visualiser/



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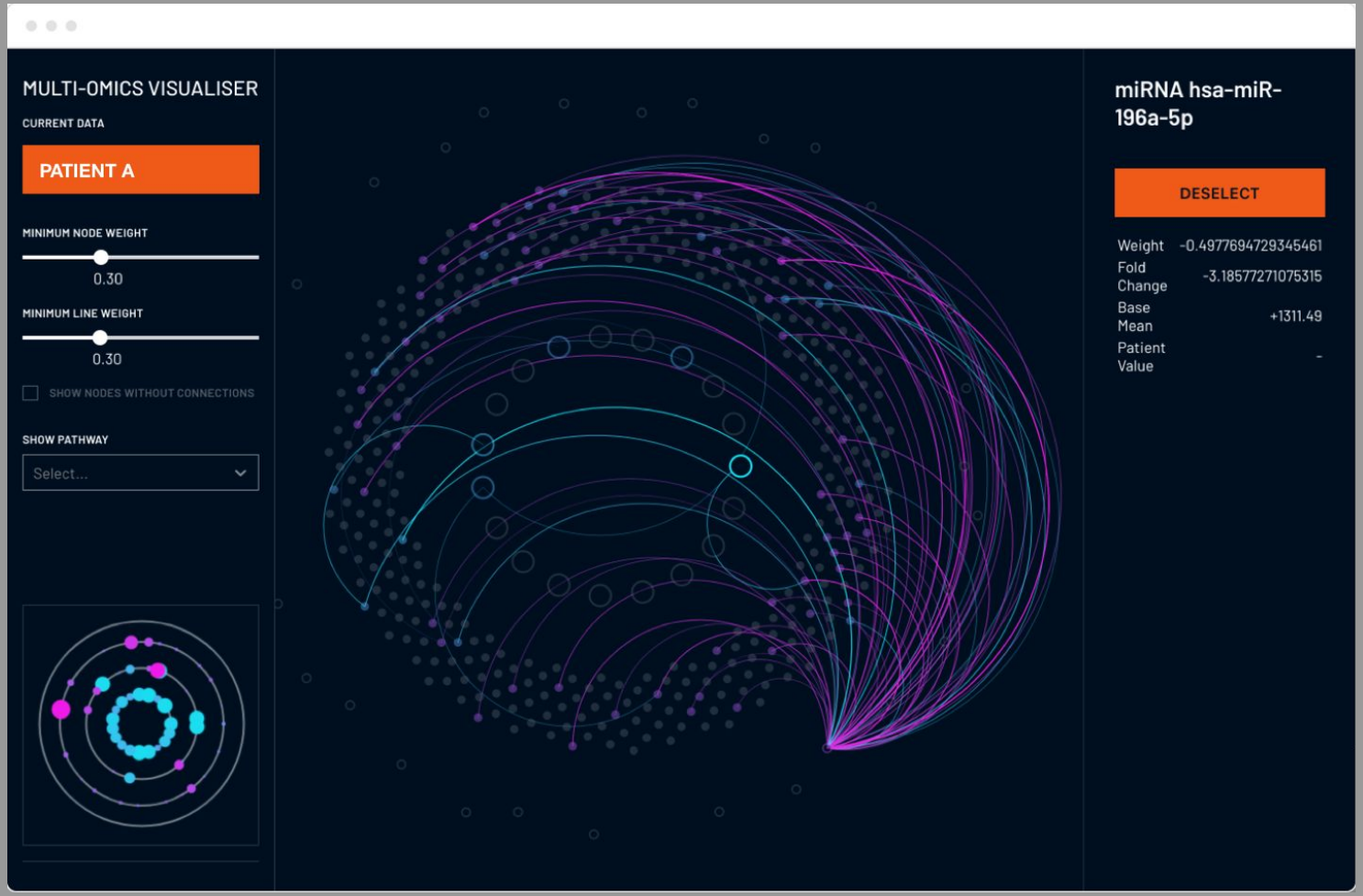

https://smallmultiples.com.au/projects/multi-omics-visualiser/

Standing on the border of giants

Visual comparison if Human Development Index of small countries

الجائزة العالمية لفن عرض البيانات
WORLD DATA VISUALIZATION PRIZE

ABOUT US THEME PROCESS العربية

WORLD DATA VISUALIZATION PRIZE

In partnership with

Information is Beautiful

We supply the themes. You provide creative, intuitive data-visualization that tell a story or reveal something interesting about data.

The winning works will receive cash prizes, international press coverage, and the chance to have your work exhibited to world leaders at the World Government Summit in February 2019.

The competition is open to anyone interested in design, data-analytics, and illustrative story-telling. Best of all, you don't need to be a designer or a creative professional to take part...

https://wdvp.worldgovernmentsummit.org/index.html

	A	B	C	D	E	F	G	H
1	indicator	land area (sq km)	human development index	population	GDP	GDP per capita (PPP)	GDP per km2 (PPP)	population density
2	source	CIA World Factbook	UNDP	Heritage Foundation	Heritage Foundation	Heritage Foundation	Heritage Foundation	World Bank
3	URL	https://www.cia.gov/	http://hdr.undp.org/e	https://www.heritage	https://www.heritage	https://www.heritage	https://www.heritage	https://data.world
4	notes				(billions, PPP)			(people per sq km
5	data year	2018	2017	2018	2018	2,018	2,018	2017
6	Albania	27,398	0.785	2,900,000	34.20	11,840	1,248,266	105
7	Armenia	28,203	0.755	3,000,000	25.80	8,621	914,796	103
8	Bahamas	10,010	0.807	400,000	9.00	24,555	899,101	39
9	Bahrain	760	0.846	1,300,000	66.90	50,704	88,026,316	1936
10	Barbados	430	0.800	300,000	4.80	17,100	11,162,791	664
11	Belize	22,806	0.708	400,000	3.10	8,220	135,929	16
12	Bhutan	38,394	0.612	800,000	6.50	8,227	169,297	21
13	Bosnia and Herzegovina	51,187	0.768	3,900,000	42.20	10,958	824,428	68
14	Botswana	566,730	0.717	2,200,000	36.70	17,042	64,757	4
15	Brunei Darussalam	5,265	0.853	400,000	32.50	76,884	6,172,840	81
16	Cabo Verde	4,033	0.654	500,000	3.50	6,662	867,840	136
17	Central African Republic	622,984	0.367	4,900,000	3.20	652	5,137	7
18	Comoros	2,235	0.752	800,000	1.30	1,529	581,655	437
19	Congo, Republic of	341,500	0.606	4,500,000	29.80	6,676	87,262	15
20	Costa Rica	51,060	0.794	4,900,000	80.70	16,436	1,580,494	96
21	Croatia	55,974	0.831	4,200,000	95.10	22,795	1,699,003	74
22	Cyprus	9,241	0.869	800,000	29.70	34,970	3,213,938	128
23	Djibouti	23,180	0.476	1,000,000	3.30	3,370	142,364	41
24	Dominica	751	0.715	100,000	0.80	11,375	1,065,246	99
25	Equatorial Guinea	28,051	0.591	800,000	31.70	38,639	1,130,084	45
26	Estonia	42,388	0.871	1,300,000	38.50	29,313	908,276	31
27	Eswatini	17,204	0.588	1,100,000	11.10	9,776	645,199	79
28	Fiji	18,274	0.741	900,000	8.30	9,268	454,197	50
29	Gabon	257,667	0.702	1,900,000	35.90	19,057	139,327	8
30	Gambia	10,120	0.460	2,100,000	3.40	1,667	335,968	208
31	Georgia	69,700	0.780	3,700,000	37.20	10,044	533,716	65
32	Guinea-Bissau	28,120	0.455	1,700,000	2.90	1,730	103,129	66
33	Guyana	196,849	0.654	800,000	6.00	7,873	30,480	4
34	Iceland	100,250	0.935	300,000	16.50	49,136	164,589	3
35	Ireland	68,883	0.938	4,700,000	324.90	69,231	4,716,694	70
36	Jamaica	10,831	0.732	2,800,000	25.40	8,976	2,345,120	267
37	Kiribati	811	0.612	100,000	0.20	1,823	246,609	144
38	Kosovo	10,887	-	1,900,000	18.40	9,600	1,690,089	168
39	Kuwait	17,818	0.803	4,200,000	303.70	71,887	17,044,562	232
40	Latvia	62,249	0.847	2,000,000	50.60	25,710	812,864	31
41	Lebanon	10,230	0.757	4,600,000	85.20	18,525	8,328,446	595
42	Lesotho	30,355	0.520	1,900,000	7.00	3,601	230,605	74
43	Liberia	96,320	0.435	4,400,000	3.80	855	39,452	49
44	Lithuania	62,680	0.858	2,900,000	86.10	29,972	1,373,644	45
45	Luxembourg	2,586	0.904	600,000	59.90	104,003	23,163,186	231
46	Macedonia	25,433	-	2,100,000	30.30	14,597	1,191,366	83
47	Maldives	298	0.717	400,000	5.50	15,553	18,456,376	1454
48	Malta	316	0.878	400,000	17.30	39,834	54,746,835	1454
49	Mauritania	1,030,700	0.520	3,800,000	16.40	4,328	15,912	4
50	Mauritius	2,030	0.790	1,300,000	25.90	20,422	12,758,621	623
51	Micronesia	702	0.627	100,000	0.30	3,234	427,350	151
52	Moldova	32,891	0.700	3,600,000	18.90	5,328	574,625	124
53	Mongolia	1,553,556	0.741	3,000,000	37.00	12,275	23,816	2
54	Montenegro	13,452	0.814	600,000	10.40	16,643	773,119	46
55	Namibia	823,290	0.647	2,300,000	26.00	11,290	31,581	3
56	New Zealand	264,537	0.917	4,700,000	177.00	37,294	669,094	18
57	Oman	309,500	0.821	4,000,000	184.80	46,698	597,092	15
58	Panama	74,340	0.789	4,000,000	92.90	23,024	1,249,664	55
59	Qatar	11,586	0.856	2,600,000	329.20	127,660	28,413,603	227
60	Saint Lucia	606	0.747	200,000	2.10	11,783	3,465,347	293
61	Saint Vincent and the Grenadines	389	0.723	100,000	1.20	11,271	3,084,833	282
62	Samoa	2,821	0.713	200,000	1.10	5,553	389,933	69
63	São Tomé and Príncipe	964	0.589	200,000	0.60	3,072	622,407	213
64	Seychelles	455	0.797	100,000	2.60	27,602	5,714,286	208
65	Slovenia	20,151	0.896	2,100,000	66.20	32,085	3,285,197	103
66	Solomon Islands	27,986	0.546	600,000	1.20	1,973	42,879	22
67	Suriname	156,000	0.720	600,000	7.90	13,988	50,641	4
68	Timor-Leste	14,874	0.625	1,200,000	5.00	4,187	336,157	87
69	Tonga	717	0.726	100,000	0.60	5,387	836,820	150
70	Trinidad and Tobago	5,128	0.784	1,400,000	43.60	31,870	8,502,340	267
71	Uruguay	175,015	0.804	3,500,000	74.90	21,527	427,963	20
72	Vanuatu	12,189	0.603	300,000	0.70	2,631	57,429	23

```r
# PLOT NEIGHBOUR

# Paste data for non-small neighbour countries
if(length(d$small[d$Country == nCountry]) != 0 & !is.na(nArea) & !is.na(myArea)){
  if(nArea > 2*myArea){

    # Neighbour values
    nVal <- d[d$Country == nCountry, COLUMN]
    val <- nVal - myVal

    # Difference in HDI
    if(!is.na(val) & !is.na(nVal) & abs(val) > tmp_maxDiff ){
      tmp_maxDiff <- val
    }

    nAngleRad <- angle[j] * (pi/180)
    nY <- sin(nAngleRad) * val
    nX <- cos(nAngleRad) * val

    # Limit area
    if(LIM_AREA){
      nArea <- LIM_AREA * nArea / maxArea
    }

    nRadius <- sqrt(nArea/pi) * AREA_SCALE;

    if(!is.na(nArea)){
      segments(0,0,nX,nY, col='#eeeeee', lwd=2)
      symbols(nX, nY, inches=FALSE, circles <- nRadius, add=T, fg='#cccccc', lwd=2)
      symbols(nX, nY, inches=FALSE, circles <- 0.025, add=T, fg='#ff0000', lwd=1)
      text(nX,nY,nCode, pos=1, cex=0.8)
      text(nX,nY-0.025,nVal, pos=1, cex=0.8)
      print(nCountry)
      nYear <- d$lastHDIYear[d$Country == nCountry]
      if(nYear != 2017 & !is.na(nYear)){
        text(nX,nY-0.05, nYear, pos=1, cex=0.8)
      }
    }
  }else{
    print("ommitting neighbour because it's not big enough")
  }
}
```

Lebanon

```r
# SETUP
COLUMN <- 'lastHDI' # Parameter to visualise
W <- 0.4 # Canvas size # max diff is 0.393 (Solomon Islands-Australia)
LIM_AREA <- FALSE #1000000
AREA_SCALE <- 0.00016

# Print values for small countries and neighbours
s <- d[d$small.wdvp==1 | d$small==1,] # !!! also set to same for neighbour countries !

for(i in 1:nrow(s)){
  if(!is.na(s$neighbourBorder[i])){
    myVal <- s[i, COLUMN]
    myCountry <- s$Country[i]
    myArea <- s$Land[i]
    nYear <- s$lastHDIYear[i]
    print(paste(myCountry, ' (', i, ')', sep=''))
    print('##########')
    print(paste("HDI: ", s$lastHDI[i]))
    print(paste("Foreign born: ", s$migrationPercentage[i], '%', sep=''))
    print(paste("HPI: ", s$HPI[i]))
    print(paste("Eco: ", s$EcologicalFootprint[i]))
    print('-')
    print('Big neighbours:')

    # Remove str if there is no direct neighbour
    myneighbours.str <- ''
    if(nchar(s$neighbourBorder[i]) != 0){
      myneighbours.str <- paste(
        s$neighbourBorder[i], s$neighbour[i], sep=';'
      )
    }else{
      myneighbours.str <- s$neighbour[i]
    }

    myneighbours.arr <- strsplit(myneighbours.str, ';')

    # PLOT SETUP
    pdf(paste('pdf/',COLUMN,'/',myArea,'_',myCountry,'.pdf',sep=''))
    plot(0, 0, asp=1, type="n", xlab="", ylab="", xlim=c(-W,W), ylim=c(-W,W), bty="n", main <- paste(myCountry, 'HDI:',myVal, '(',nYear, ')', myArea,'km2'
    abline(h=0, col='#eeeeee')
    symbols(0, 0, inches=FALSE, circles <- W, add=T, fg='#eeeeee', lwd=2)

    # Get max area of neighbour
    maxArea <- 0
    for(j in 1:length(myneighbours.arr[[1]])){
      country_test <- myneighbours.arr[[1]][j]
      maxArea_test <- d$Land[d$Country == country_test]

      # Country is in data and has an entry for area
      if(length(maxArea_test) != 0 && !is.na(maxArea_test)){
        if(maxArea_test > maxArea){
          maxArea <- maxArea_test
        }
      }
    }

    neighbourNum <- length(myneighbours.arr[[1]])
```

160_Liechtenstein.pdf
298_Maldives.pdf
316_Malta.pdf
389_Saint Vincent and the...ines.pdf
430_Barbados.pdf
455_Seychelles.pdf
468_Andorra.pdf
606_Saint Lucia.pdf
709.2_Singapore.pdf
717_Tonga.pdf
751_Dominica.pdf
760_Bahrain.pdf
811_Kiribati.pdf
964_Sao Tome and Principe.pdf
2030_Mauritius.pdf
2235_Comoros.pdf
2586_Luxembourg.pdf
2821_Samoa.pdf
4033_Cabo Verde.pdf
5128_Trinidad and Tobago.pdf
5265_Brunei.pdf
9241_Cyprus.pdf
10010_Bahamas.pdf
10120_Gambia.pdf
10230_Lebanon.pdf
10831_Jamaica.pdf
10887_Kosovo.pdf
11586_Qatar.pdf
12189_Vanuatu.pdf
13452_Montenegro.pdf
14874_Timor-Leste.pdf
17204_Eswatini.pdf
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51187_Bosnia and Herzegovina.pdf
55974_Croatia.pdf
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68883_Ireland.pdf
69700_Georgia.pdf
74340_Panama.pdf
96320_Liberia.pdf
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175015_Uruguay.pdf
196849_Guyana.pdf
257667_Gabon.pdf
264537_New Zealand.pdf
309500_Oman.pdf
341500_Congo, Republi...f the.pdf
566730_Botswana.pdf
622984_Central African...ublic.pdf
823290_Namibia.pdf
1030700_Mauritania.pdf
1553556_Mongolia.pdf
NA_Micronesia.pdf

- Small country and its land area
- Neighbour country with a **higher HDI**
- Neighbour country with a **lower HDI**

HDI | Land area

Standing on the borders of giants

Visual comparison of the Human Development Index of 30 smaller countries and their bigger neighbour's.

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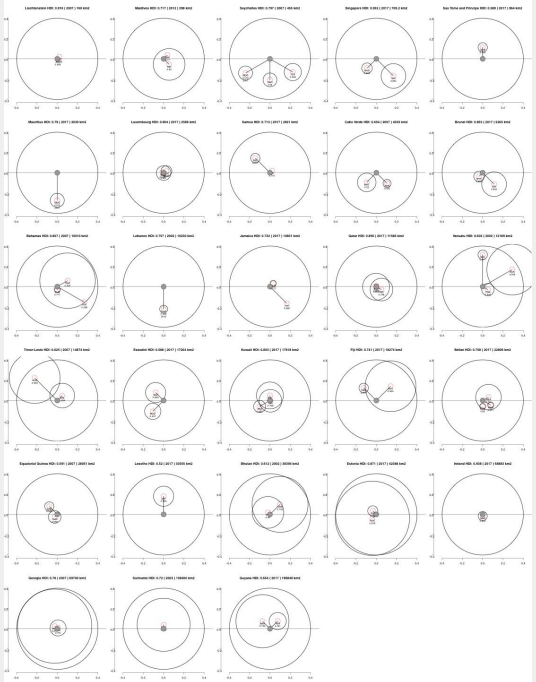

https://smallmultiples.com.au/projects/standing-on-the-borders-of-giants/

Standing on the borders of giants

Visual comparison of the Human Development Index of 30 smaller countries and their bigger neighbour's.

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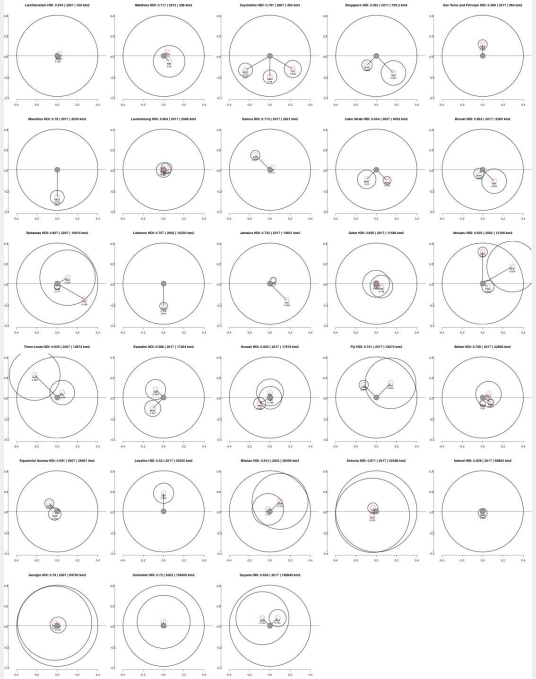
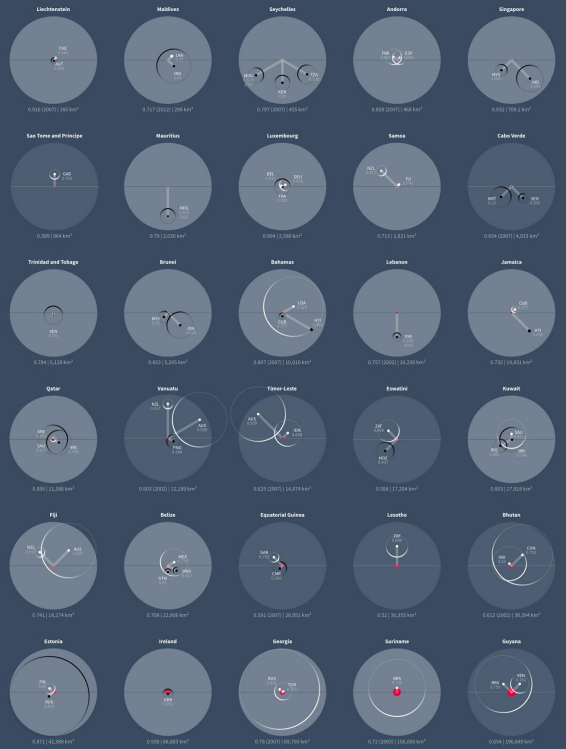


STANDING ON THE BORDERS OF GIANTS

Visual comparison of the 2017 Human Development Index of 30 smaller countries and their larger neighbours.



The visualisation reveals similarities and differences of Human Development Indices of small countries and their larger neighbours. Neighbouring countries (white or black) in proximity to the centre (red) indicate a similar HDI whereas a larger distance indicates bigger differences. Countries positioned above the centre line (white dots) have an HDI that is higher while the ones with lower values are placed below the divider line (black dots). The area of the small countries is shown by the area of the centre circle (red) while an outline with a gradient indicates the land size of the neighbouring country. Countries with high HDI values (0.7 and higher) are highlighted using a brighter colour of the background circle. The background's radius equals an HDI difference of 0.4. The 30 small countries and their neighbours have been handpicked based on their land area, available HDI data and suitability for this project.

