

```

1 local R = require
2 local _,the,CLS,BIN,NUM = R"lib", R"the", R"cls", R"bin", R"num"
3 local o,oo,downl,map,push,sort,powerset = _,o,_,oo,_.downl,_.map,_.push,_.sort,_.p
4 overset
5 local slice,merge,slots,fmt,rnds = _.slice, _.merge,_.slots,_.fmt,_.rnds
6 local class,OBJ = _.class, _.OBJ
7
8 local RULE = class("RULE",OBJ)
9
10 function RULE.best(bins,h)
11     local function score1(b1,b2) return RULE((b1),h).score > RULE((b2),h).score end
12     return slice(sort(bins, score1), 1, the.beam) end
13
14 function RULE.fromBins(bins,all,h,bests,rests, n,out,rule,sizes,scores)
15     out={}
16     sizes=NUM()
17     scores=NUM()
18     for _,some in pairs(powerset(RULE.best(bins,h))) do
19         if #some>0 then
20             rule = RULE(some,h)
21             sizes:add(#some)
22             scores:add(rule.score)
23             push(out, (size=#some,score=rule.score,rule=rule)) end end
24     local function order(one)
25         return ((0 - sizes:norm(one.size))^2 + (1 - scores:norm(one.score))^2)^.5 end
26     local n = 0
27     for _,three in pairs(sort(out, function(a,b) return order(a) < order(b) end)) do
28         local selected1= three.rule:selects(bests)
29         local cover1 = 100*#selected1/#bests//1
30         local selected2= three.rule:selects(rests)
31         local cover2 = 100*#selected2/#rests//1
32         local some = all:clone(three.rule:selects(all.rows))
33         if cover1 < 100 or cover2 < 100 then
34             print(o(rnds(some:mid()))),
35                 o(rnds(some:div()))),
36                 fmt("%.3f%.4u%.4u%s", three.score, cover1, cover2, three.rule)
37         )
38         n=n+1
39         if n > the.beam then return end end
40     end
41     return out end
42
43 function RULE:new(bins,h, t)
44     self:seen={}
45     self.bins = {}
46     for _,bin in pairs(bins) do
47         self.bins[bin.at] = self.bins[bin.at] or {}
48         push(self.bins[bin.at], bin) end
49     for _,one in pairs(self.bins) do sort(one, function(a,b) return a.lo < b.lo end)
50     end
51     self.score = self:scored(h)
52 end
53
54 function RULE:___tostring() return self:show(self.bins) end --return self:show(sel
55 f.bins) end
56
57 function RULE:like(klass,h) -- h=("true"=100, "false"=40) n=100+40
58     local n=0; for _,v in pairs(h) do n = n + v end
59     local fs = {}
60     for at,bins in pairs(self.bins) do
61         fs[at] = 0
62         for _,bin in pairs(bins) do
63             fs[at] = fs[at] + (bin.ys.has[klass] or 0) end end
64     self:seen[klass] = fs
65     local prior = ((h[klass] or 0) + the.K) / (n + the.K * 2)
66     local out = math.log(prior)
67     for at,v in pairs(fs) do
68         local inc = (v+the.M*prior)/(h[klass]+the.M)
69         out=out + math.log( inc)
70     end
71     return out end
72
73 RULE.bias = {}
74 local bias = RULE.bias
75 function bias.optimize(b,r) return b+r==0 and 0 or b^2/(b+r) end
76 function bias.monitor( b,r) return b+r==0 and 0 or r^2/(b+r) end
77 function bias.tabu( b,r) return b+r==0 and 0 or 1/(b+r) end
78
79 function RULE:scored(h)
80     return self.bias[the.rule](self:like("left",h), self:like("right",h)) end
81
82 function RULE:selects(rows)
83     return map(rows, function(row) if self:select(row) then return row end end) end
84
85 function RULE:select(row)
86     local function ors(bins)
87         for _,bin in pairs(bins) do if bin:select(row) then return true end end
88         return false end
89     for at,bins in pairs(self.bins) do if not ors(bins) then return false end end
90     return true end
91
92 function RULE:show(ands)
93     local cat, order, sortor, sortand
94     cat = function(t,sep) return table.concat(t,sep) end
95     sortand= function(t) return map(slots(t), function(k) return t[k] end) end
96     sortor = function(a,b) return a.lo < b.lo end
97     return cat(map(sortand(ands),
98         function(ands)
99             return ("..cat(map(sort(ands1,sortor),
100                 function(or1) return tostring(or1) end)," or ")..")" end)," and ")
101     end
102
103 -- print has to wipe out fullranges and print selected items
104 --sort(bins,order)
105 -- ors= function(bins)
106 --     return cat(map(merge(sort(bins,order),BIN.mergeNext)), " or ") end
107 -- return cat(map(bins, ors), " and ") end
108
109 return RULE

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