Carl Morris

A Celebration of Carl on the Occasion of his Retirement from the Harvard Statistics Department
carl, brad, circa 2005
brad, stanford
Brad’s Bootstrap

Bootstrap (Efron '77) resampling

Real world

\[ F \sim y \sim X \]

\[ \hat{F} = \frac{1}{n} \sum_{i=1}^{n} I(y_i \leq y) \]

Bootstrap world

\[ \hat{F}_n \sim y \sim X \]

Empirical CDF

\[ \hat{F}_n(y) = \frac{1}{n} \sum_{i=1}^{n} I(y_i \leq y) \]

as \[ n \to \infty \]

\[ \hat{F}_n \to F(y) \]

\[ \text{Glivenko-Cantelli: uniform} \]

\[ 3.14, 2.71, 1.618, 0.577 \]

\[ 2.71, 2.71, 0.577, 3.14 \]

\[ 1.618, 3.14, 1.618, 0.577 \]
carl’s father, john, 1952
sis ann, carl, age 4
carl, age 5 - 6, sis ann
cabrillo lighthouse, circa 1950
carl, age 17, army-navy academy
carl, age 19
carl, age 19
carl, age 30
carl, age 31, sis ann
carl, age 31
carl, age 33, son john, wife anne
carl, age 33, son john
Carl, age 34, son John
carl, age 37, rand tournament
carl, age 37, rand tournament
carl, age 37, rand tournament
carl, age 37, rand tournament
carl, age 37, rand tournament
carl, age 37, rand tournament
carl, age 37, rand tournament
carl, age 39, daughters catherine, claire, thumbs
daughters claire, catherine, circa 1979
carl’s kids
carl, dennis lindley, david hinkley, UT, 1985
carl, 1st year at harvard, 1990
department faculty, circa 1991
graduation, circa 1994
graduation, circa 1995
carl and other faculty with honoree janet norwood, circa 1998
alan, carl, ?
carl, marge, betsey, sally
carl, ralph, shelly
bill, carl
heng, cindy, shelly
carl, dick hess, caltech doubles partner, 2004
NEFs

Constant LLN

Normal

Gamma

Poisson

Beta

Binomial

Neg. Bin.

Polya I

Hyper-geometric

NEF 1

NEF 2

NEF 3

NEF 4

NEF 5

NEF-QVF

Y \sim \left( \mu, \frac{\sigma^2}{\nu} \right)

Conjugate

\mu \sim \left( \mu, \frac{\sigma^2}{\nu} \right)

Mixture

Y \sim \left[ \mu, \frac{\sigma^2}{\nu} \right]

NEF-CHS

Skew-\tau

Skew + -CHS

NEF-CHS

F

Polya II

joe, carl, with kelly bodwin’s NEF blanket
stephen, carl, raj, jessie, keli
andy, carl
carl, joey
caltech men: joe, carl, brad, giri
fresh pond walk, department faculty and students, 2011
joey, martin, tak
Carl Morris Symposium on Large Scale Data Inference, Washington, DC, 2012
brother steve, mother jane, carl, sis ann
brother steve

Remembering Stevie
1952 - 2003
carl, Harley, 1987
sis ann with her husband sheridon
daughter claire, carl, don, circa 1994
carl, daughter catherine, circa 1995
daughter claire, carl, circa 1997
daughter claire, grandson otto
carl, grandson otto
daughter catherine, granddaughter pearl
granddaughter pearl, age 3, 2015
son-in-law erik, grandson zephyr
carl, grandson zephyr
grandson zephyr
daughter-in-law yamin, son john, sis ann
carl, daughter-in-law yamin, son john, daughter catherine, china, 2006
daughter-in-law yamin, son john, china, 2006
son john, grandson armstrong yuhan, 2012
grandsons otto, age 11, armstrong yuhan, age 3, 2015
maternal grandfather carl neracher, 1960, inventor Neracar and Fluid Drive, carl’s namesake
carl, son john, grandson otto, neracar
<table>
<thead>
<tr>
<th></th>
<th>X Malisse</th>
<th>G Rusedski</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aces</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Double Faults</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Unreturned Serves</td>
<td>49</td>
<td>43</td>
</tr>
<tr>
<td>Direction of Aces</td>
<td>2 0 3</td>
<td>2 0 2</td>
</tr>
<tr>
<td>Direction of Serves</td>
<td>27 18 29 39 12 21</td>
<td>23 5 37 17 3 35</td>
</tr>
<tr>
<td>1st Serves In</td>
<td>60%</td>
<td>66%</td>
</tr>
<tr>
<td>Pts Won on Serve 1st : 2nd</td>
<td>76% : 56%</td>
<td>77% : 58%</td>
</tr>
<tr>
<td>Average MPH 1st : 2nd</td>
<td>115 mph: 88 mph</td>
<td>116 mph: 102 mph</td>
</tr>
<tr>
<td>Fastest MPH 1st : 2nd</td>
<td>125 mph: 96 mph</td>
<td>138 mph: 117 mph</td>
</tr>
<tr>
<td>Pts Lost on Serve</td>
<td>32%</td>
<td>30%</td>
</tr>
<tr>
<td>Serve &amp; Volley 1st : 2nd</td>
<td>17% : 0%</td>
<td>100% : 100%</td>
</tr>
<tr>
<td>Pts at the Net Won : Lost</td>
<td>17 : 13</td>
<td>62 : 44</td>
</tr>
<tr>
<td>Winners : Unforced Errors</td>
<td>50 : 23</td>
<td>51 : 30</td>
</tr>
<tr>
<td>Baseline Winners FH : BH</td>
<td>19 : 15</td>
<td>4 : 1</td>
</tr>
<tr>
<td>Volley Winners</td>
<td>6</td>
<td>31</td>
</tr>
<tr>
<td>Passing (+Lob) Winners</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>Return Winners</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Returns In % 1st : 2nd</td>
<td>61% : 71%</td>
<td>59% : 79%</td>
</tr>
<tr>
<td>Break Pts Won / Played</td>
<td>3 / 7</td>
<td>2 / 12</td>
</tr>
</tbody>
</table>

**Additional Information:**
- Total Match Time: 2h 36m
- Last Serves: 3 / 6 / 3 / 6 / 3 / 6 / 6
- mph: km/h
carl, fiancée linda