- Small country and its land area
- Neighbour country with a **higher HDI**
- Neighbour country with a **lower HDI**

Smaller land area — Larger land area

More similar HDI — More difference in HDI

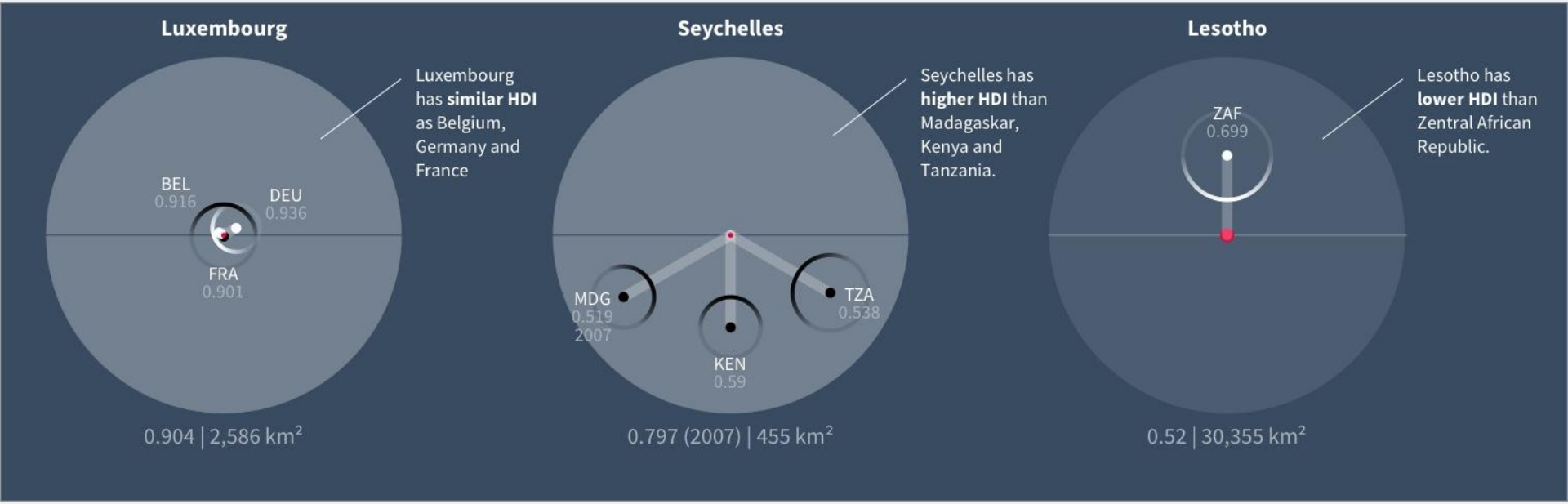
Countries with **higher HDI** compared to the small country

Countries with **lower HDI** compared to the small country

HDI | Land area

Country area by CIA World Factbook | Human Development Index By UNDP | Made by Martin von Lupin at Small Multiples | martin@small.mu

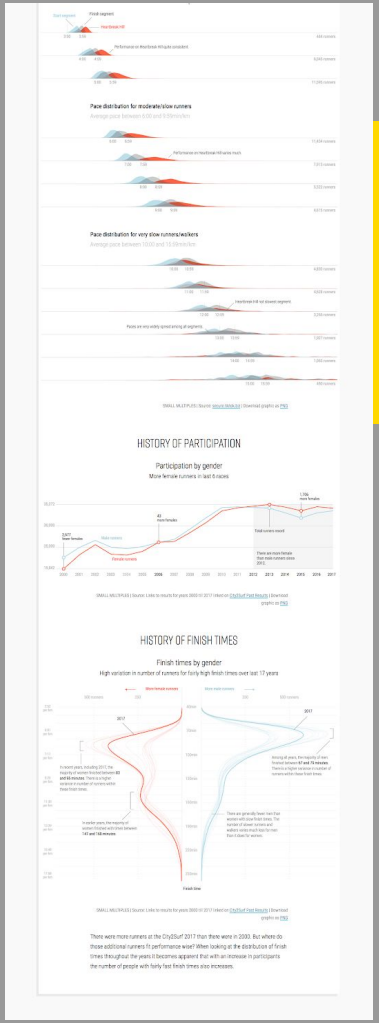
الجائزة العالمية لفن عرض البيانات
WORLD DATA VISUALIZATION PRIZE



https://smallmultiples.com.au/projects/standing-on-the-borders-of-giants/

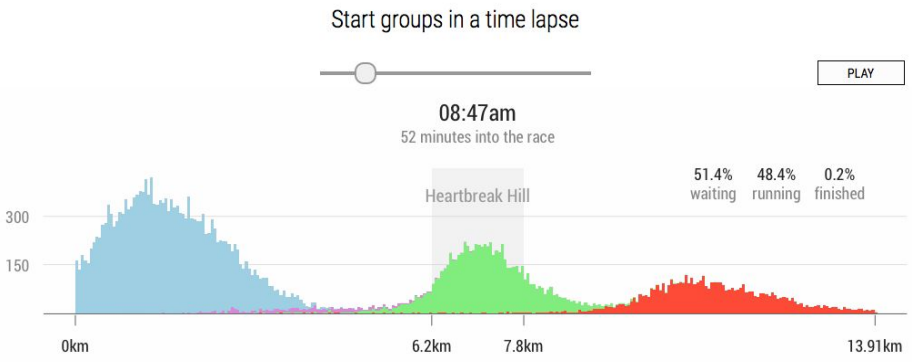
Visualising Sydney’s City2Surf 2017

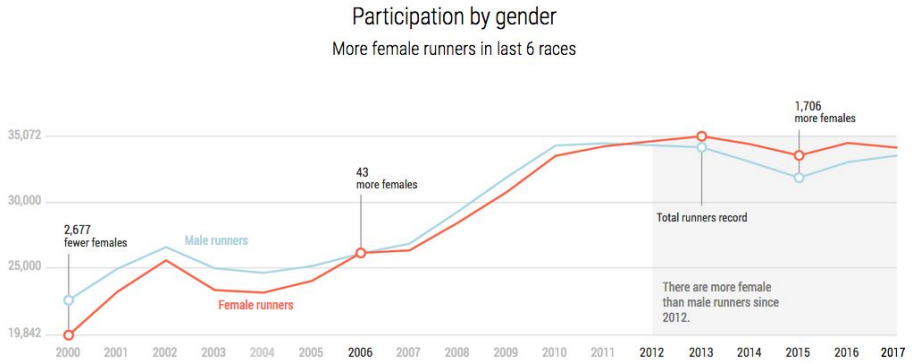
https://city2surf.com.au/

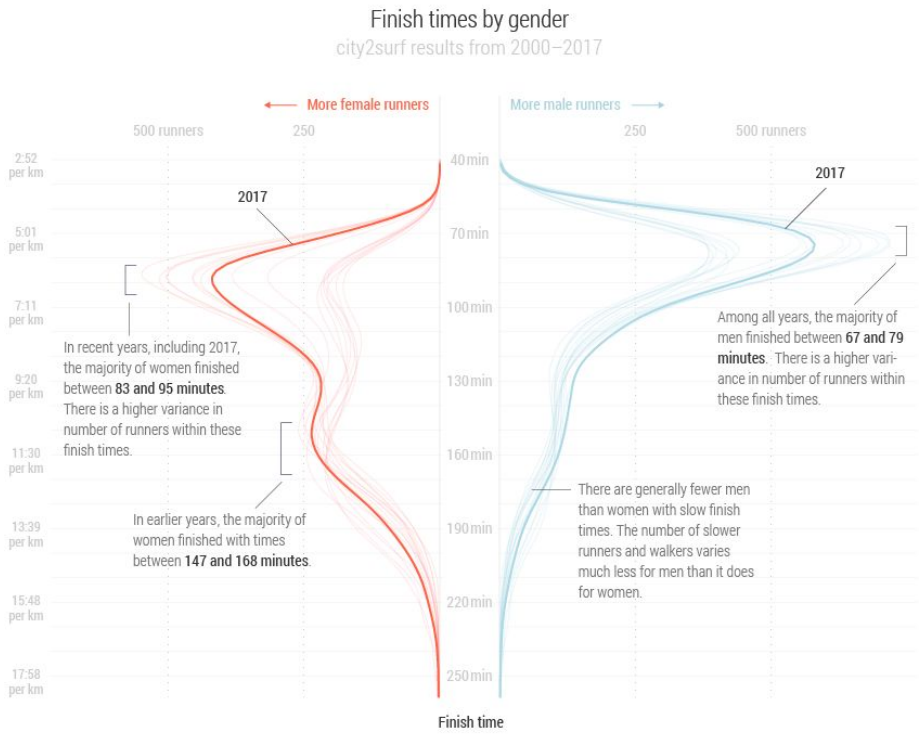


VISUALISING SYDNEY'S CITY2SURF 2017

https://smallmultiples.com.au/articles/visualising-sydneys-city2surf-2017/







https://smallmultiples.com.au/articles/visualising-sydneys-city2surf-2017/

Visualising the city2surf 2017

1. Getting the data

https://results.timingsports.com/list/city2surf/2017/14KM/

TIMINGSPORTS

City2Surf

SHOWING ROWS: 1 - 100

Prev Page Next Page

#	Bib	Name	Finish Time	Place	Gender	G/Pl	Division	D/Pl	
1	00102	HARRY SUMMERS	00:42:09	1	M	1	M20-29	1	view
2	00100	THOMAS DO CANTO	00:42:14	2	M	2	M30-39	1	view
3	00101	KEVIN BATT	00:43:21	3	M	3	M20-29	2	view
4	00073	JAMES NIPPERESS	00:43:31	4	M	4	M20-29	3	view
5	00079	EDWARD GODDARD	00:44:01	5	M	5	M16-19	1	view
6	00105	KEITH MACPHERSON	00:44:23	6	M	6	M20-29	4	view
7	00024	JAMES TUNBRIDGE	00:44:32	7	M	7	M20-29	5	view
8	00090	JOHN BARTLETT	00:44:32	8	M	8	M30-39	2	view
9	00094	DAVID CRINITI	00:44:52	9	M	9	M30-39	3	view
10	00085	SCOTT O'CONNOR	00:45:34	10	M	10	M30-39	4	view
11	00084	JAMES DAVY	00:45:43	11	M	11	M20-29	6	view
12	00099	GRANT PAGE	00:45:51	12	M	12	M30-39	5	view
13	00343	HAMISH WALLACE	00:45:59	13	M	13	M20-29	7	view
14	00036	TOM MIDDLETON	00:46:00	14	M	14	M30-39	6	view
15	00095	NATHAN HARTIGAN	00:46:00	15	M	15	M30-39	7	view
16	00187	ANDREW ALLEY	00:46:13						

https://results.timingsports.com/list/city2surf/2017/14KM/

TIMINGSPORTS

HARRY SUMMERS

Bib Number	Event	Gender	Division
00102	14KM	MALE	M20-29

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race your mates

OFFICIAL RESULT

00:42:09

AVERAGE PACE: 03:01

OVERALL	MALE	M20-29
1 OF 67,894 (100%)	1 OF 33,634 (100%)	1 OF 8,245 (100%)

GUN TIME

00:42:16

AVERAGE PACE: 03:02

SPLIT TIMES

Split Point	Split Time	S/Rank	Race Time	R/Rank	Activity	Dist.	Pace	Speed
Start to Heartbreak Hill	00:18:01	2	00:18:01	2	RUN	6.20	02:54	20.63
Heartbreak Hill	00:05:26	5	00:23:28	3	RUN	1.60	03:24	17.63
Heartbreak Hill to Bondi	00:18:41	3	00:42:09	1	RUN	6.11	03:03	19.62

https://results.timingsports.com/view/city2surf/2017/00102/

4. bash

```
Last login: Tue Jun 11 11:59:05 on ttys002
martins-air:~ matman$ cd /Users/martin\ 1/Documents/running/public/1_scraping/city2surf
martins-air:city2surf matman$ node index17.js > results.json
Starting up...
Scraping page 1...
Scraping page 2...
Scraping page 3...
Scraping page 4...
Scraping page 5...
Scraping page 6...
Scraping page 7...
Scraping page 8...
Scraping page 9...
Scraping page 10...
Scraping page 11...
Scraping page 12...
Scraping page 13...
Scraping page 14...
Scraping page 15...
Scraping page 16...
Scraping page 17...
```

results.json


```
[
{"bib":"00102","division":"M20-29","dpl":"1","gender":"M","gpl":"1","name":"HARRY SUMMERS","rank":"1","time":"00:42:09"},
{"bib":"00100","division":"M30-39","dpl":"1","gender":"M","gpl":"2","name":"THOMAS DO CANTO","rank":"2","time":"00:42:14"
{"bib":"00101","division":"M20-29","dpl":"2","gender":"M","gpl":"3","name":"KEVIN BATT","rank":"3","time":"00:43:21"},
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{"bib":"00094","division":"M30-39","dpl":"3","gender":"M","gpl":"9","name":"DAVID CRINITI","rank":"9","time":"00:44:52"},
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Line 1, Column 1 Tab Size: 4 JSON

Visualising the city2surf 2017

2. Essential data fields

RStudio

timelapse.R* | d[1:50,]

Filter

	bib	division	gpl	dpl	gender	name	rank	time	time_sec	guntime	split1	split2	split3	guntime_sec	split1_sec	split2_sec	split3_sec	missingSplit	startdelay	group	clock60	clock120	clock180	clock240	clock300
1	22	M40-49	45	3	M	CHRIS TRUSCOTT		46	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	24	M20-29	7	5	M	JAMES TUNBRIDGE		7	00:44:32	2672	00:44:39	00:18:29	00:05:38	00:20:23	2679	1109	338	1223	0	7	0	0.296	0.632	0.967	1.303
3	25	M20-29	226	70	M	JAMES CONSTANTINE		238	00:53:02	3182	00:53:12	00:21:40	00:07:04	00:24:17	3192	1300	424	1457	0	10	0	0.238	0.525	0.811	1.097
4	26	F20-29	35	12	F	ASHLEY AITKEN		581	00:56:24	3384	00:56:31	00:22:32	00:07:47	00:26:04	3391	1352	467	1564	0	7	0	0.243	0.518	0.793	1.068
5	27	M30-39	73	31	M	ROBBIE NEILL		76	00:49:32	2972	00:49:41	00:21:07	00:06:25	00:21:59	2981	1267	385	1319	0	9	0	0.250	0.543	0.837	1.130
6	28	F30-39	17	9	F	ANNA WHITE		313	00:53:59	3239	00:54:07	00:22:54	00:06:49	00:24:15	3247	1374	409	1455	0	8	0	0.235	0.505	0.776	1.047
7	29	F30-39	10	4	F	TRACY DOUGLAS		187	00:52:11	3131	00:52:20	00:22:04	00:06:34	00:23:32	3140	1324	394	1412	0	9	0	0.239	0.520	0.801	1.082
8	30	M30-39	38	19	M	MIKE LICHTWARK		39	00:47:55	2875	00:48:05	00:19:53	00:06:18	00:21:43	2885	1193	378	1303	0	10	0	0.260	0.572	0.883	1.195
9	32	F16-19	252	6	F	ANNABEL MCDERMOTT		2762	01:03:18	3798	01:03:26	00:24:10	00:08:20	00:30:47	3806	1450	500	1847	0	8	0	0.222	0.479	0.735	0.992
10	33	F20-29	41	15	F	CHARLOTTE WILSON		638	00:56:45	3405	00:56:53	00:22:44	00:07:04	00:26:56	3413	1364	424	1616	0	8	0	0.236	0.509	0.782	1.055
11	34	M30-39	34	16	M	CHRISTIAN LOTTER		35	00:47:49	2869	00:47:57	00:20:32	00:06:00	00:21:17	2877	1232	360	1277	0	8	0	0.262	0.564	0.866	1.168
12	35	M40-49	82	7	M	NEIL PEARSON		85	00:49:51	2991	00:50:00	00:20:43	00:06:28	00:22:40	3000	1243	388	1360	0	9	0	0.254	0.554	0.853	1.152
13	36	M30-39	14	6	M	TOM MIDDLETON		14	00:46:00	2760	00:46:07	00:19:37	00:05:45	00:20:36	2767	1177	345	1236	0	7	0	0.279	0.595	0.911	1.227
14	37	F30-39	4	3	F	TENNILLE ELLIS		103	00:50:27	3027	00:50:36	00:20:58	00:06:27	00:23:02	3036	1258	387	1382	0	9	0	0.251	0.547	0.843	1.138
15	40	F30-39	121	55	F	JANE WEBBER		1599	01:00:26	3626	01:00:35	00:24:23	00:08:02	00:28:00	3635	1463	482	1680	0	9	0	0.216	0.470	0.725	0.979
16	41	M30-39	21	10	M	AIDAN HOBBS		21	00:46:59	2819	00:47:06	00:19:39	00:05:49	00:21:30	2826	1179	349	1290	0	7	0	0.279	0.594	0.910	1.225
17	42	M20-29	70	30	M	JAMIE DARCY		72	00:49:30	2970	00:49:37	00:19:56	00:06:15	00:23:17	2977	1196	375	1397	0	7	0	0.275	0.586	0.897	1.208
18	43	M30-39	267	121	M	ANTHONY MAHER		282	00:53:44	3224	00:53:53	00:21:23	00:06:55	00:25:26	3233	1283	415	1526	0	9	0	0.246	0.536	0.826	1.116
19	44	M30-39	64	27	M	GEORDIE BUNDOCK-LIVINGSTON		66	00:49:13	2953	00:49:22	00:20:36	00:06:13	00:22:23	2962	1236	373	1343	0	9	0	0.256	0.557	0.858	1.159
20	45	F30-39	170	78	F	AIMEE DAVENPORT		2062	01:01:42	3702	01:01:53	00:25:33	00:08:09	00:27:59	3713	1533	489	1679	0	11	0	0.198	0.441	0.683	0.926
21	46	F30-39	20121	6020	F	ELIZABETH PITTAWAY		46415	02:07:35	7655	03:01:02	00:46:20	00:17:00	01:04:14	10862	2780	1020	3854	0	3207	3	-1.000	-1.000	-1.000	-1.000
22	47	F30-39	27	16	F	RENEE EVERETT		442	00:55:22	3322	00:55:31	00:23:13	00:06:52	00:25:16	3331	1393	412	1516	0	9	0	0.227	0.494	0.761	1.028
23	48	M30-39	29	14	M	QUENTIN REEVE		30	00:47:37	2857	00:47:44	00:19:41	00:06:13	00:21:42	2864	1181	373	1302	0	7	0	0.278	0.593	0.908	1.223
24	50	F30-39	13	5	F	REGINA JENSEN		241	00:53:06	3186	00:53:16	00:22:26	00:06:47	00:23:52	3196	1346	407	1432	0	10	0	0.230	0.507	0.783	1.059
25	51	M30-39	5148	1959	M	MITCHELL HAYES		5944	01:08:23	4103	01:08:30	00:28:16	00:08:21	00:31:45	4110	1696	501	1905	0	7	0	0.194	0.413	0.632	0.852
26	53	F20-29	5	2	F	BRITTANY ZENDLER		111	00:50:41	3041	00:50:48	00:21:34	00:06:39	00:22:27	3048	1294	399	1347	0	7	0	0.254	0.541	0.829	1.116
27	54	M30-39	20	9	M	NICK ROBERTS		20	00:46:48	2808	00:46:56	00:19:26	00:05:49	00:21:32	2816	1166	349	1292	0	8	0	0.277	0.596	0.915	1.234
28	55	F30-39	20	12	F	MEGAN TOWILL		395	00:54:56	3296	00:55:05	00:23:09	00:07:06	00:24:39	3305	1389	426	1479	0	9	0	0.228	0.495	0.763	1.031
29	56	F40-49	21	2	F	ERIKA JORDAN		397	00:54:57	3297	00:55:07	00:23:03	00:06:58	00:24:54	3307	1383	418	1494	0	10	0	0.224	0.493	0.762	1.031
30	57	F30-39	3	2	F	LAUREN REID		73	00:49:30	2970	00:49:38	00:20:25	00:06:27	00:22:37	2978	1225	387	1357	0	8	0	0.263	0.567	0.871	1.174
31	58	F50-59	95	4	F	LOUISE ARNOTT		1315	00:59:30	3570	00:59:41	00:25:13	00:07:38	00:26:38	3581	1513	458	1598	0	11	0	0.201	0.447	0.693	0.938
32	59	F30-39	38	21	F	KIRSTEN MOLLOY		613	00:56:37	3397	00:56:48	00:23:42	00:07:20	00:25:33	3408	1422	440	1533	0	11	0	0.214	0.475	0.737	0.998
33	60	M20-29	79	31	M	MATT WHITE		82	00:49:47	2987	00:49:56	00:20:35	00:06:20	00:22:51	2996	1235	380	1371	0	9	0	0.256	0.557	0.858	1.160
34	61	M30-39	1588	658	M	MITCHELL WILLIAMSON		1726	01:00:48	3648	01:00:55	00:19:58	00:06:13	00:34:36	3655	1198	373	2076	0	7	0	0.274	0.585	0.895	1.206
35	62	F30-39	51	29	F	LAURA LEWIS		758	00:57:23	3443	00:57:32	00:23:56	00:07:22	00:26:04	3452	1436	442	1564	0	9	0	0.220	0.479	0.738	0.997
36	63	M20-29	19	10	M	PETER GREEN		19	00:46:46	2806	00:46:53	00:19:20	00:06:08	00:21:17	2813	1160	368	1277	0	7	0	0.283	0.604	0.925	1.245
37	66	F20-29	8	5	F	HANNAH WALMSLEY		162	00:51:41	3101	00:51:49	00:21:29	00:06:42	00:23:29	3109	1289	402	1409	0	8	0	0.250	0.539	0.827	1.116
38	68	F30-39	50	28	F	LILIAN MOLESWORTH		757	00:57:23	3443	00:57:32	00:23:57	00:07:33	00:25:53	3452	1437	453	1553	0	9	0	0.220	0.479	0.738	0.997
39	70	M30-39	164	75	M	DAVID JENKINS		173	00:51:56	3116	00:52:06	00:21:25	00:06:45	00:23:45	3126	1285	405	1425	0	10	0	0.241	0.531	0.820	1.110
40	72	M20-29	18	9	M	BRIAN MCGINLEY		18	00:46:42	2802	00:46:50	00:19:39	00:05:51	00:21:10	2810	1179	351	1270	0	8	0	0.273	0.589	0.904	1.220
41	73	M20-29	4	3	M	JAMES NIPPERESS		4	00:43:31	2611	00:43:38	00:18:10	00:05:25	00:19:55	2618	1090	325	1195	0	7	0	0.301	0.643	0.984	1.325
42	76	M30-39	28	13	M	MICHAEL HO		29	00:47:36	2856	00:47:44	00:19:56	00:06:01	00:21:38	2864	1196	361	1298	0	8	0	0.270	0.581	0.892	1.203
43	77	M20-29	32	14	M	JAKE VOCKINS		33	00:47:41	2861	00:47:50	00:19:53	00:06:03	00:21:44	2870	1193	363	1304	0	9	0	0.265	0.577	0.889	1.201

Showing 1 to 44 of 50 entries

Console

Environment | History | Connections

Import Dataset | List

Global Environment

Data

d	65229 obs. of 381 variables

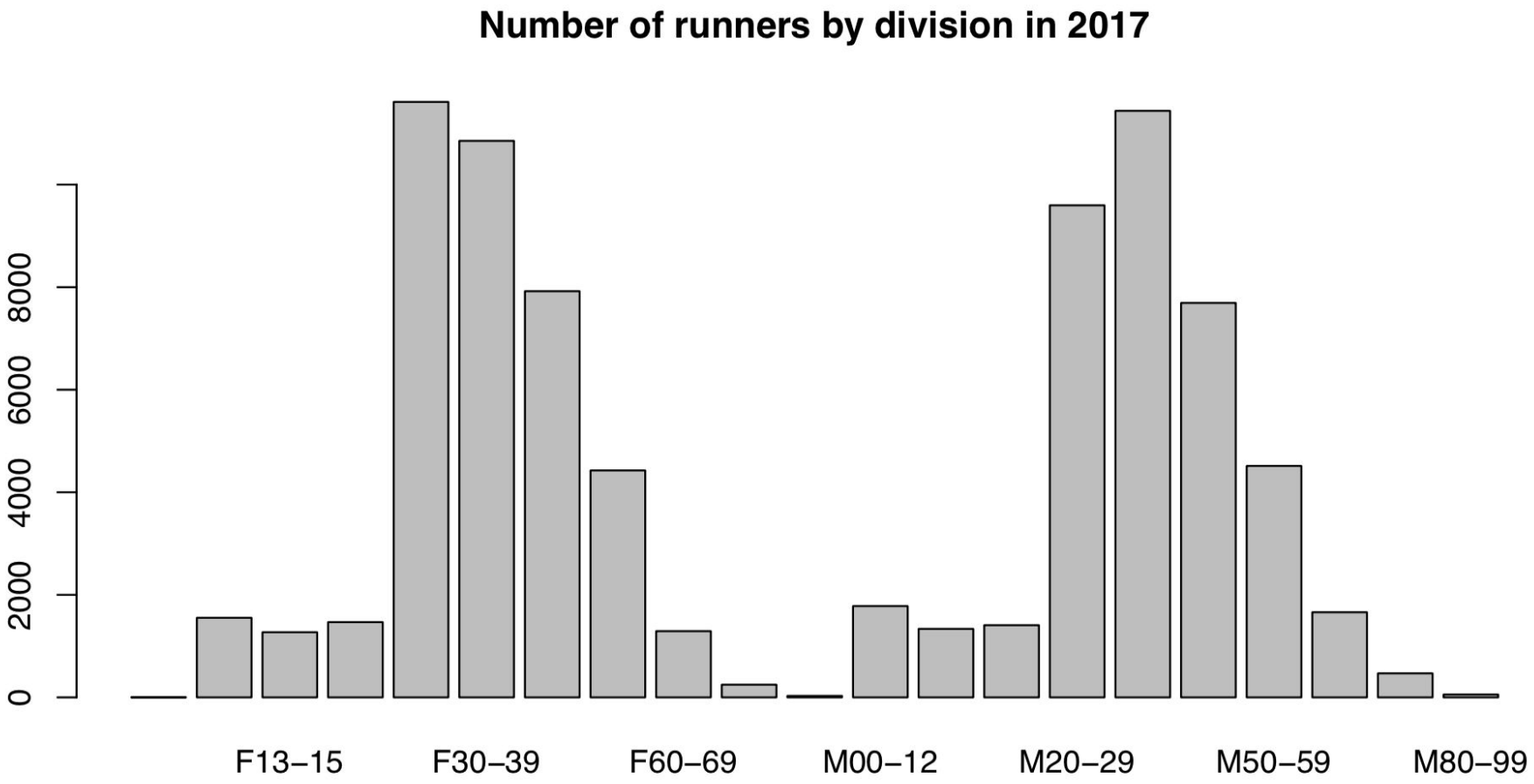
Values

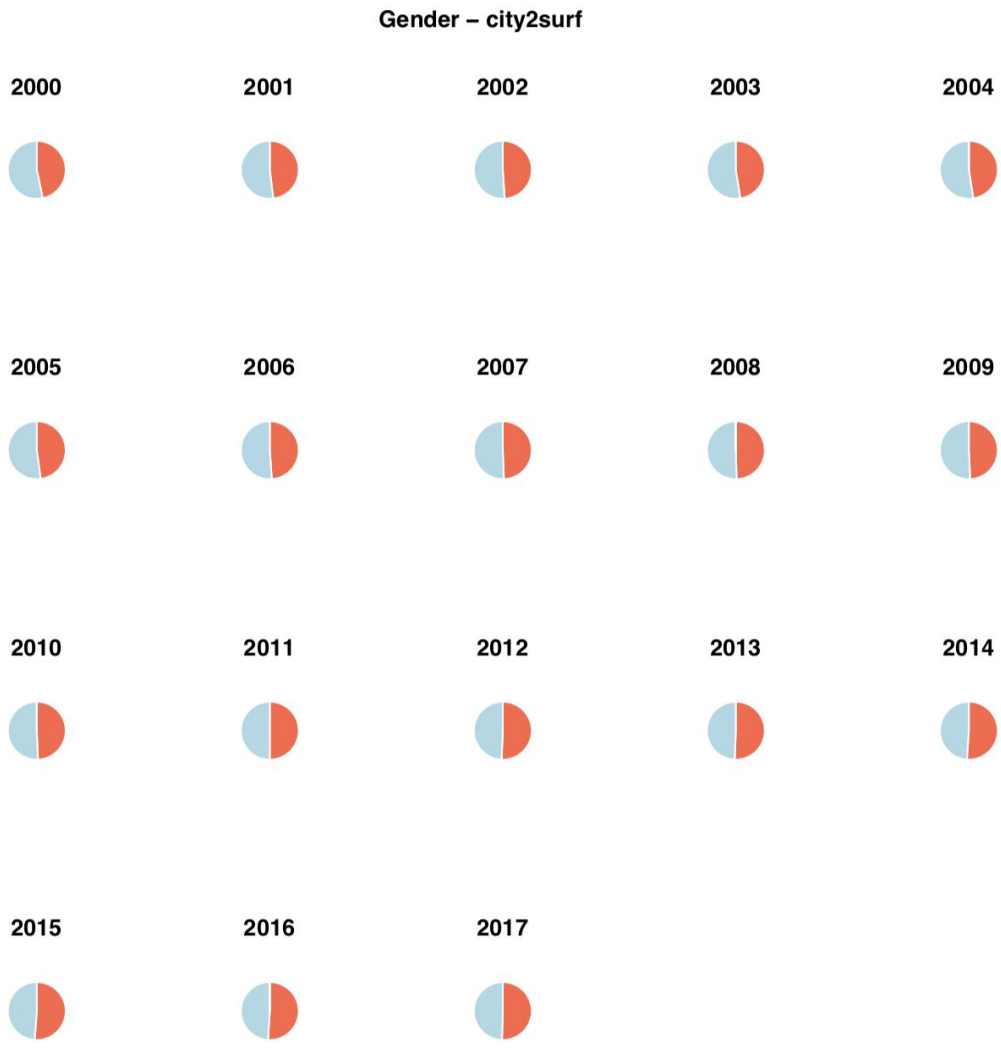
path	"_input/city2surf-2017_clocks.…
roboto.light	"Roboto Condensed Light"
roboto.regu…	"Roboto Condensed Regular"
y	2017

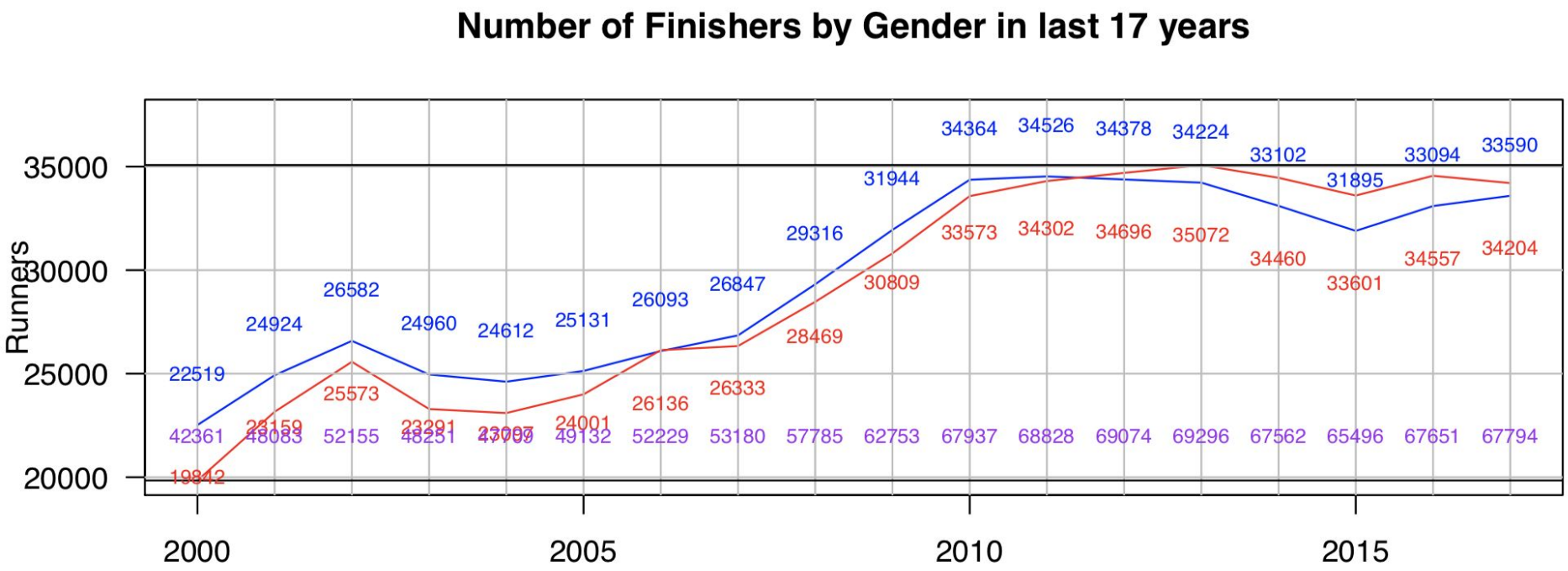
Files | Plots | Packages | Help | Viewer

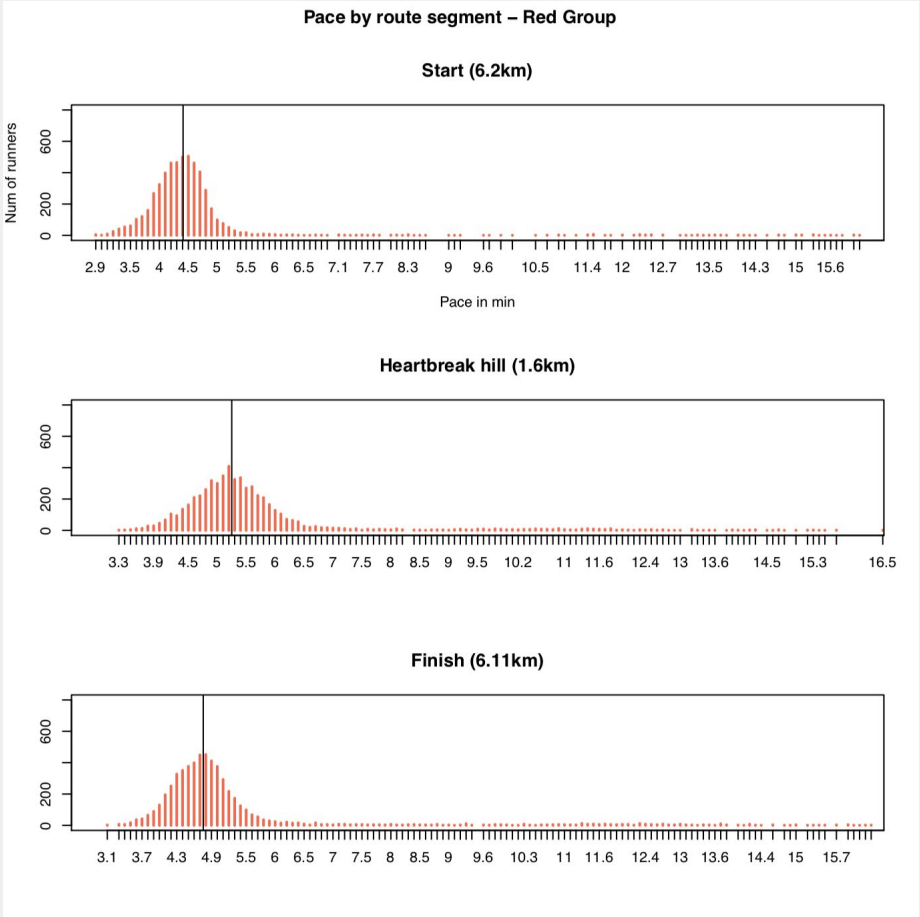
Visualising the city2surf 2017

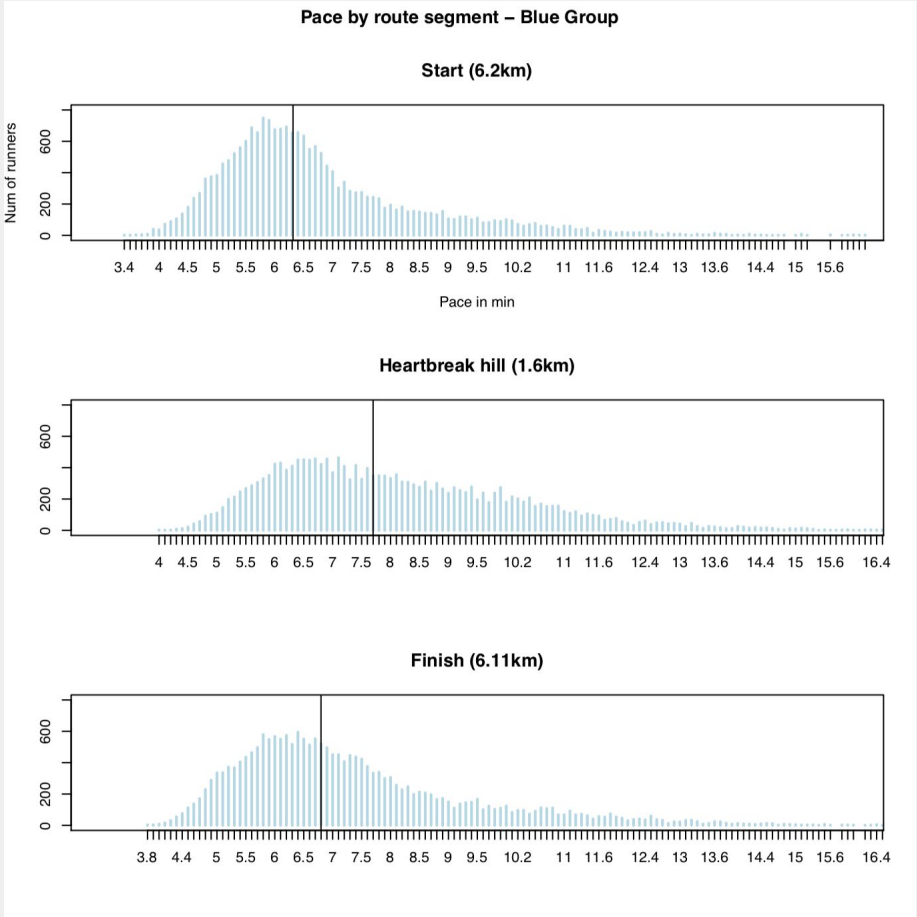
3. Exploration and plotting

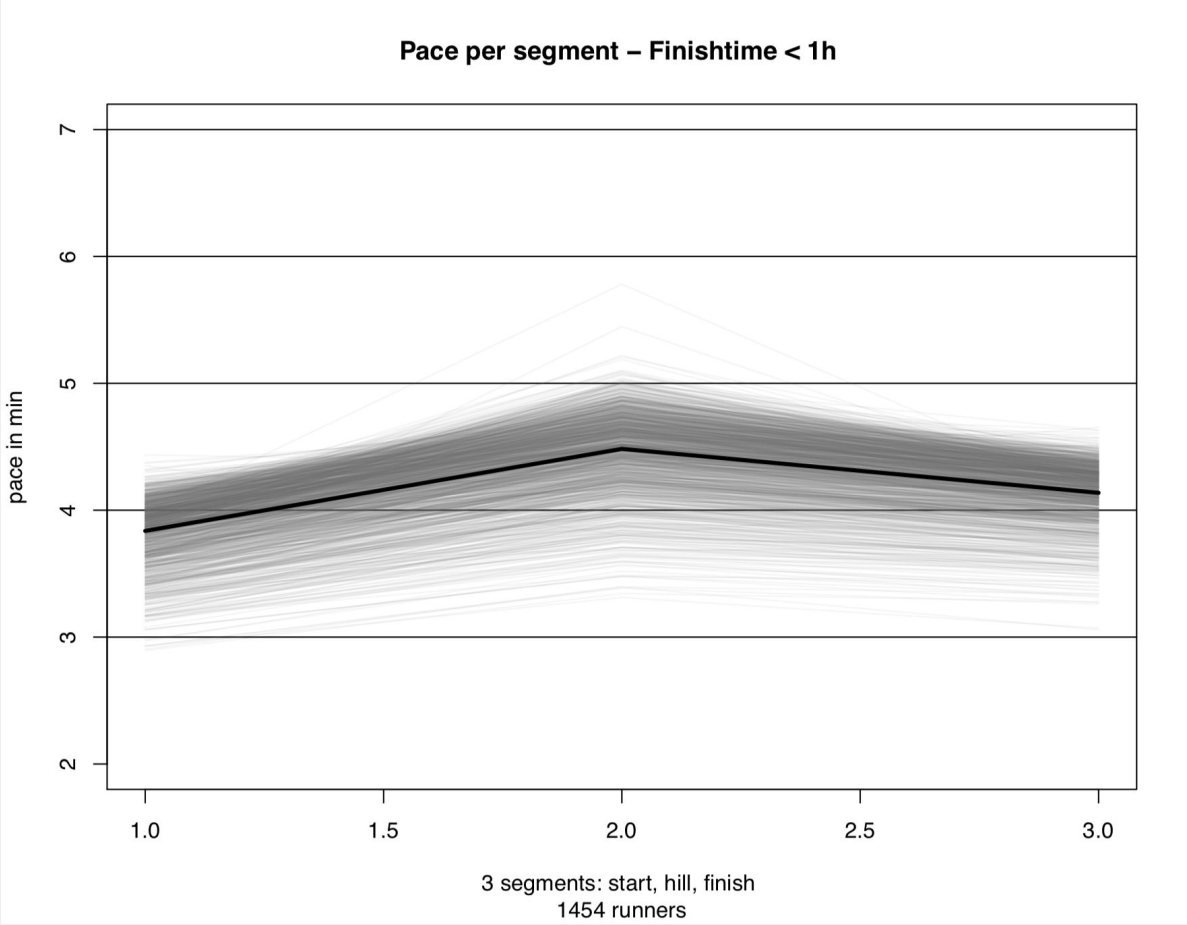

Number of runners by division in 2017
0
2000
4000
6000
8000
F13–15
F30–39
F60–69
M00–12
M20–29
M50–59
M80–99

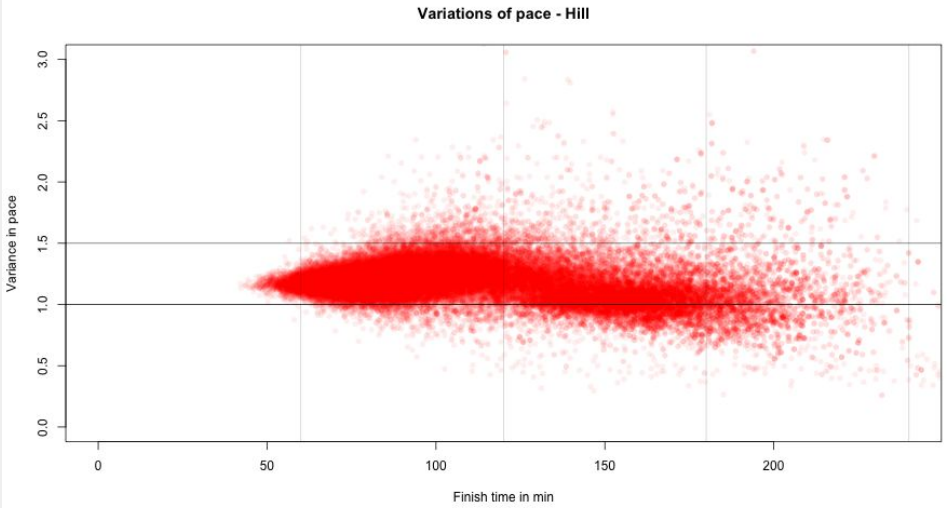

Gender – city2surf
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

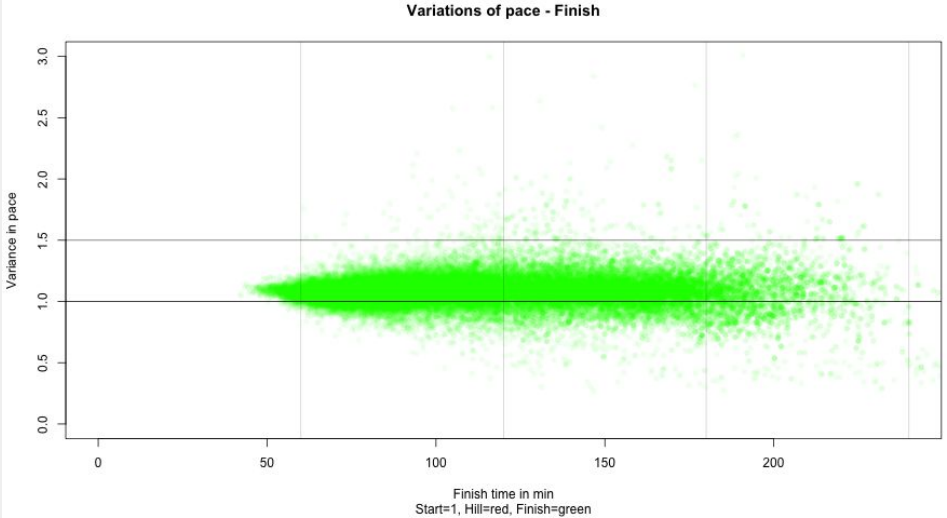

Number of Finishers by Gender in last 17 years
Runners
35000
30000
25000
20000
2000
2005
2010
2015
22519
24924
26582
24960
24612
25131
26093
26847
29316
31944
34364
34526
34378
34224
33102
31895
33094
33590
19842
23159
25573
23291
23007
24001
26136
26333
28469
30809
33573
34302
34696
35072
34460
33601
34557
34204
42361
48083
52155
48251
47709
49132
52229
53180
57785
62753
67937
68828
69074
69296
67562
65496
67651
67794

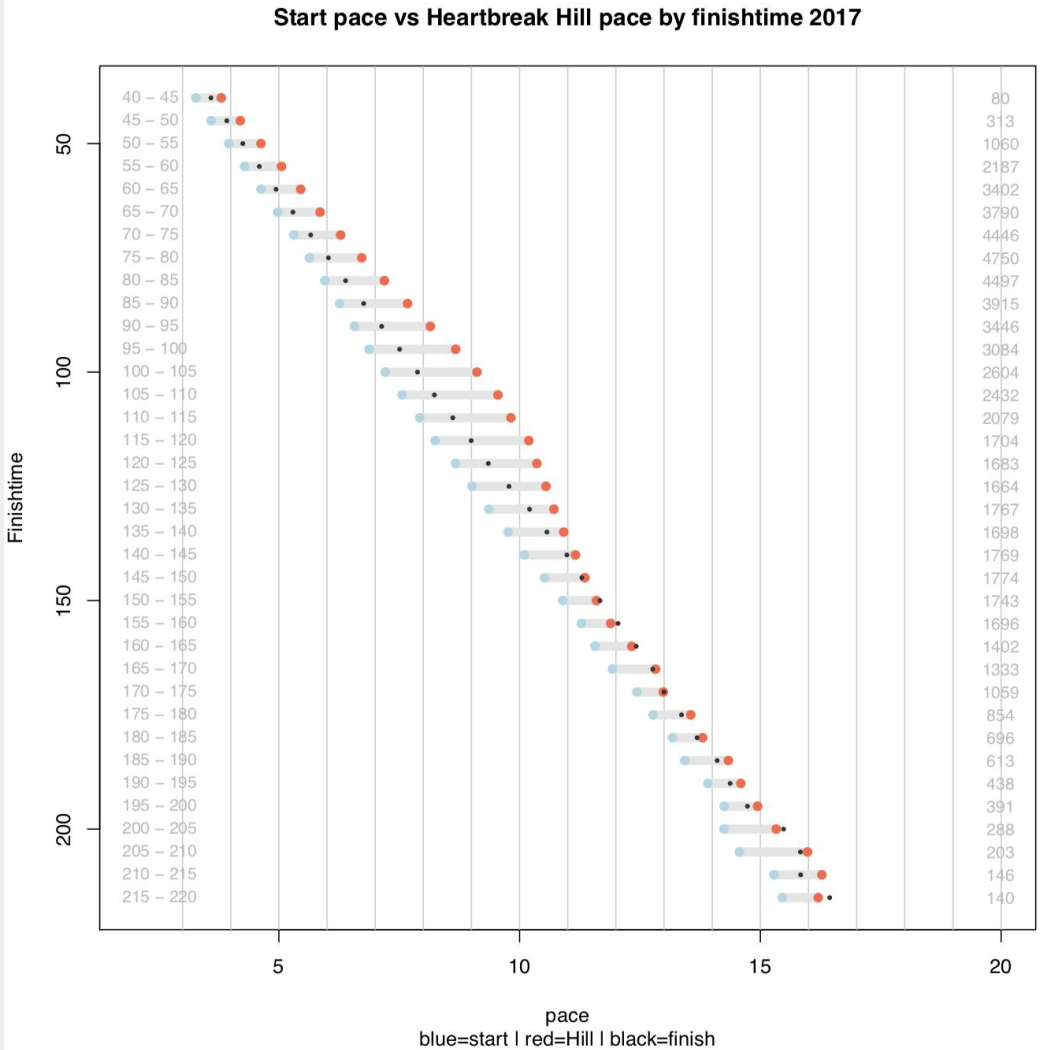

Pace by route segment – Red Group
Start (6.2km)
Num of runners
0
200
600
2.9 3.5 4 4.5 5 5.5 6 6.5 7.1 7.7 8.3 9 9.6 10.5 11.4 12 12.7 13.5 14.3 15 15.6
Pace in min
Heartbreak hill (1.6km)
0
200
600
3.3 3.9 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10.2 11 11.6 12.4 13 13.6 14.5 15.3 16.5
Finish (6.11km)
0
200
600
3.1 3.7 4.3 4.9 5.5 6 6.5 7 7.5 8 8.5 9 9.6 10.3 11 11.6 12.4 13 13.6 14.4 15 15.7

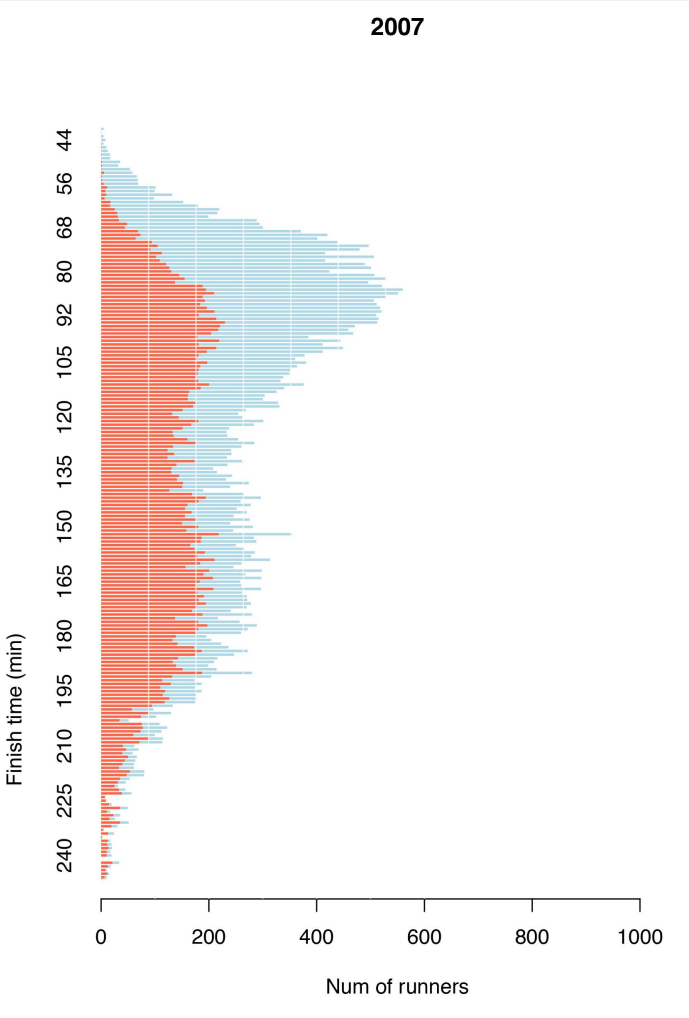

Pace by route segment – Blue Group
Start (6.2km)
Num of runners
0
200
600
3.4 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10.2 11 11.6 12.4 13 13.6 14.4 15 15.6
Pace in min
Heartbreak hill (1.6km)
0
200
600
4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10.2 11 11.6 12.4 13 13.6 14.4 15 15.6 16.4
Finish (6.11km)
0
200
600
3.8 4.4 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10.2 11 11.6 12.4 13 13.6 14.4 15 15.6 16.4

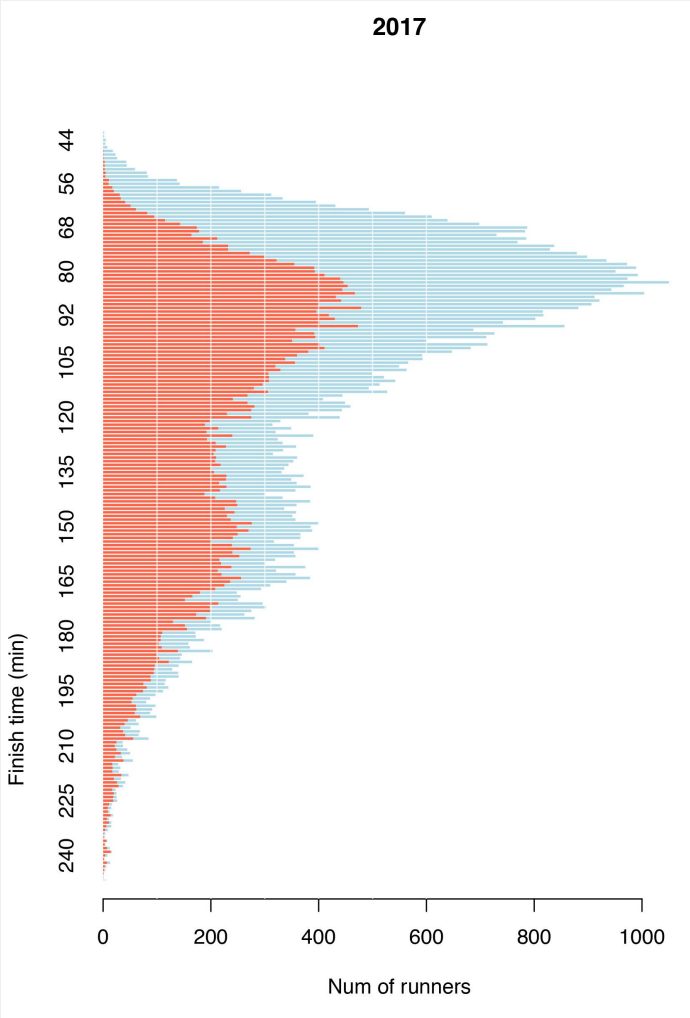

Pace per segment – Finishtime < 1h
pace in min
7
6
5
4
3
2
1.0
1.5
2.0
2.5
3.0
3 segments: start, hill, finish
1454 runners

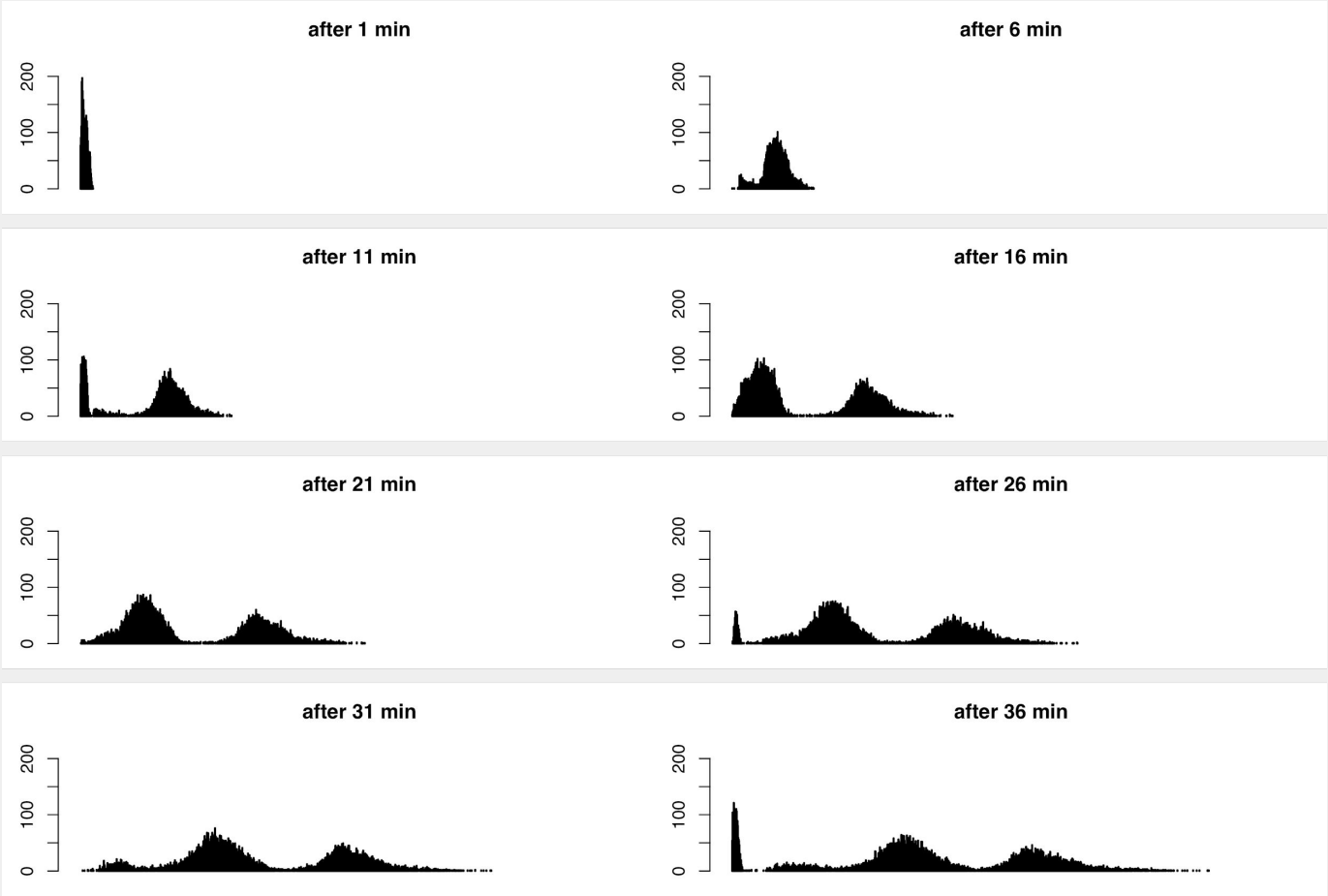

Variations of pace - Hill
Variance in pace
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
50
100
150
200
Finish time in min

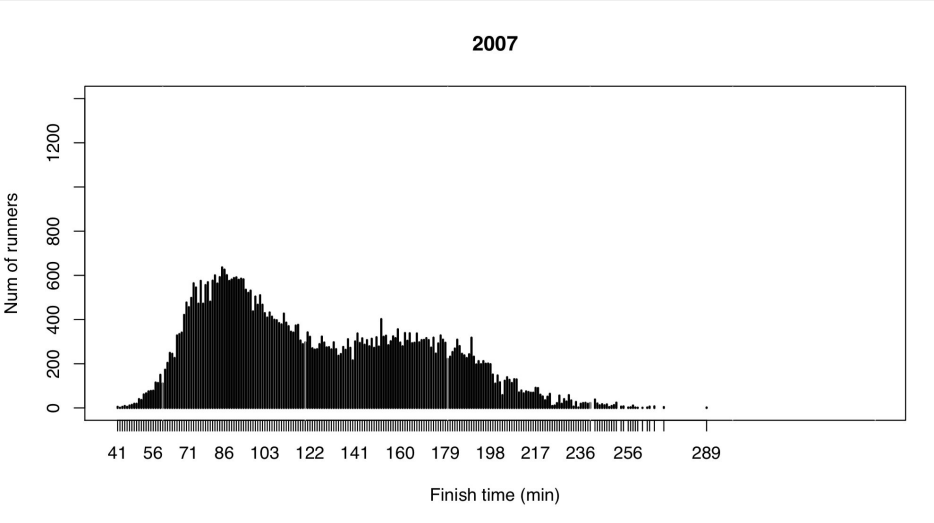

Variations of pace - Finish
Variance in pace
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
50
100
150
200
Finish time in min
Start=1, Hill=red, Finish=green

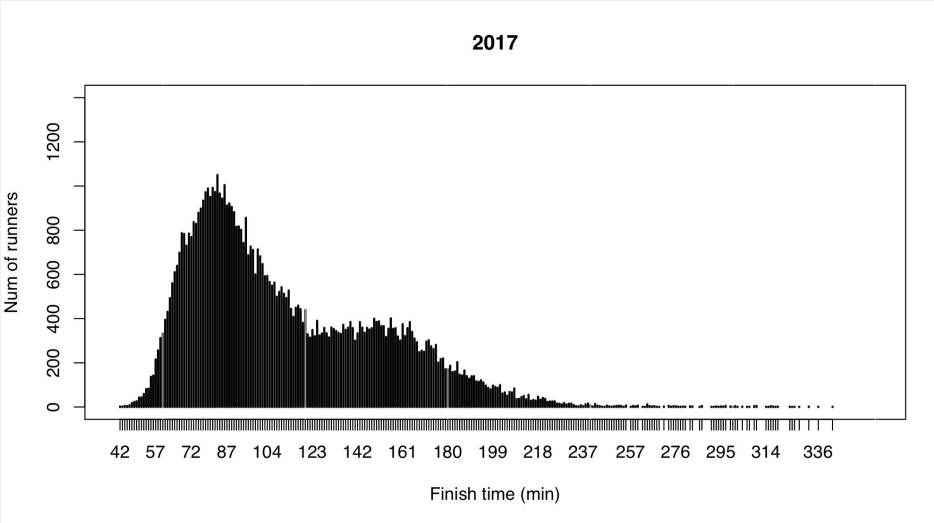

Start pace vs Heartbreak Hill pace by finishtime 2017
Finishtime
50
100
150
200
40 – 45
45 – 50
50 – 55
55 – 60
60 – 65
65 – 70
70 – 75
75 – 80
80 – 85
85 – 90
90 – 95
95 – 100
100 – 105
105 – 110
110 – 115
115 – 120
120 – 125
125 – 130
130 – 135
135 – 140
140 – 145
145 – 150
150 – 155
155 – 160
160 – 165
165 – 170
170 – 175
175 – 180
180 – 185
185 – 190
190 – 195
195 – 200
200 – 205
205 – 210
210 – 215
215 – 220
80
313
1060
2187
3402
3790
4446
4750
4497
3915
3446
3084
2604
2432
2079
1704
1683
1664
1767
1698
1769
1774
1743
1696
1402
1333
1059
854
696
613
438
391
288
203
146
140
5
10
15
20
pace
blue=start | red=Hill | black=finish


2007
Finish time (min)
44
56
68
80
92
105
120
135
150
165
180
195
210
225
240
0
200
400
600
800
1000
Num of runners


2017
Finish time (min)
44
56
68
80
92
105
120
135
150
165
180
195
210
225
240
0
200
400
600
800
1000
Num of runners


after 1 min
after 6 min
after 11 min
after 16 min
after 21 min
after 26 min
after 31 min
after 36 min
0
100
200


2007
Num of runners
0
200
400
600
800
1200
41 56 71 86 103 122 141 160 179 198 217 236 256 289
Finish time (min)


2017
Num of runners
0
200
400
600
800
1200
42 57 72 87 104 123 142 161 180 199 218 237 257 276 295 314 336
Finish time (min)

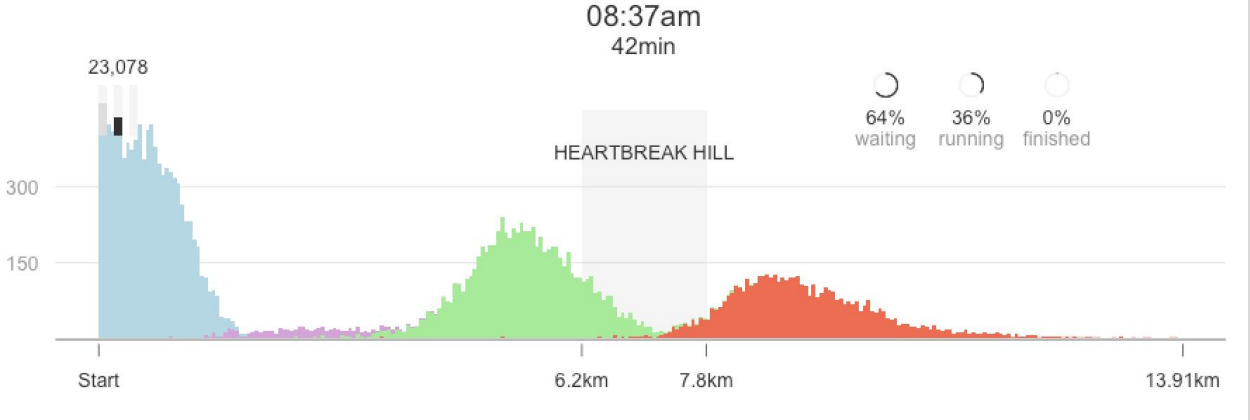
Visualising the city2surf 2017

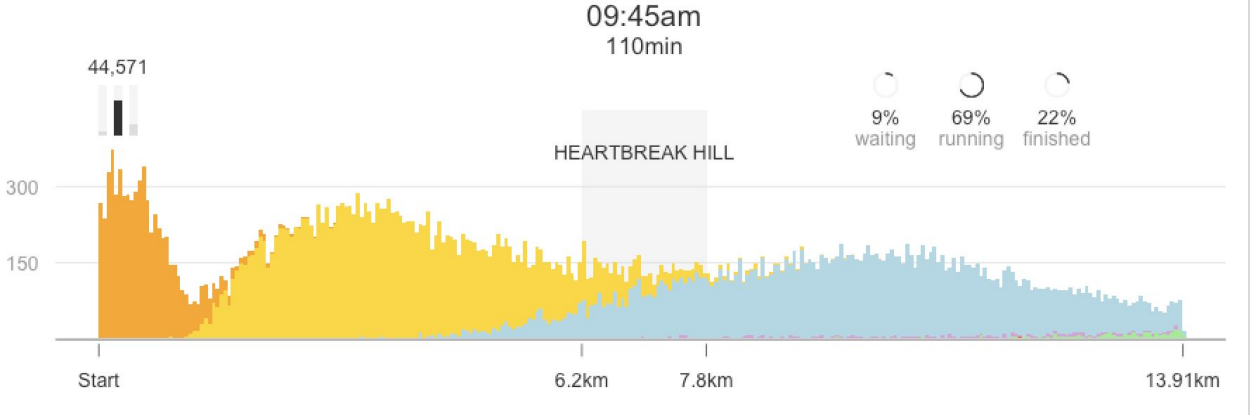
5. Prepare the final output

1. Animation

Gender vs groups

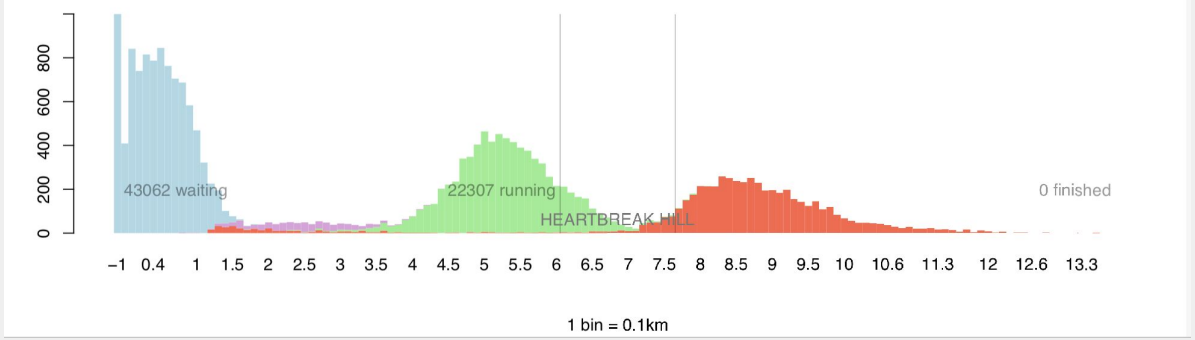
Microvis vs text

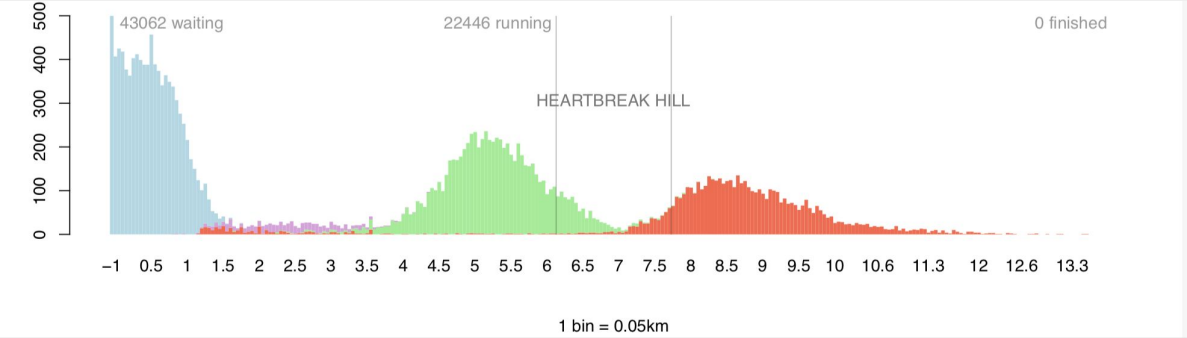


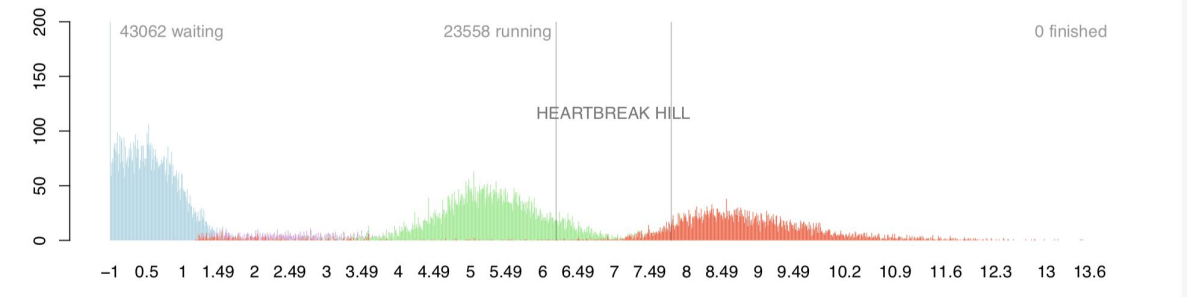


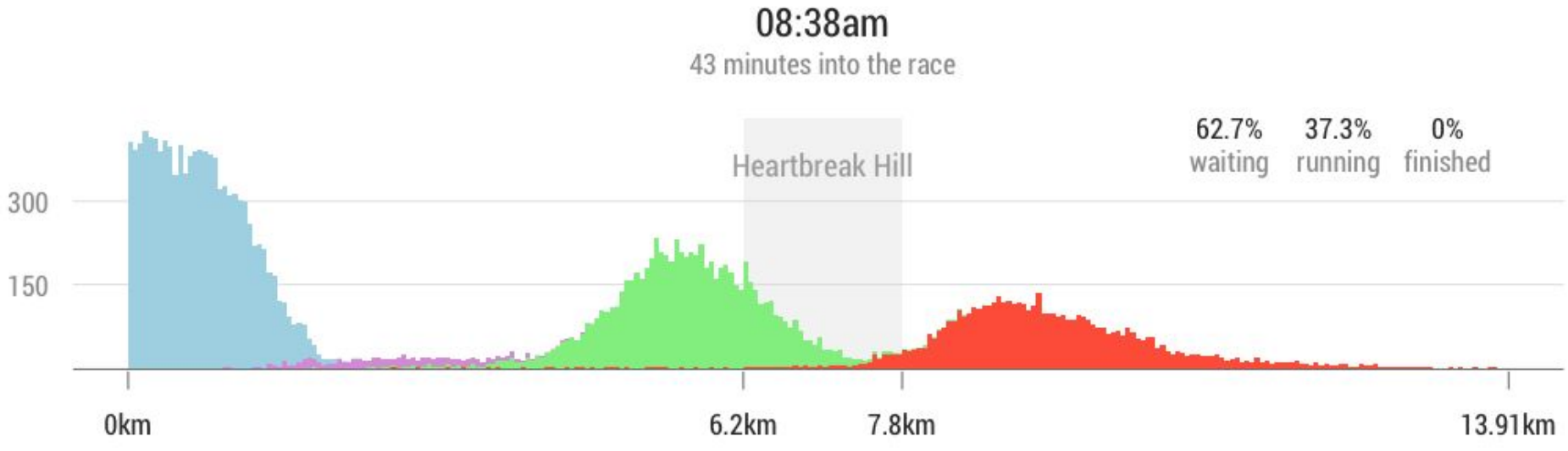
Binning

100m vs 50m vs 1m



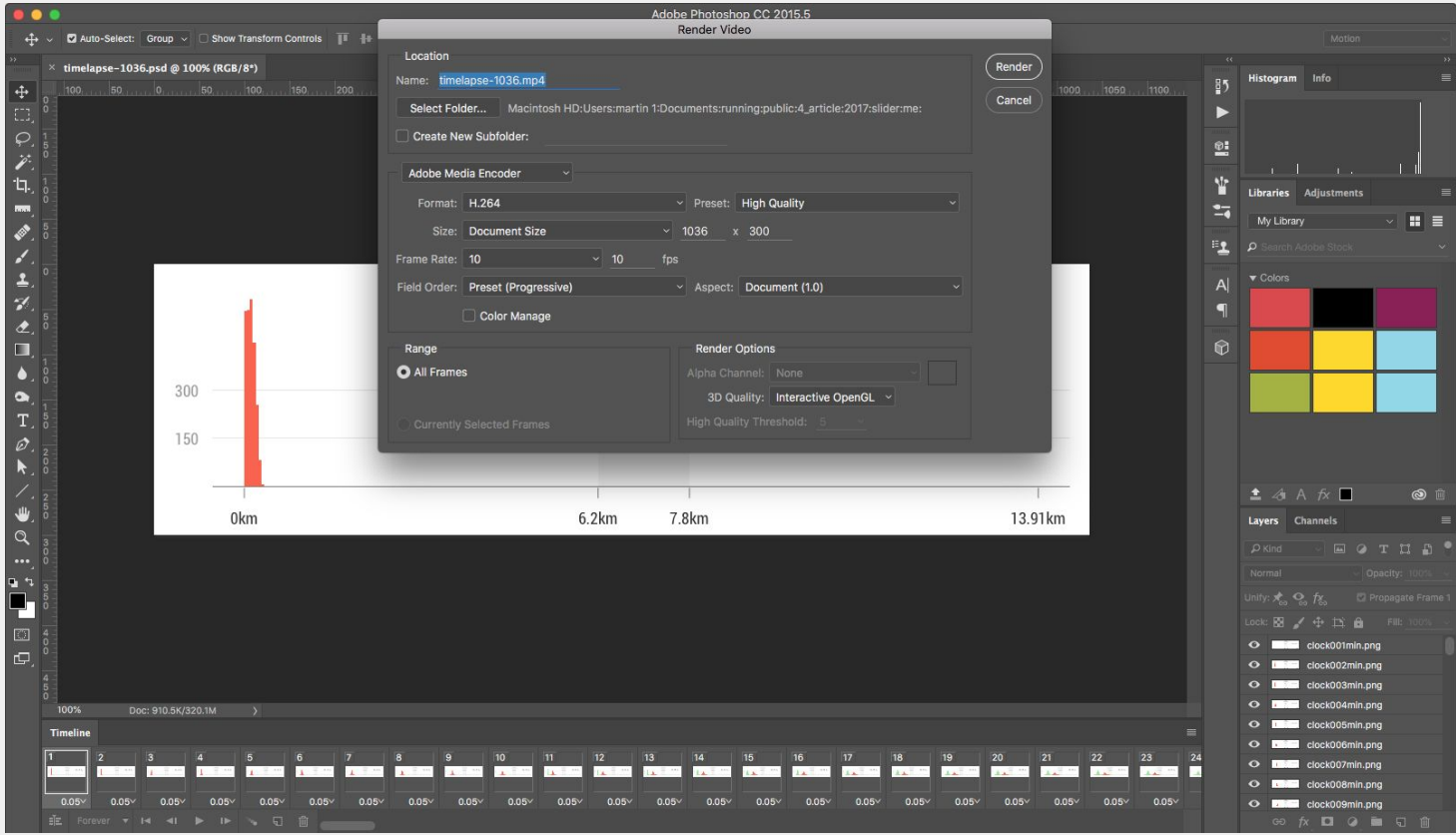




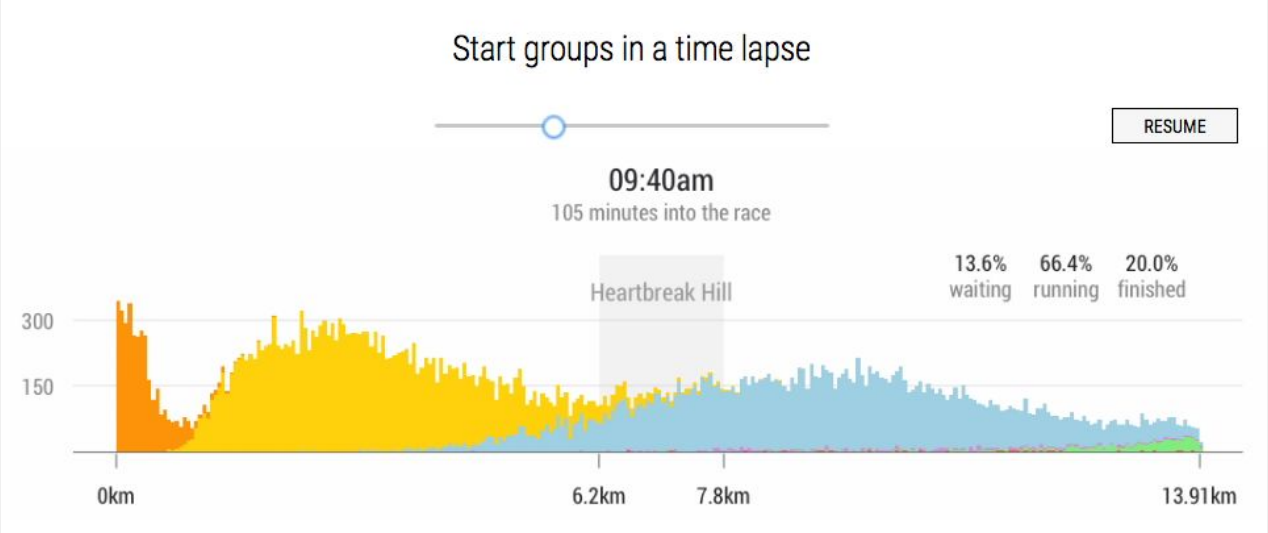

08:38am
43 minutes into the race
62.7%
waiting
37.3%
running
0%
finished
Heartbreak Hill
300
150
0km
6.2km
7.8km
13.91km

One PDF for every frame

Creating animation in Photoshop



Interactive time slider
to select a certain time



Visualising the city2surf 2017

5. Prepare the final output

2. History by gender

finishtimeHoriz-2000

2 Notifications

Insert Data Forward Backward Create Symbol Group Ungroup Make Grid 228% Zoom Edit Transform Rotate Flatten Union Subtract Intersect Difference Mask Scale Union Subtract Intersect Difference Forward

finishtimeHoriz-2000

PAGES

Page 1

Fill 619
Fill 618
Fill 617
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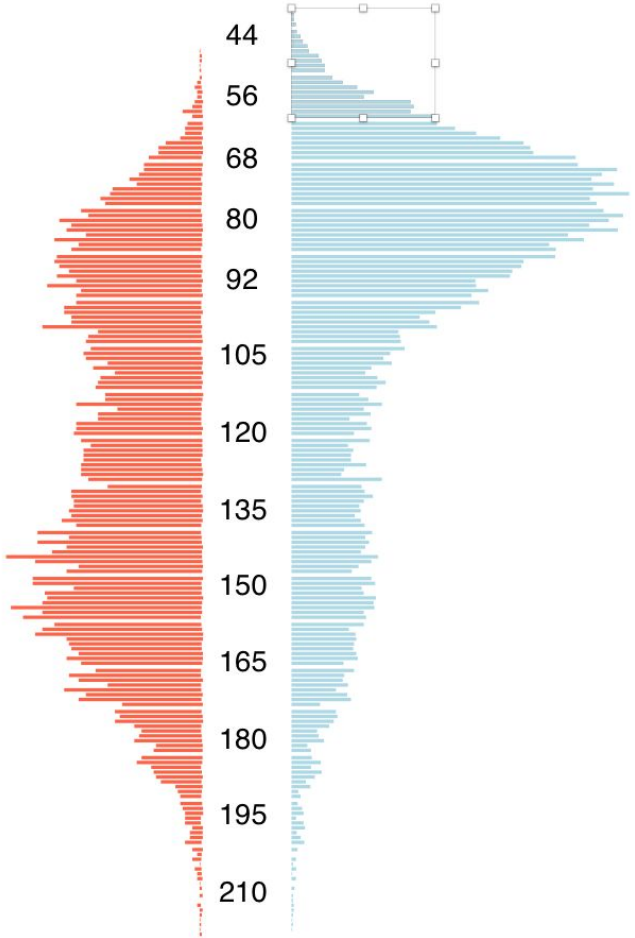
Fill 591
Fill 590
Fill 589

Filter



145 X Multi Y 0 °

Multi W 1.41 H

APPEARANCE

No Layer Style

Opacity (Normal) 100%

STYLE

Fills

Multiple 100%

Color Hex Opacity

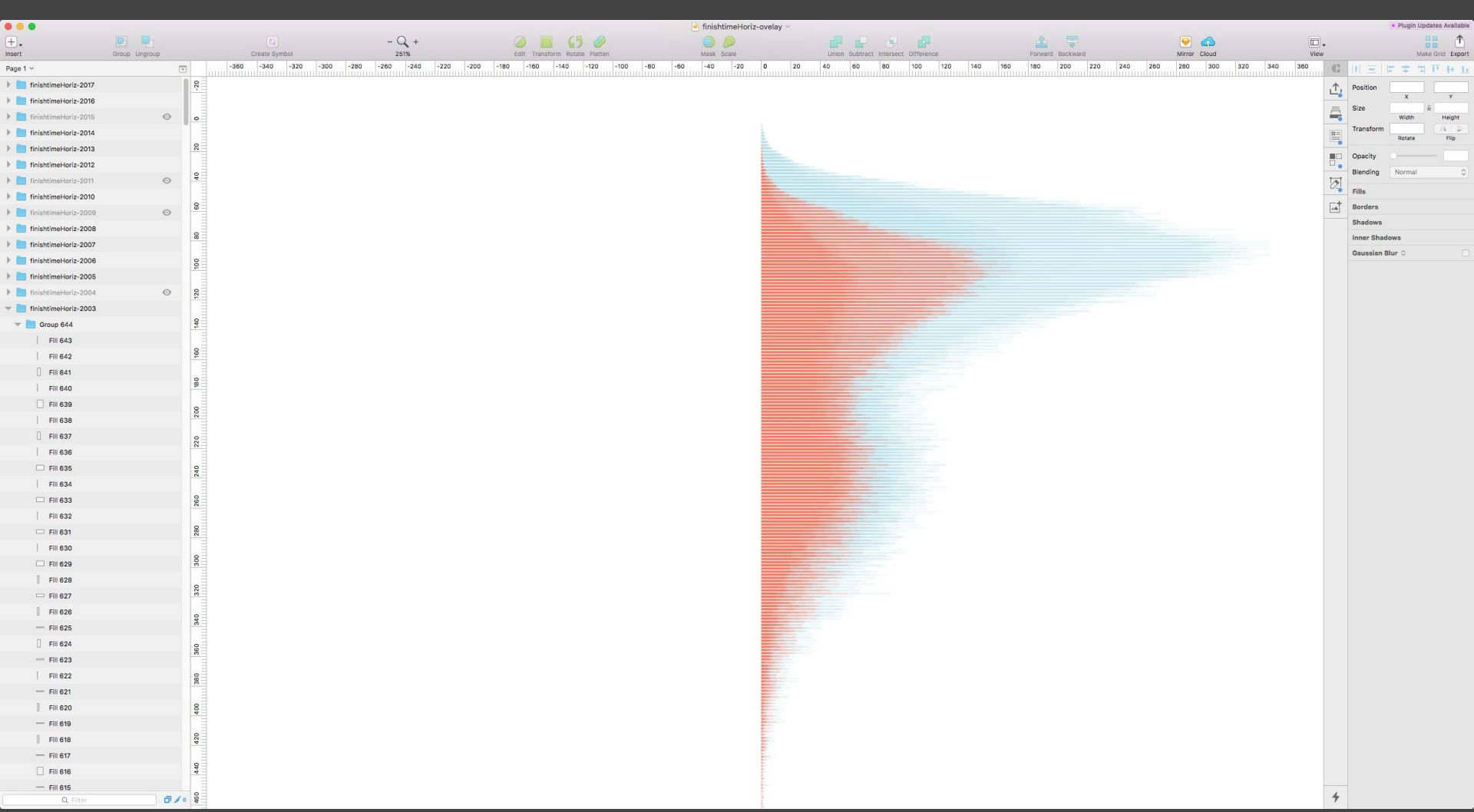
Borders

Shadows

Inner Shadows

Blurs

MAKE EXPORTABLE


finishtimeHoriz-ovelay
Plugin Updates Available
Insert
Group
Ungroup
Create Symbol
251%
Edit
Transform
Rotate
Flatten
Mask
Scale
Union
Subtract
Intersect
Difference
Forward
Backward
Mirror
Cloud
View
Make Grid
Export
Page 1
finishtimeHoriz-2017
finishtimeHoriz-2016
finishtimeHoriz-2015
finishtimeHoriz-2014
finishtimeHoriz-2013
finishtimeHoriz-2012
finishtimeHoriz-2011
finishtimeHoriz-2010
finishtimeHoriz-2009
finishtimeHoriz-2008
finishtimeHoriz-2007
finishtimeHoriz-2006
finishtimeHoriz-2005
finishtimeHoriz-2004
finishtimeHoriz-2003
Group 644
Fill 643
Fill 642
Fill 641
Fill 640
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Fill 620
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Fill 618
Fill 617
Fill 616
Fill 615
Filter
Position
X
Y
Size
Width
Height
Transform
Rotate
Flip
Opacity
Blending
Normal
Fills
Borders
Shadows
Inner Shadows
Gaussian Blur

finishtimeHoriz-ovelay — Edited

Plugin Updates Available

Insert | Group | Ungroup | Create Symbol | 251% | Edit | Transform | Rotate | Flatten | Mask | Scale | Union | Subtract | Intersect | Difference | Forward | Backward | Mirror | Cloud | View | Make Grid | Export

Page 1

Fill 582
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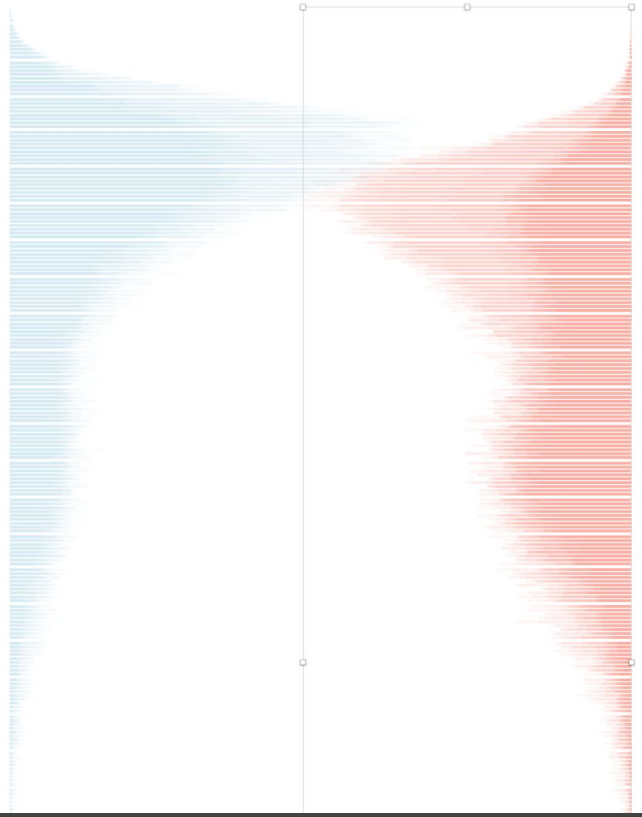
Fill 539
Fill 538

Filter



Position X Y
Size Width Height
Transform 0° Rotate Flip
Resizing Fix Width Fix Height
No Shared Style
Opacity 5%
Blending Normal
Fills
Fill Normal Blending 100% Opacity
Borders
Shadows
Inner Shadows
Gaussian Blur

Make Exportable

RStudio

history.R* | d

```r

# Butterfly Chart of - All years in 1 graph
plot(NA,NA,xlim=c(-800,800), ylim=c(60*4.5,40))
bar.height = 1
bar.xoffset = 0

for(y in 2000:2017){

  # Import running results for each year
  path = paste('_input/city2surf-', y,'.csv', sep='') # city2surf-2000.csv
  d = read.csv(path, stringsAsFactors = F)
  mytable = table(d[,'gender'], floor(d$timesec/60))

  lines.xmale = c()
  lines.ymale = c()
  lines.xfemale = c()
  lines.yfemale = c()

  for(j in 1:dim(mytable)[2]){
    min = as.double(colnames(mytable)[j])
    value.male = mytable['M',j]
    value.female = mytable['F',j]
    rect(bar.xoffset, min, value.male+bar.xoffset, min+1, col='#00000011', border=NA)
    rect(-value.female-bar.xoffset, min, -bar.xoffset, min+1, col='#00000011', border=NA)

    lines.ymale = c(lines.ymale, min)
    lines.xmale = c(lines.xmale, value.male+bar.xoffset)

    lines.yfemale = c(lines.yfemale, min)
    lines.xfemale = c(lines.xfemale, -value.female-bar.xoffset)
  }

  #lines(lines.xmale, lines.ymale, col='#00000033', type='l')
  #lines(lines.xfemale, lines.yfemale, col='#00000033', type='l')
}
```

132:5 (Top Level) R Script

Console | Terminal

~/Documents/running/public/3_vis/city2surf/

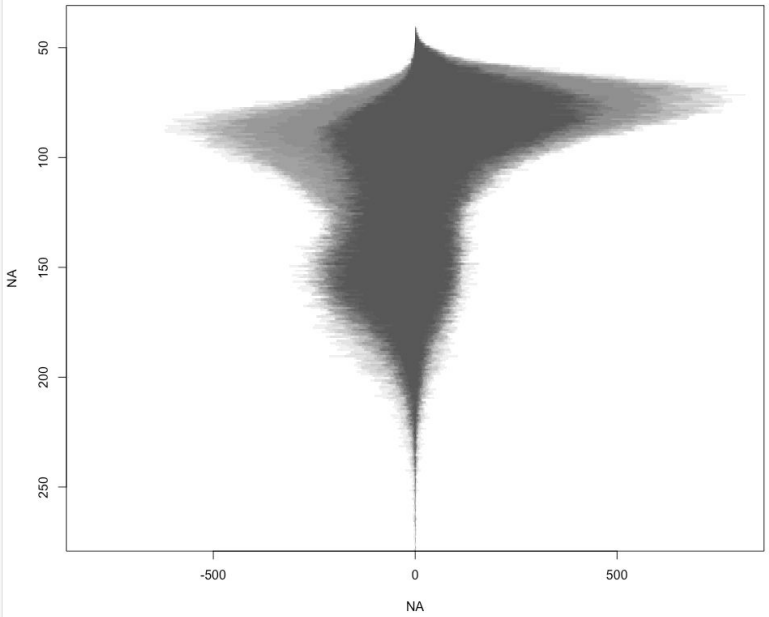
```
> for(y in 2000:2017){
+
+   # Import running results for each year
+   path = paste('_input/city2surf-', y,'.csv', sep='') # city2surf-2000.csv
+   d = read.csv(path, stringsAsFactors = F)
+   mytable = table(d[,'gender'], floor(d$timesec/60))
+
+   lines.xmale = c()
+   lines.ymale = c()
+   lines.xfemale = c()
+   lines.yfemale = c()
+
+   for(j in 1:dim(mytable)[2]){
+     min = as.double(colnames(mytable)[j])
+     value.male = mytable['M',j]
+     value.female = mytable['F',j]
+     rect(bar.xoffset, min, value.male+bar.xoffset, min+1, col='#00000011', border=NA)
+     rect(-value.female-bar.xoffset, min, -bar.xoffset, min+1, col='#00000011', border=NA)
+
+     lines.ymale = c(lines.ymale, min)
+     lines.xmale = c(lines.xmale, value.male+bar.xoffset)
+
+     lines.yfemale = c(lines.yfemale, min)
+     lines.xfemale = c(lines.xfemale, -value.female-bar.xoffset)
+   }
+
+   #lines(lines.xmale, lines.ymale, col='#00000033', type='l')
+   #lines(lines.xfemale, lines.yfemale, col='#00000033', type='l')
+ }
>
```

Environment | History | Connections

Global Environment

bar.xoffset	0
i	360L
j	268L
lines.xfemale	num [1:268] 0 0 0 0 0 -1 -1 -1 -3 -3 ...
lines.xmale	num [1:268] 2 2 5 4 8 17 22 25 40 41 ...
lines.yfemale	num [1:268] 42 43 44 45 46 47 48 49 50 51 ...
lines.ymale	num [1:268] 42 43 44 45 46 47 48 49 50 51 ...
maxtime	360
min	342
mintime	40
mytable	'table' int [1:2, 1:268] 0 2 0 2 0 5 0 4 0 8 ...
mytable.rev	'table' int [1:2, 1:321] 0 0 0 0 0 0 0 0 0 0 ...
path	"_input/city2surf-2017.csv"
value.female	0L
value.male	1L

Files | Plots | Packages | Help | Viewer



RStudio

history.R* | d

```r
plot(NA,NA,xlim=c(-800,800), ylim=c(60*4.5,40))
bar.height = 1
bar.xoffset = 1

for(y in 2000:2017){

  # Import running results for each year
  path = paste('_input/city2surf-', y,'.csv', sep='') # city2surf-2000.csv
  d = read.csv(path, stringsAsFactors = F)
  mytable = table(d[,'gender'], floor(d$timesec/60))

  lines.xmale = c()
  lines.ymale = c()
  lines.xfemale = c()
  lines.yfemale = c()

  for(j in 1:dim(mytable)[2]){
    min = as.double(colnames(mytable)[j])
    value.male = mytable['M',j]
    value.female = mytable['F',j]
    #rect(bar.xoffset, min, value.male+bar.xoffset, min+1, col='#00000011', border=NA)
    #rect(-value.female-bar.xoffset, min, -bar.xoffset, min+1, col='#00000011', border=NA)

    lines.ymale = c(lines.ymale, min)
    lines.xmale = c(lines.xmale, value.male+bar.xoffset)

    lines.yfemale = c(lines.yfemale, min)
    lines.xfemale = c(lines.xfemale, -value.female-bar.xoffset)
  }

  points(bezierCurve(lines.xmale, lines.ymale,100), col='#00000022', type='l', lwd=4)
  points(bezierCurve(lines.xfemale, lines.yfemale,100), col='#00000022', type='l', lwd=4)
  #lines(lines.xmale, lines.ymale, col='#00000033', type='l')
  #lines(lines.xfemale, lines.yfemale, col='#00000033', type='l')
}

bezierCurve <- function(x, y, n=10)
```

110:1 (Top Level) R Script

Console | Terminal

~/Documents/running/public/3_vis/city2surf/

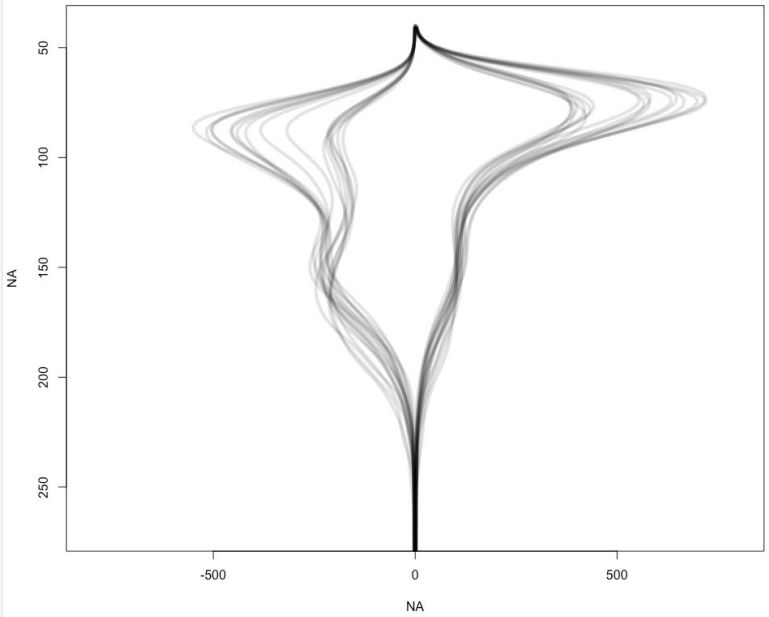
```
+   # Import running results for each year
+   path = paste('_input/city2surf-', y,'.csv', sep='') # city2surf-2000.csv
+   d = read.csv(path, stringsAsFactors = F)
+   mytable = table(d[,'gender'], floor(d$timesec/60))
+
+   lines.xmale = c()
+   lines.ymale = c()
+   lines.xfemale = c()
+   lines.yfemale = c()
+
+   for(j in 1:dim(mytable)[2]){
+     min = as.double(colnames(mytable)[j])
+     value.male = mytable['M',j]
+     value.female = mytable['F',j]
+     #rect(bar.xoffset, min, value.male+bar.xoffset, min+1, col='#00000011', border=NA)
+     #rect(-value.female-bar.xoffset, min, -bar.xoffset, min+1, col='#00000011', border=NA)
+
+     lines.ymale = c(lines.ymale, min)
+     lines.xmale = c(lines.xmale, value.male+bar.xoffset)
+
+     lines.yfemale = c(lines.yfemale, min)
+     lines.xfemale = c(lines.xfemale, -value.female-bar.xoffset)
+   }
+
+   points(bezierCurve(lines.xmale, lines.ymale,100), col='#00000022', type='l', lwd=4)
+   points(bezierCurve(lines.xfemale, lines.yfemale,100), col='#00000022', type='l', lwd=4)
+   #lines(lines.xmale, lines.ymale, col='#00000033', type='l')
+   #lines(lines.xfemale, lines.yfemale, col='#00000033', type='l')
+ }
>
```

Environment | History | Connections

Global Environment

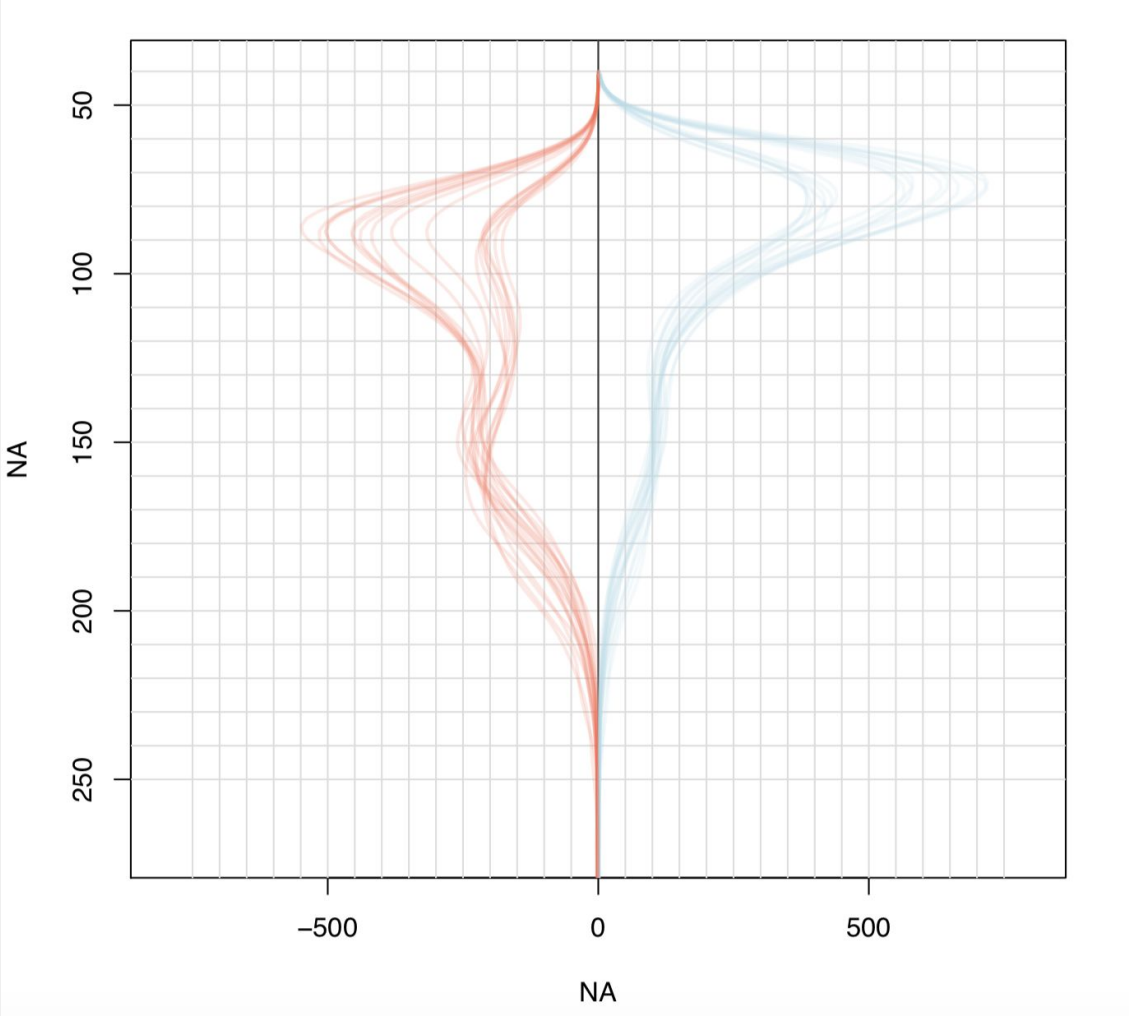
bar.xoffset	1
i	360L
j	268L
lines.xfemale	num [1:268] -1 -1 -1 -1 -1 -2 -2 -2 -4 -4 ...
lines.xmale	num [1:268] 3 3 6 5 9 18 23 26 41 42 ...
lines.yfemale	num [1:268] 42 43 44 45 46 47 48 49 50 51 ...
lines.ymale	num [1:268] 42 43 44 45 46 47 48 49 50 51 ...
maxtime	360
min	342
mintime	40
mytable	'table' int [1:2, 1:268] 0 2 0 2 0 5 0 4 0 8 ...
mytable.rev	'table' int [1:2, 1:321] 0 0 0 0 0 0 0 0 0 0 ...
path	"_input/city2surf-2017.csv"
value.female	0L
value.male	1L

Files | Plots | Packages | Help | Viewer



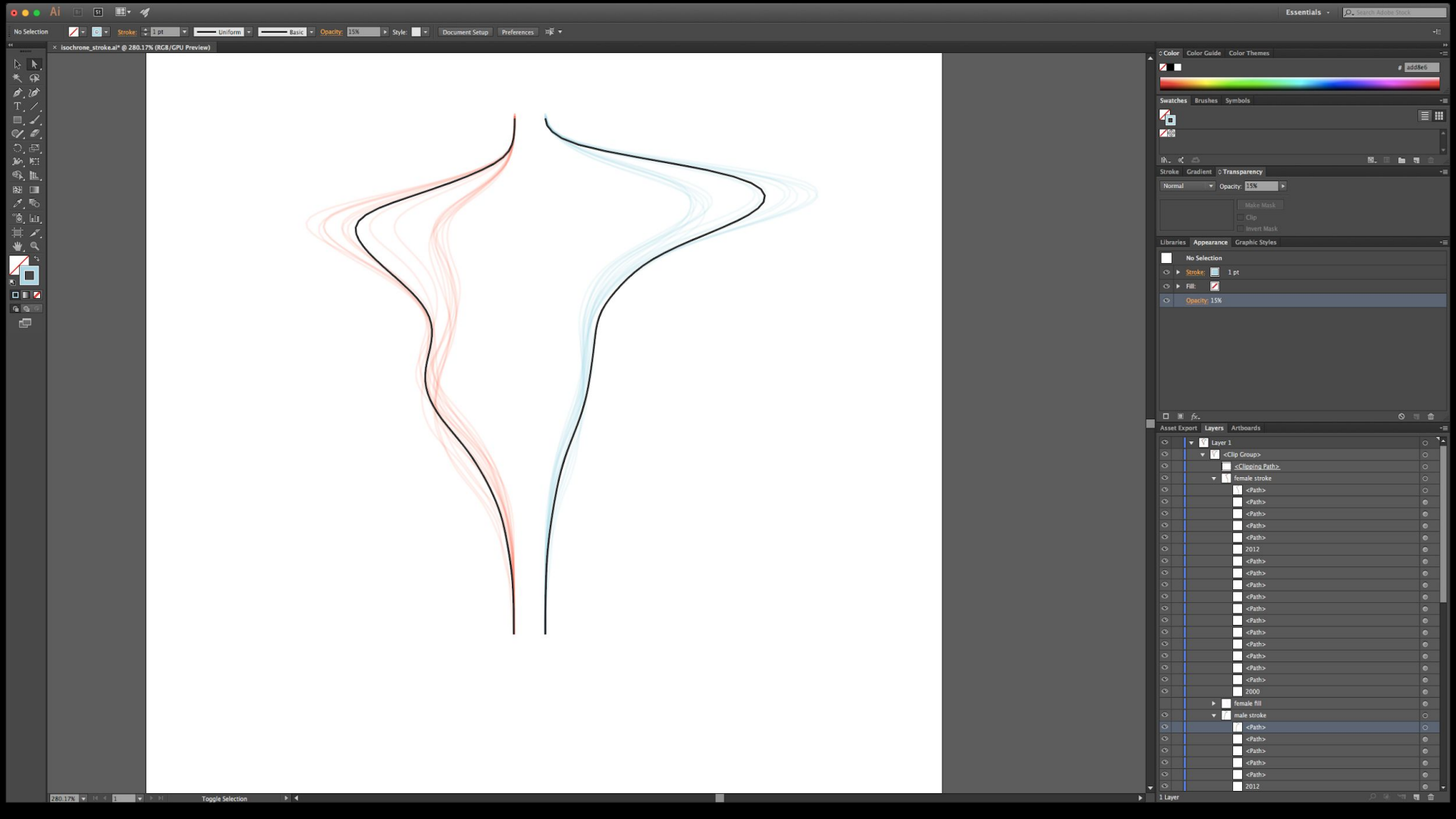
Exporting key visuals and grids

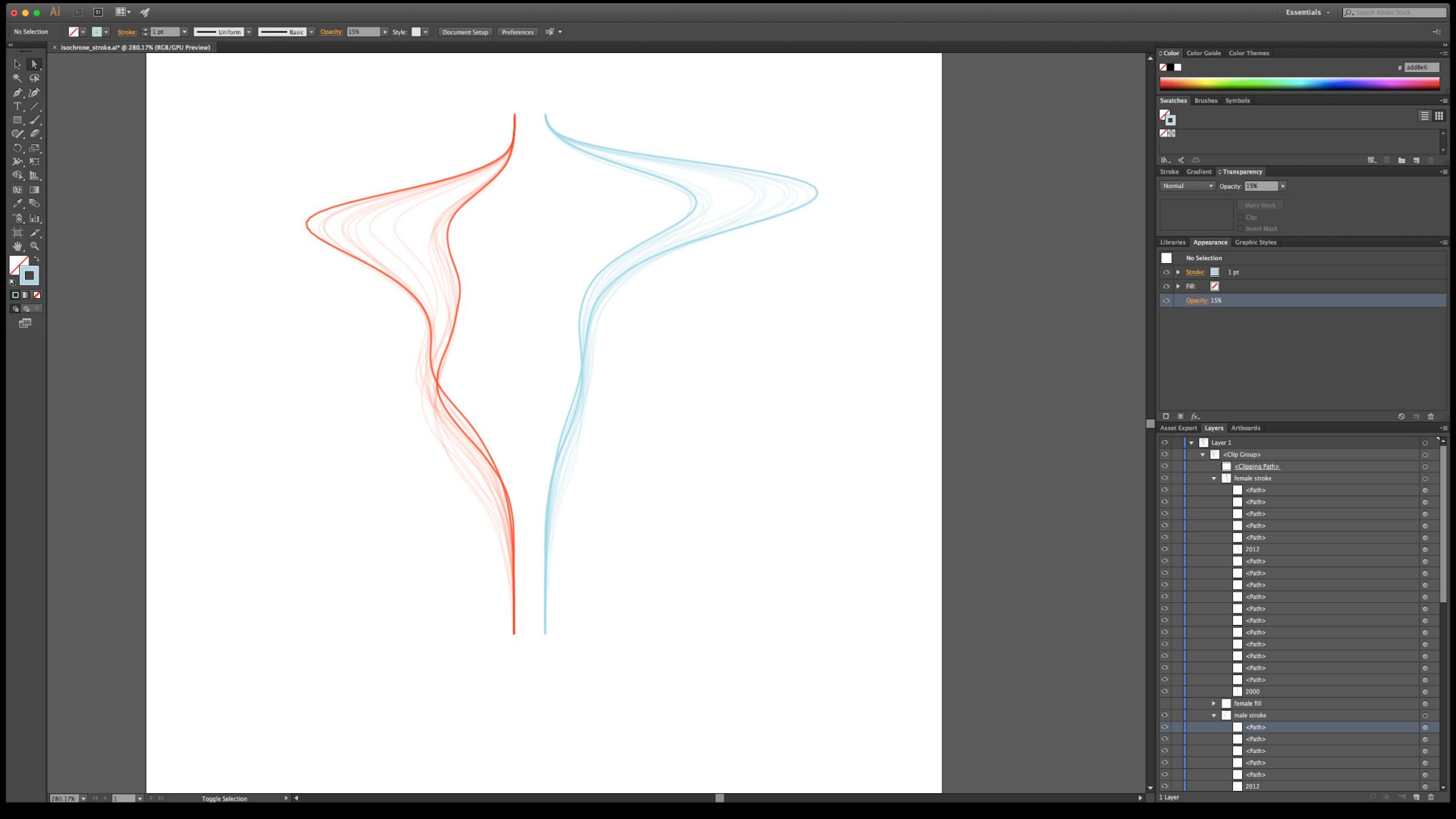
isochrone_2017.pdf

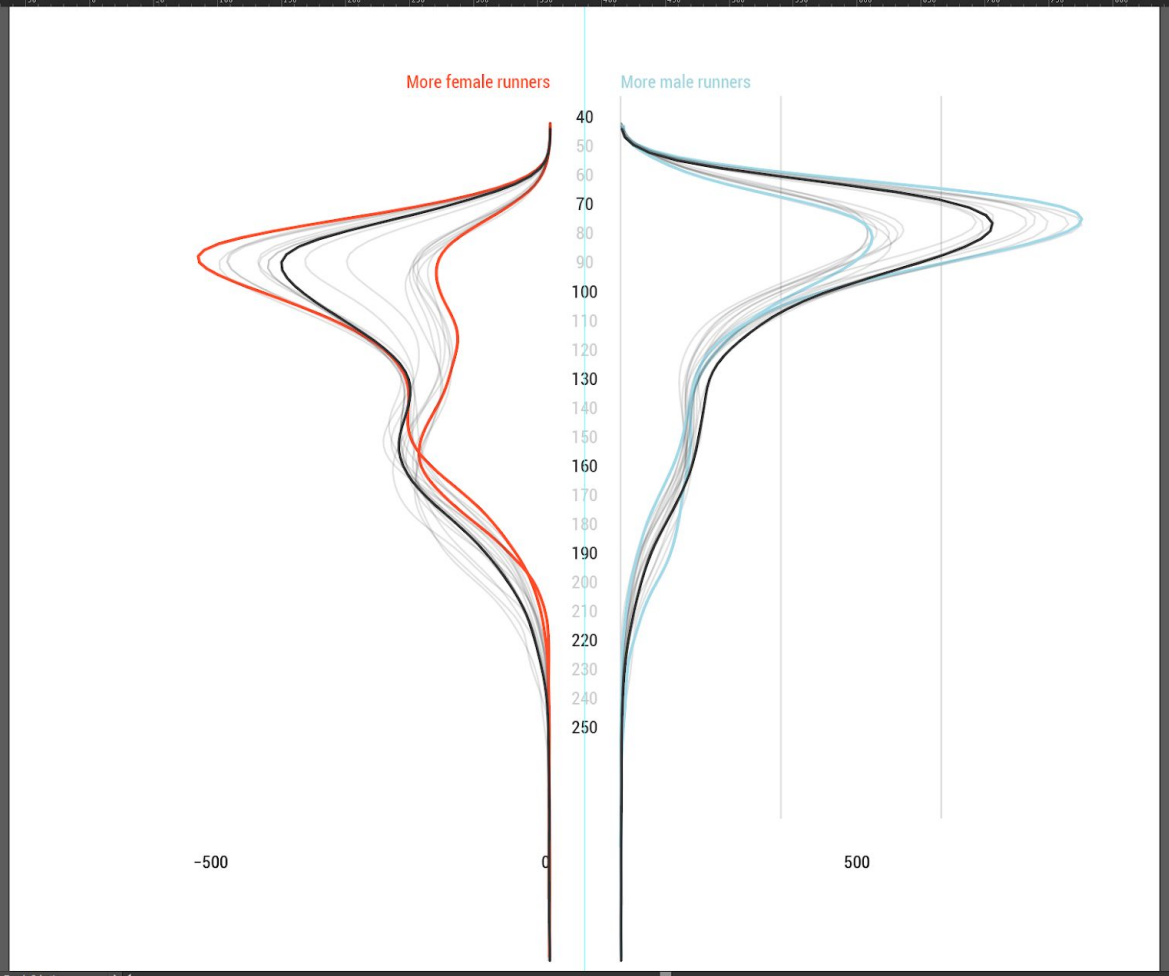


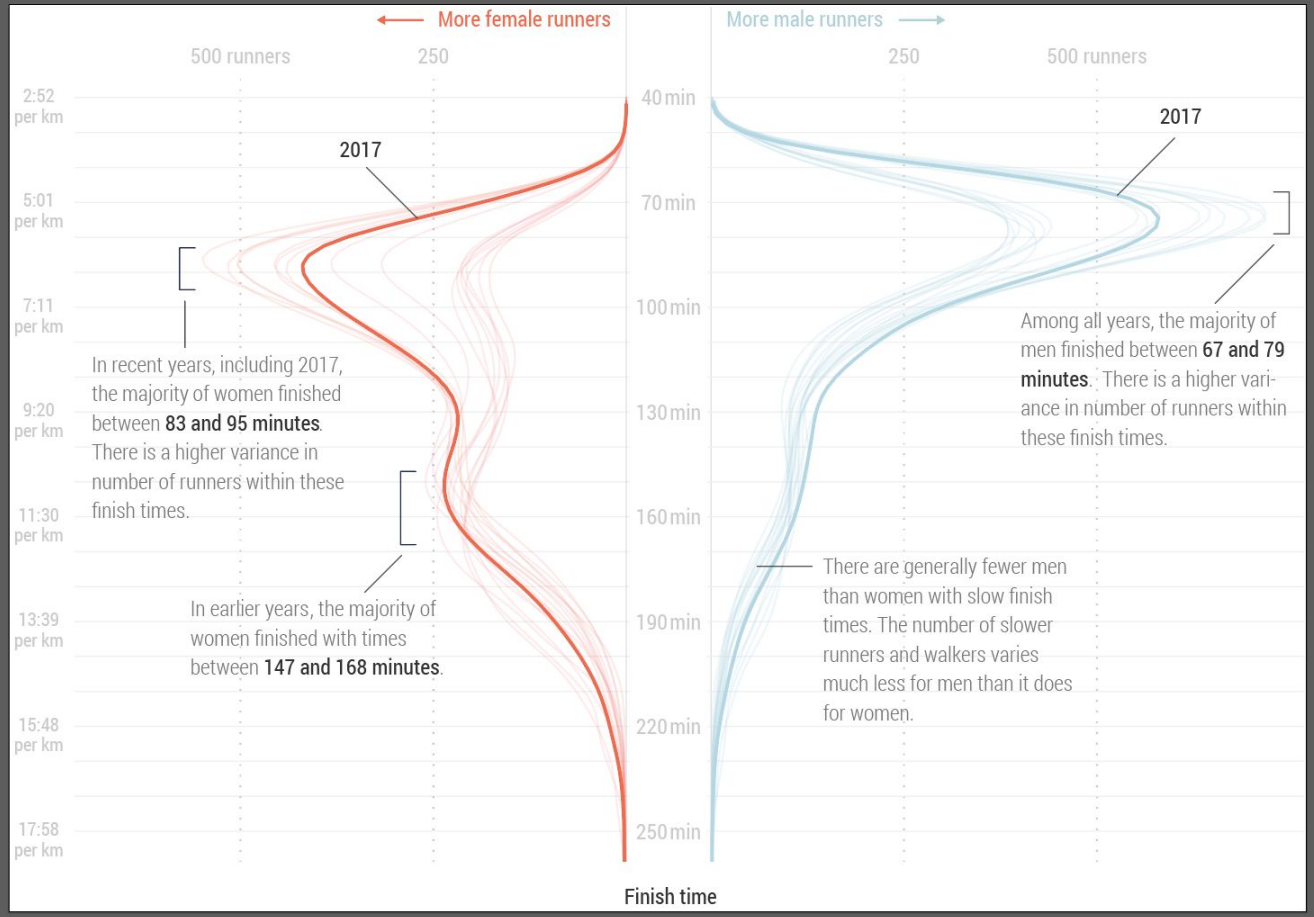
Visualising the city2surf 2017

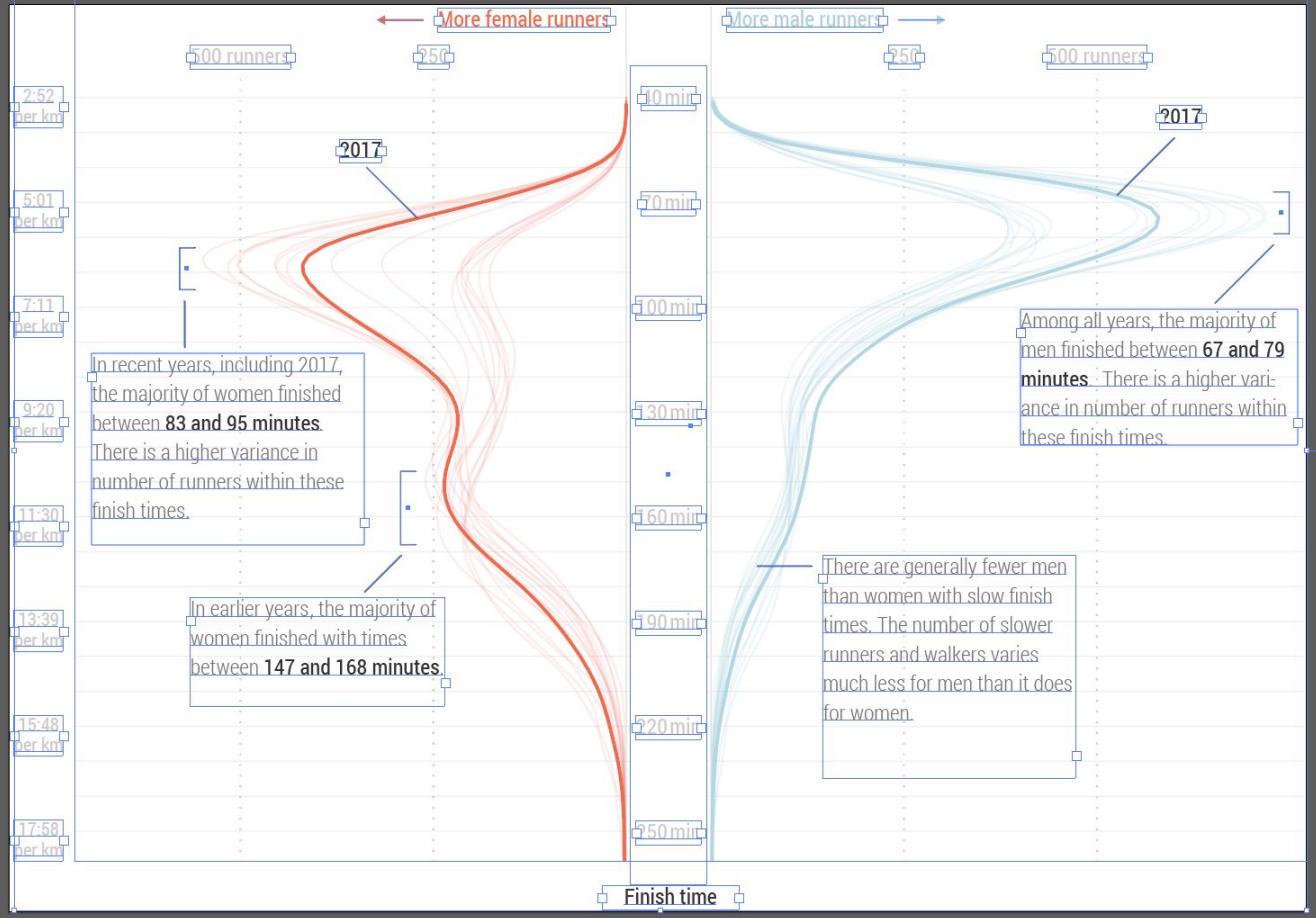
6. Polishing in Illustrator


Ai
Essentials
No Selection
Stroke: 1 pt
Uniform
Basic
Opacity: 15%
Style:
Document Setup
Preferences
isochrone_stroke.ai* @ 280.17% (RGB/GPU Preview)
Color
Color Guide
Color Themes
add8e6
Swatches
Brushes
Symbols
Stroke
Gradient
Transparency
Normal
Opacity: 15%
Make Mask
Clip
Invert Mask
Libraries
Appearance
Graphic Styles
No Selection
Stroke: 1 pt
Fill:
Opacity: 15%
Asset Export
Layers
Artboards
Layer 1
<Clip Group>
<Clipping Path>
female stroke
<Path>
2012
2000
female fill
male stroke
1 Layer
280.17%
Toggle Selection


Ai
Essentials
No Selection
Stroke: 1 pt
Uniform
Basic
Opacity: 15%
Style:
Document Setup
Preferences
isochrone_stroke.ai* @ 280.17% (RGB/GPU Preview)
Color
Color Guide
Color Themes
add8e6
Swatches
Brushes
Symbols
Stroke
Gradient
Transparency
Normal
Opacity: 15%
Make Mask
Clip
Invert Mask
Libraries
Appearance
Graphic Styles
No Selection
Stroke: 1 pt
Fill:
Opacity: 15%
Asset Export
Layers
Artboards
Layer 1
<Clip Group>
<Clipping Path>
female stroke
<Path>
2012
2000
female fill
male stroke
1 Layer
280.17%
Toggle Selection


More female runners
More male runners
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
210
220
230
240
250
-500
0
500


More female runners
More male runners
500 runners
250
250
500 runners
2:52 per km
5:01 per km
7:11 per km
9:20 per km
11:30 per km
13:39 per km
15:48 per km
17:58 per km
40 min
70 min
100 min
130 min
160 min
190 min
220 min
250 min
2017
2017
In recent years, including 2017, the majority of women finished between 83 and 95 minutes. There is a higher variance in number of runners within these finish times.
In earlier years, the majority of women finished with times between 147 and 168 minutes.
Among all years, the majority of men finished between 67 and 79 minutes. There is a higher variance in number of runners within these finish times.
There are generally fewer men than women with slow finish times. The number of slower runners and walkers varies much less for men than it does for women.
Finish time


More female runners
More male runners
500 runners
250
250
500 runners
2:52 per km
5:01 per km
7:11 per km
9:20 per km
11:30 per km
13:39 per km
15:48 per km
17:58 per km
40 min
70 min
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190 min
220 min
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2017
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Finish time

Visualising the city2surf 2017

7. Creating a responsive graphic

ai2html

> ai2html is an open-source script for Adobe Illustrator that converts your Illustrator documents into html and css.

Here are examples of how we've used the script at The New York Times and examples of how others have used it. Share your ai2html projects on Twitter, Delicious, etc. using #ai2html.

Table of contents

How to install ai2html

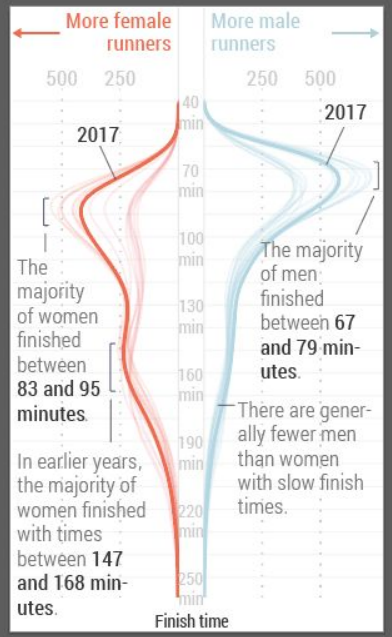
Download the latest version of the script here by clicking the link and saving the file to your computer.

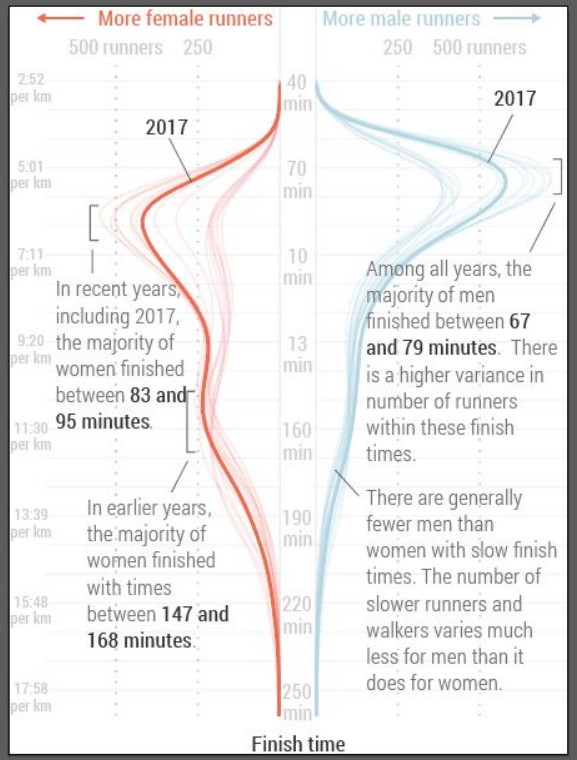
ai2html

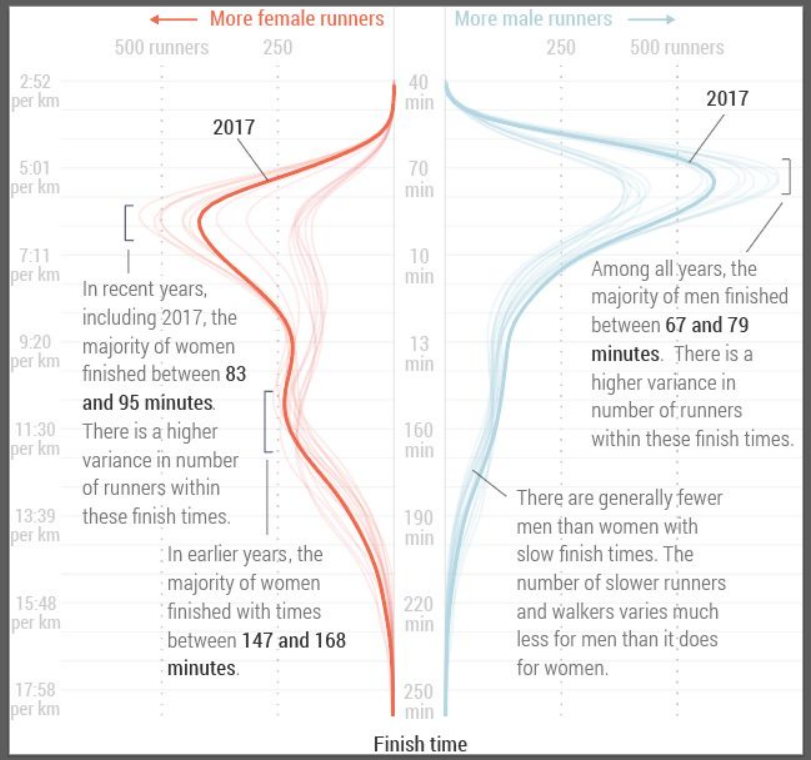
ai2html turns your Illustrator files into HTML.

http://ai2html.org/

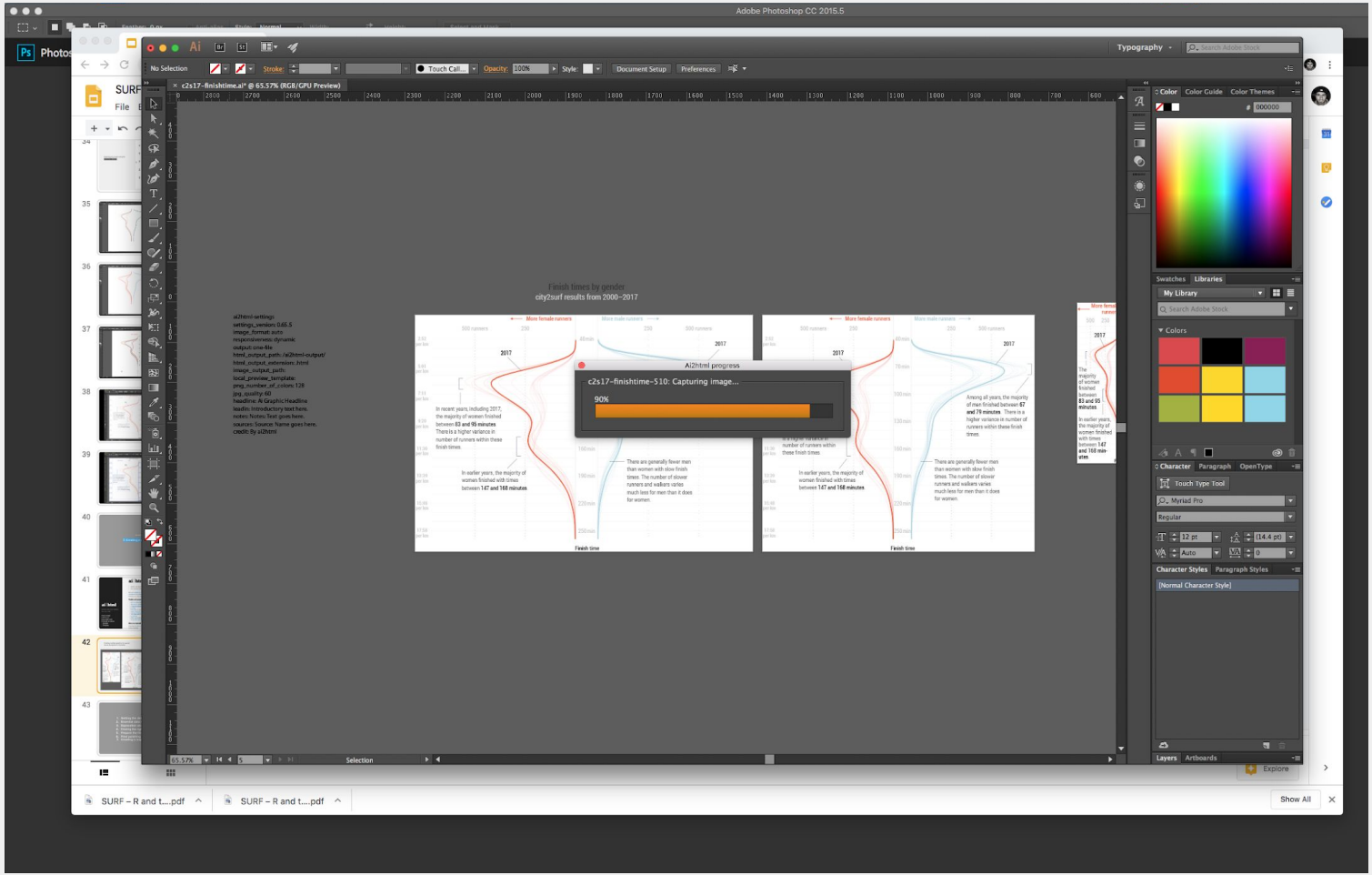
Creating multiple graphics for several device breakpoints in Illustrator



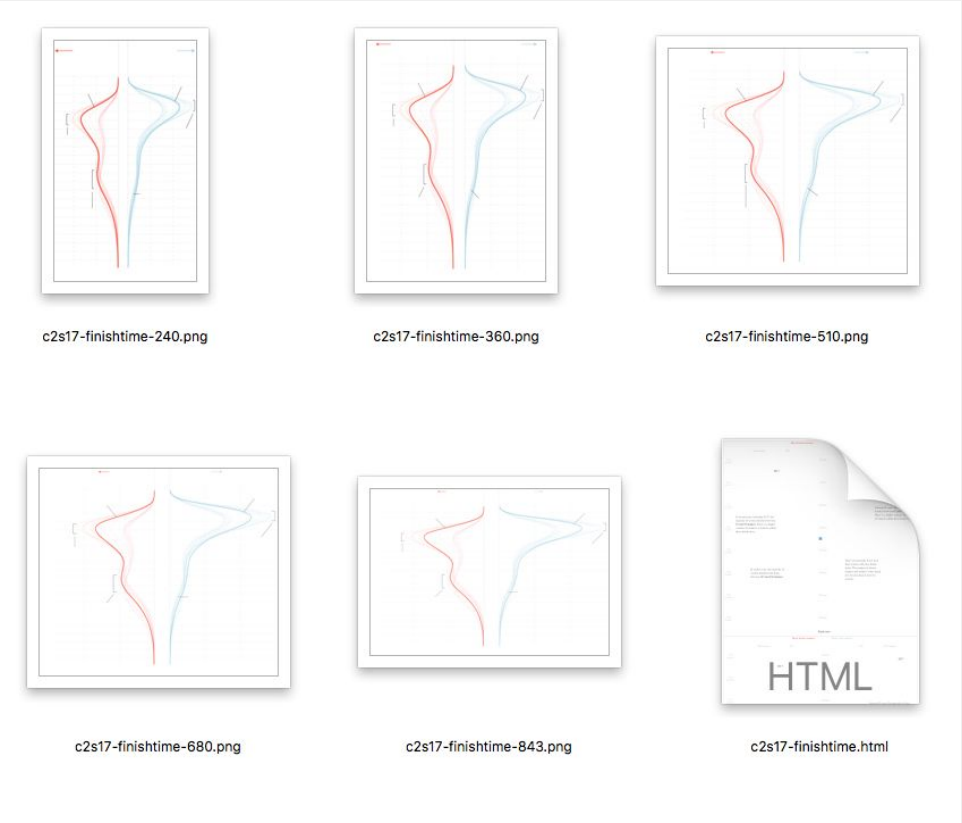


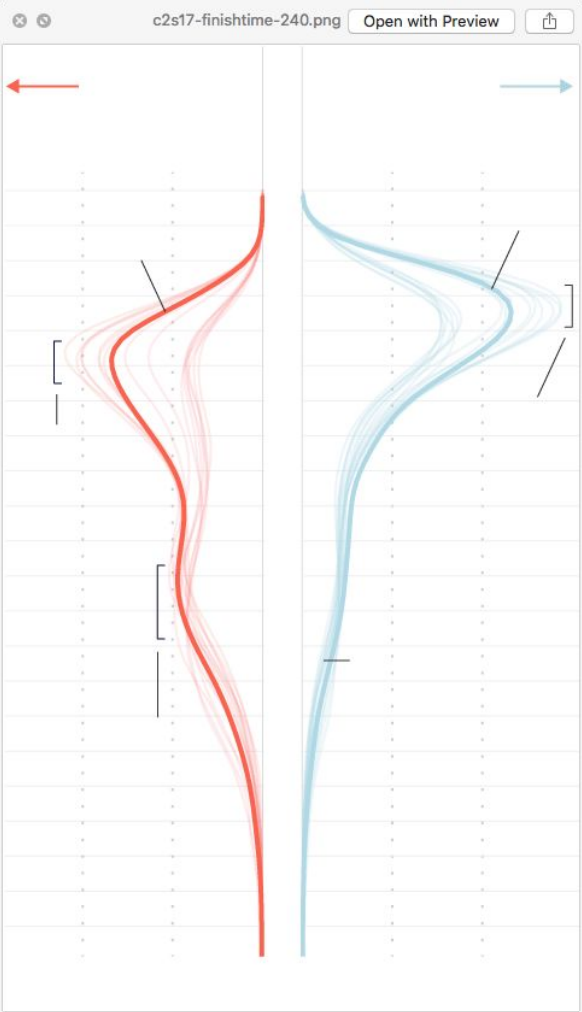


Run the plugin
ai2html

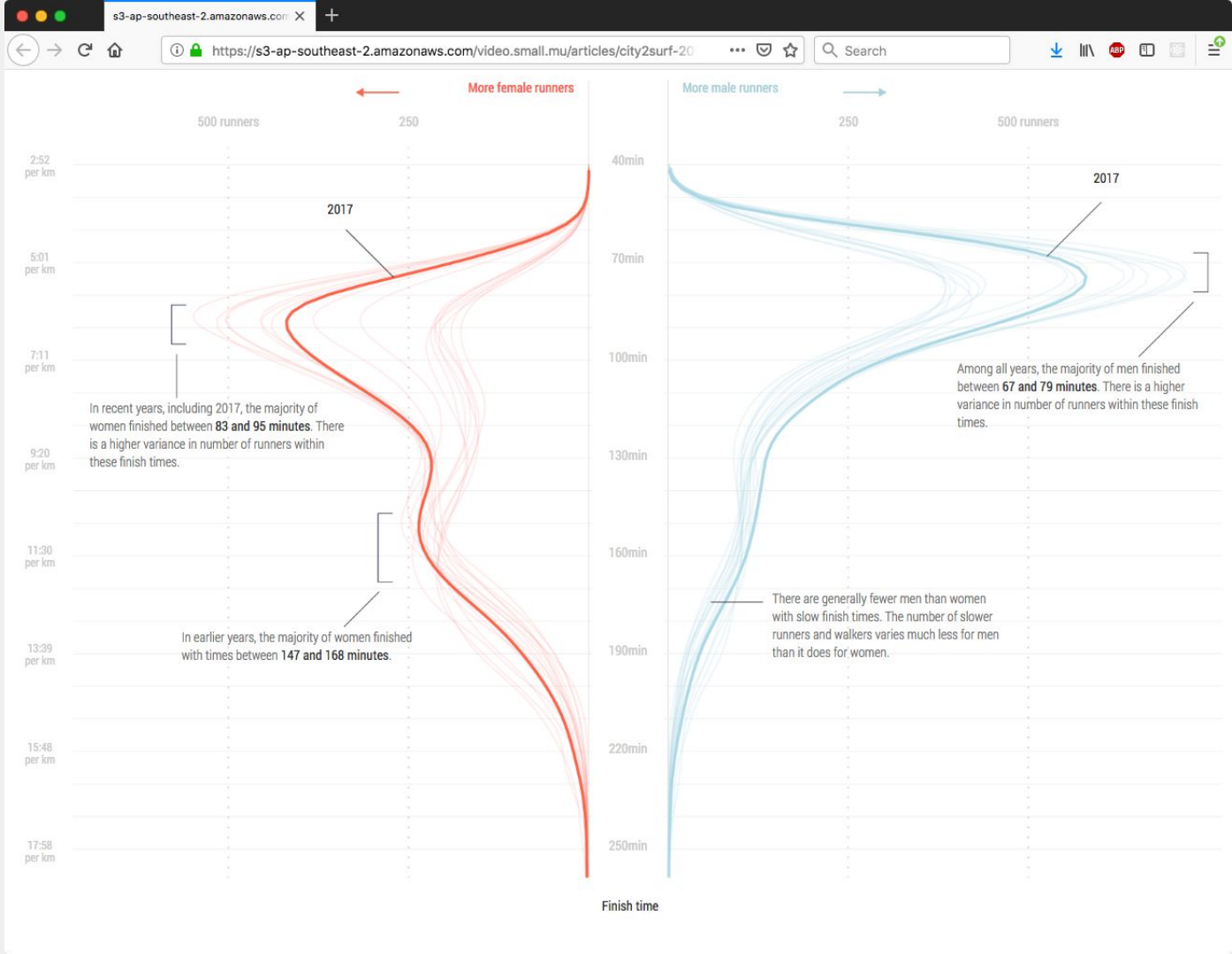


One file for content, several for background

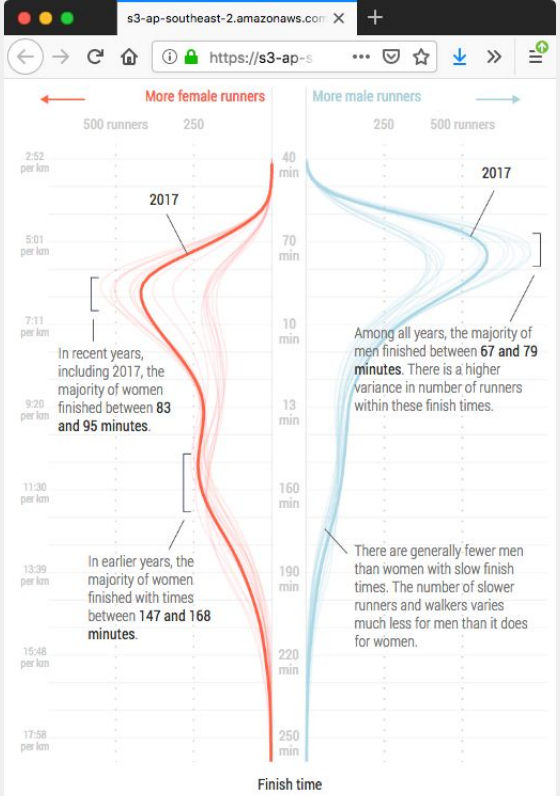




Width: 1300px



Width: 335px


s3-ap-southeast-2.amazonaws.com
https://s3-ap-s
More female runners
More male runners
500 runners
250
250
500 runners
2:52 per km
5:01 per km
7:11 per km
9:20 per km
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15:48 per km
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70 min
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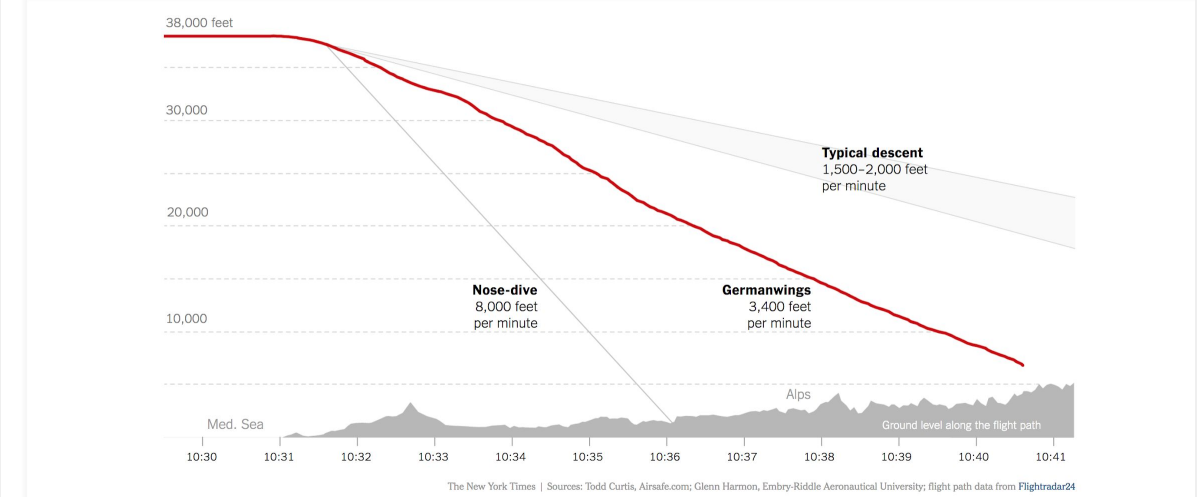
In earlier years, the majority of women finished with times between 147 and 168 minutes.
Among all years, the majority of men finished between 67 and 79 minutes. There is a higher variance in number of runners within these finish times.
There are generally fewer men than women with slow finish times. The number of slower runners and walkers varies much less for men than it does for women.
Finish time

The New York Times uses ai2html for their R graphics

(Because they developed it)

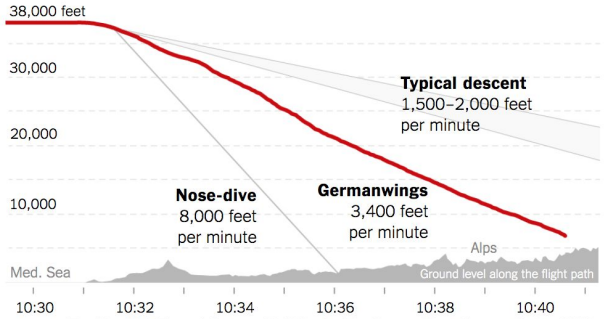


https://driven-by-data.net/2015/03/24/germanwings.html

https://www.nytimes.com/interactive/2015/03/24/world/europe/germanwings-plane-crash-map.html

Width: 530px

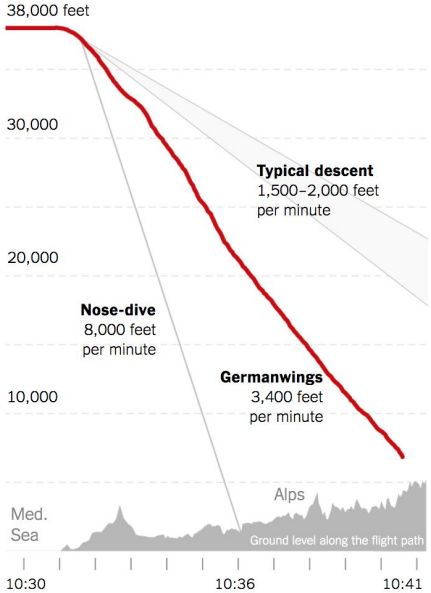
The plane's last known location from civilian flight radar was at 6,800 feet. "You can hear human breathing in the cockpit up until the moment of impact," Mr. Robin said.



The New York Times | Sources: Todd Curtis, Airsafe.com; Glenn Harmon, Embry-Riddle Aeronautical University; flight path data from Flightradar24

Width: 380px

The plane's last known location from civilian flight radar was at 6,800 feet. "You can hear human breathing in the cockpit up until the moment of impact," Mr. Robin said.



The New York Times | Sources: Todd Curtis, Airsafe.com; Glenn Harmon, Embry-Riddle Aeronautical University; flight path data from Flightradar24

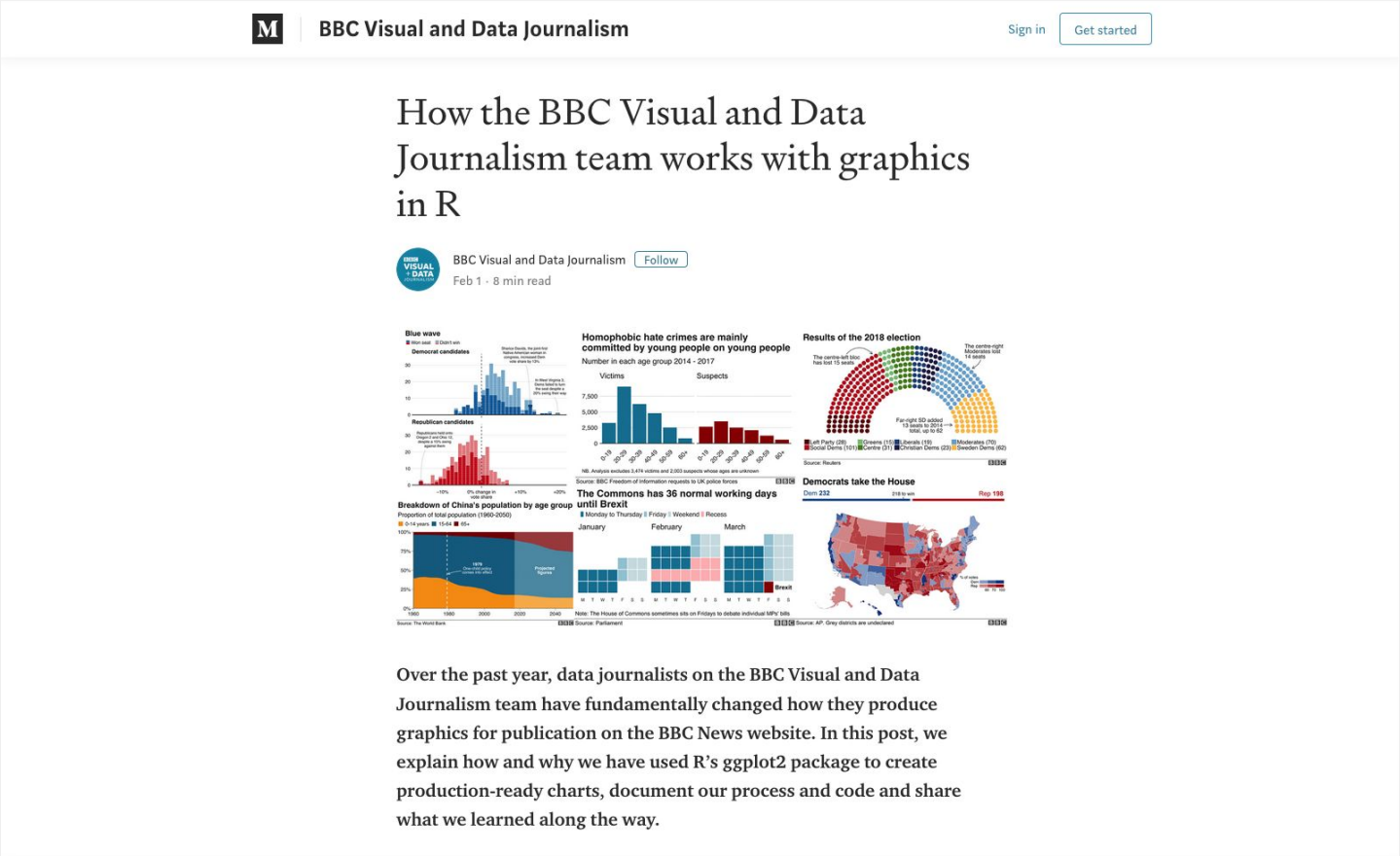
Advantages of ai2html

- Pixel-perfect designs
- Full controll of visual design
- Responsive on the web

Disadvantages of ai2html

- Lots of manual work
- Graphics can’t be replicated 100%
- Takes time to adjust graphics (e.g. data changes)
- Need to own Adobe Illustrator

The BBC uses a custom ggplot2 library bbplot to create polished chart out of the box



BBC Visual and Data Journalism

Sign in | Get started

How the BBC Visual and Data Journalism team works with graphics in R

BBC Visual and Data Journalism | Follow

Feb 1 · 8 min read

Over the past year, data journalists on the BBC Visual and Data Journalism team have fundamentally changed how they produce graphics for publication on the BBC News website. In this post, we explain how and why we have used R's ggplot2 package to create production-ready charts, document our process and code and share what we learned along the way.

https://medium.com/bbc-visual-and-data-journalism/how-the-bbc-visual-and-data-journalism-team-works-with-graphics-in-r-ed0b35693535

The BBC uses a custom ggplot2 library bbplot to create polished chart out of the box

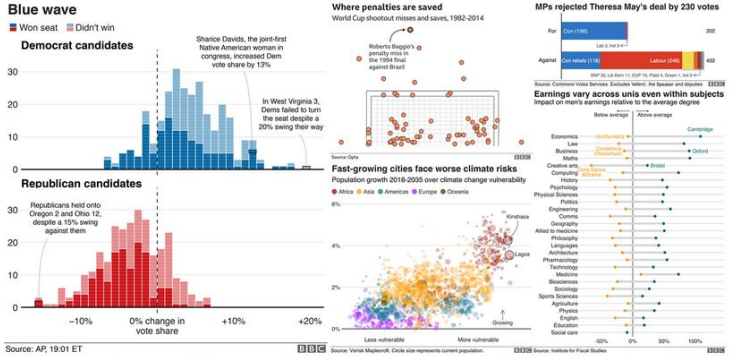
BBC Visual and Data Journalism cookbook for R graphics

Last updated: 2019-01-24

How to create BBC style graphics

At the BBC data team, we have developed an R package and an R cookbook to make the process of creating publication-ready graphics in our in-house style using R's ggplot2 library a more reproducible process, as well as making it easier for people new to R to create graphics.

The cookbook below should hopefully help anyone who wants to make graphics like these:



We'll get to how you can put together the various elements of these graphics, but **let's get the admin out of the way first…**

Load all the libraries you need

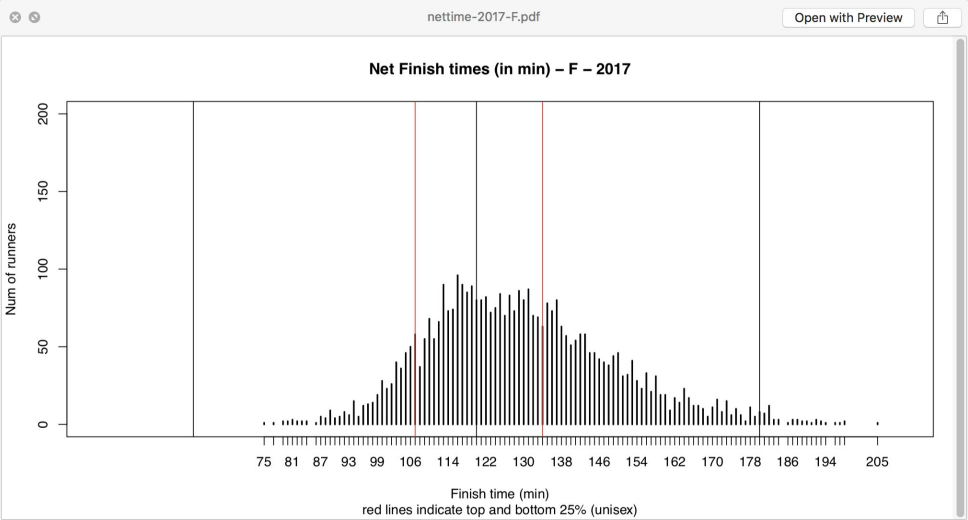
A few of the steps in this cookbook - and to create charts in R in general - require certain packages to be installed and loaded. So that you do not have to install and load them one by one, you can use the `p_load` function in the `pacman` package to load them all at once with the following code.

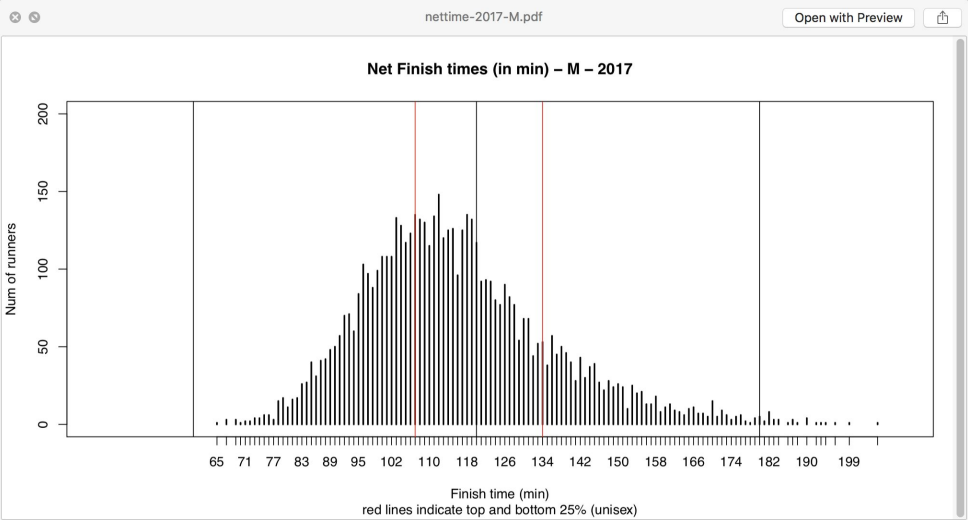
```
#This line of code installs the pacman page if you do not have it installed - if you do, it s
imply loads the package
if(!require(pacman))install.packages("pacman")

pacman::p_load('dplyr', 'tidyr', 'gapminder',
               'ggplot2',  'ggalt',
```

https://bbc.github.io/rcookbook/

Visualising Sydney Half Marathon 2018

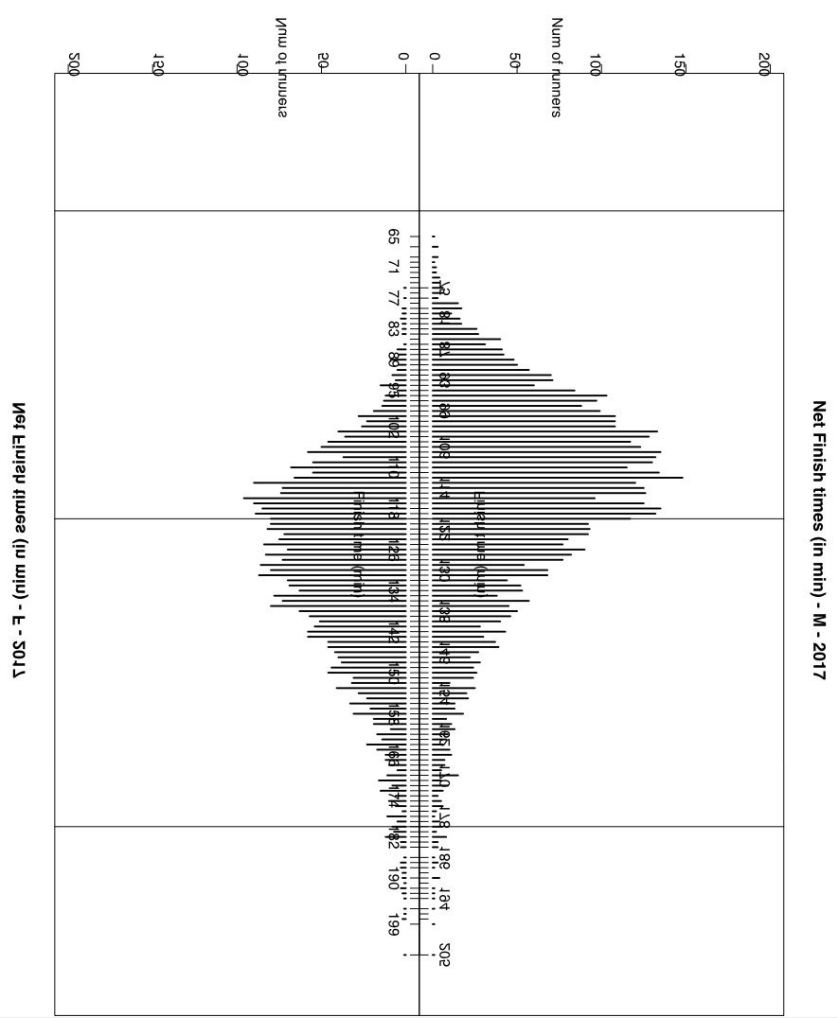
Plotting finish times
By gender



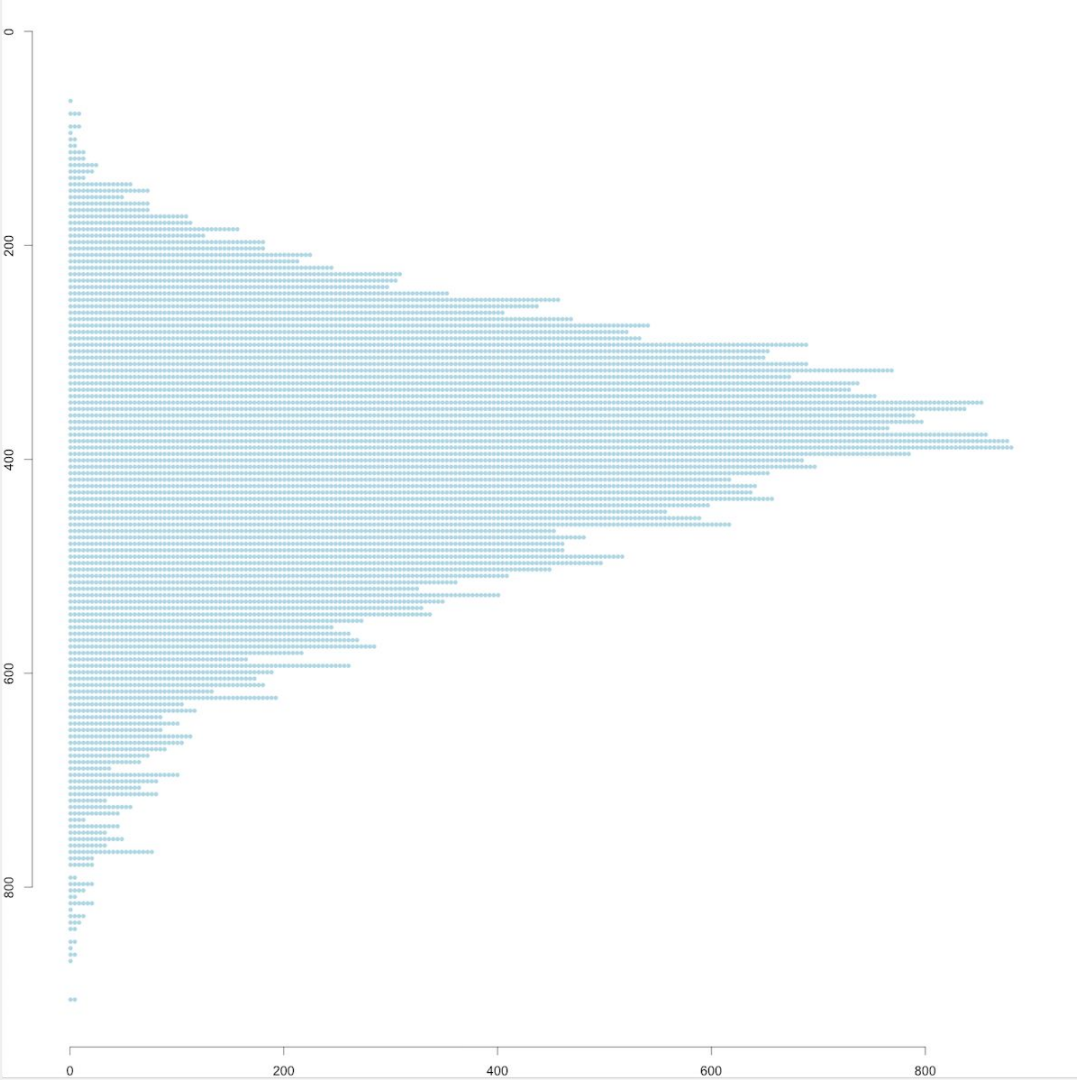


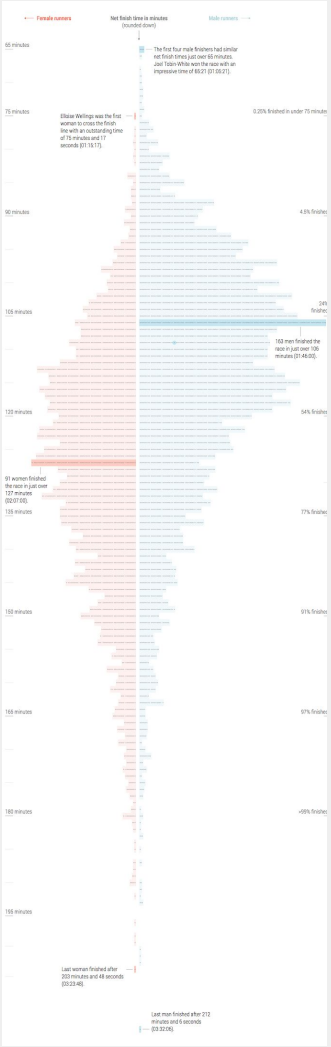
Merging charts in Photoshop

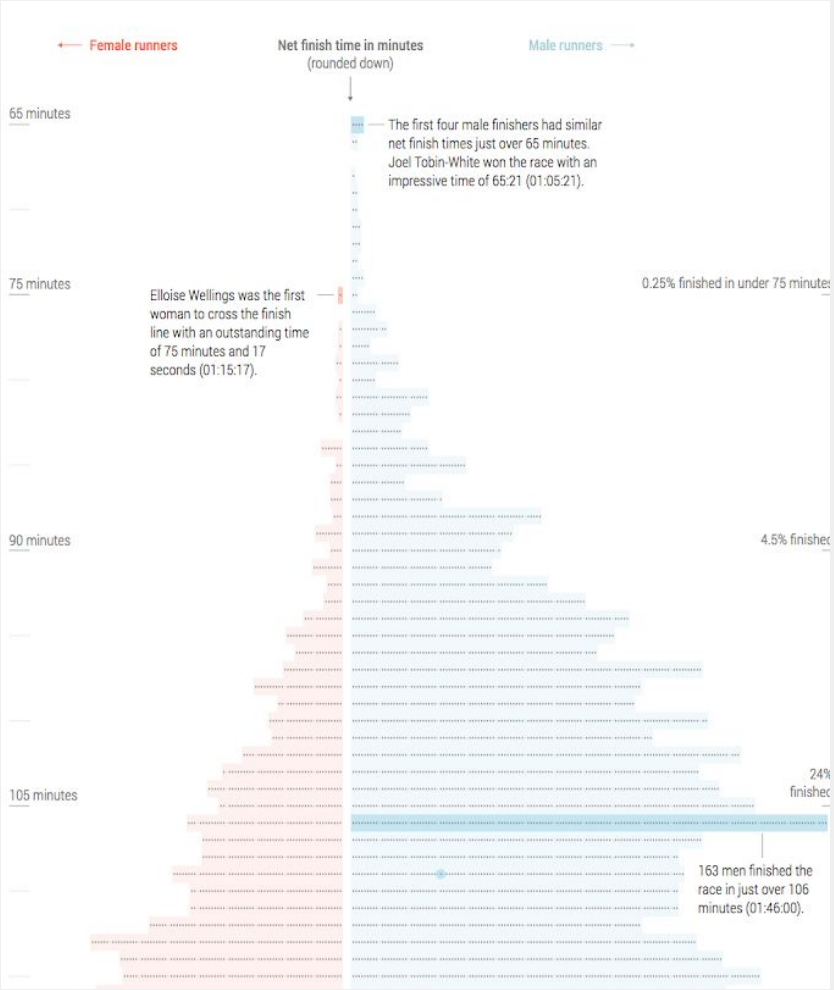
(because I don't know how to do it in R)



Experimenting with
individual dots for each finisher




Female runners
Net finish time in minutes
(rounded down)
Male runners
65 minutes
The first four male finishers had similar net finish times just over 65 minutes. Joel Tobin-White won the race with an impressive time of 65:21 (01:05:21).
75 minutes
0.25% finished in under 75 minutes
Elloise Wellings was the first woman to cross the finish line with an outstanding time of 75 minutes and 17 seconds (01:15:17).
90 minutes
4.5% finished
105 minutes
24% finished
163 men finished the race in just over 106 minutes (01:46:00).
120 minutes
54% finished
91 women finished the race in just over 127 minutes (02:07:00).
135 minutes
77% finished
150 minutes
91% finished
165 minutes
97% finished
180 minutes
>99% finished
195 minutes
Last woman finished after 203 minutes and 48 seconds (03:23:48).
Last man finished after 212 minutes and 6 seconds (03:32:06).


Female runners
Net finish time in minutes
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Elloise Wellings was the first woman to cross the finish line with an outstanding time of 75 minutes and 17 seconds (01:15:17).
90 minutes
4.5% finished
105 minutes
24% finished
163 men finished the race in just over 106 minutes (01:46:00).

Setting up R code to speed up process with ai2html

nettime-2018.R UNREGISTERED

nettime-2018.R

```r
### SETUP ###

# DIRECTORIES
PATH.SCRIPT = '/Users/martin/Documents/running/public/3_vis/smh'
PATH.DATA = '/Users/martin/Documents/running/public/2_data/smh/output'

# LIB
library('shape') # for plotcircle()

# DATA CONFIG
YEAR = 2018
MAX.runners = 250 # the bigger the more squeezed will x-dimension be. Doesn't need to be actual max
MAX.finishtime = 60*3.5

# STYLE CONFIG
ANNOTATION = F

COL.blue = '#add8e6'
COL.red = 'tomato'
COL = c(COL.red, COL.blue)
COL.lite = c('#FFD6CE', '#CEEBF4')
COL.superlite = c('#fff4f3', '#f4fafc')
COL.superlite.alpha = c('#ff63470D', '#add8e61A')

COL.DOT.default = '#777777'
COL.DOT.emphasis = '#77777733' # '#d1d1d1'
COL.abline = '#cccccc'

FONT.SIZE = 18

CIRCLE.d = 0.5
CIRCLE.r = CIRCLE.d / 2
BAR.OFFSET = CIRCLE.d + CIRCLE.r

# PNG OUTPUT CONFIC
PNG_W = 1020 #160
PNG_H = 3500 #320 #
FILENAME.base = paste('nettime/',  PNG_W, 'px/', 'smh-nettime-', sep='')

# PLOT CONFIG
PAR.mar = c(0,0,0,0)
```

Spaces: 2 R

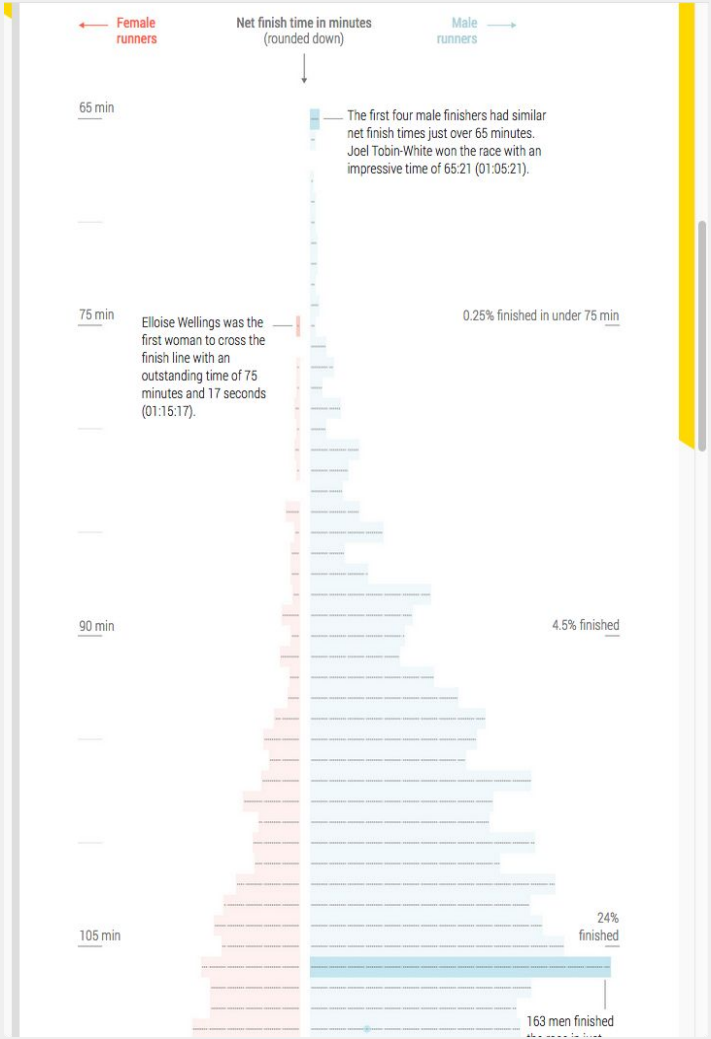
Setting up R code to speed up process with ai2html

nettime-2018.R UNREGISTERED

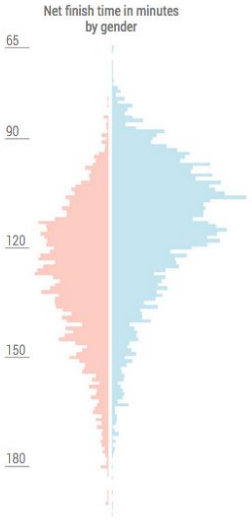
nettime-2018.R

```r
# MEAN time: Average for current gender
time.average = floor(mean(d1$timesec[d1$gender==gender & !is.na(d1$timesec)])/60)
message(
  paste("STAT: Average net finish time of runners with gender ", gender, " is ", time.average, " m
)

time.emphasise = c(
  time.slowest,
  time.fastest,
  time.maxrunners
)

# Fixed Ablines
if(ANNOTATION){

  # Line every 15 minutes
  line.interval = seq(60, 60*3.5, 15)
  abline(h = line.interval, col=COL.abline)
  text(50, line.interval, labels=c(line.interval), pos=3)

  # Slowest / fastest runner
  abline(h = time.sf, col=COL.abline)
  text(50, time.sf, labels=time.sf, pos=3)

  # Top / bottom 25%
  time.perc = c(time.top25, time.bottom25)
  abline(h = time.perc, col= 'red')
  text(50, time.perc, labels=time.perc, pos=3)

}


for(t in 1:nrow(d.g)){

  count = d.g[t,]$count
  time = as.numeric(as.character(d.g[t,]$time)) # stupid factors

  y = time

  # bars
  rect(
```

Spaces: 2 R



place on 20 May in Sydney's CBD. The weather conditions where great with plenty of sun. The morning temperature was just over 11 degrees Celsius. 40% of the 9,195 runners who finished the race were women. The average net finish time for women was 02:08:41, while men had an average time of 01:55:03. The chart below plots the net finish time of every single woman and man . To enhance this visualisation I undertook on-field observations in the form of running the half marathon myself. Look out for the .



This graphic looks more awesome on a larger screen.

SMALL MULTIPLES | Source: Results from secure.tiktok.biz | Download graphic as PNG.

https://smallmultiples.com.au/articles/visualising-the-sydney-half-marathon-2018/

Questions?

Martin von Lupin
@martinvonlupin

Thanks.

Martin von Lupin
@martinvonlupin