

SLS RUNTIME VISUALIZATION

THE PROBLEM DOMAIN: QUICK REMINDER

- Stochastic Local Search (SLS)
 - Class of meta-heuristics to solve problem using a sequence of local perturbations of a solution.
- Can be instrumented to generate a time series as the search progresses
 - SLS typically makes very small moves very frequently resulting in large amounts of data being generated.
- Goal is to provide a tool to aid in analyzing the behaviour of a search over time



ORGANIZING DATA SETS

- Each time series is identified by a set of tags
 - ie.
 - computer: skopelos
 - solver: LKH paramset 4
 - instance: pla7397
 - run: 8
 - measurement: quality / iteration
- There may be several thousand different time series available for a particular task
 - Need a way to organize them so they can be quickly located



ORGANIZING DATA SETS

- Construct a tree based on tag values
- An ordering may not be useful for a task
 - Allow the tags to be reordered -> pivot the tree

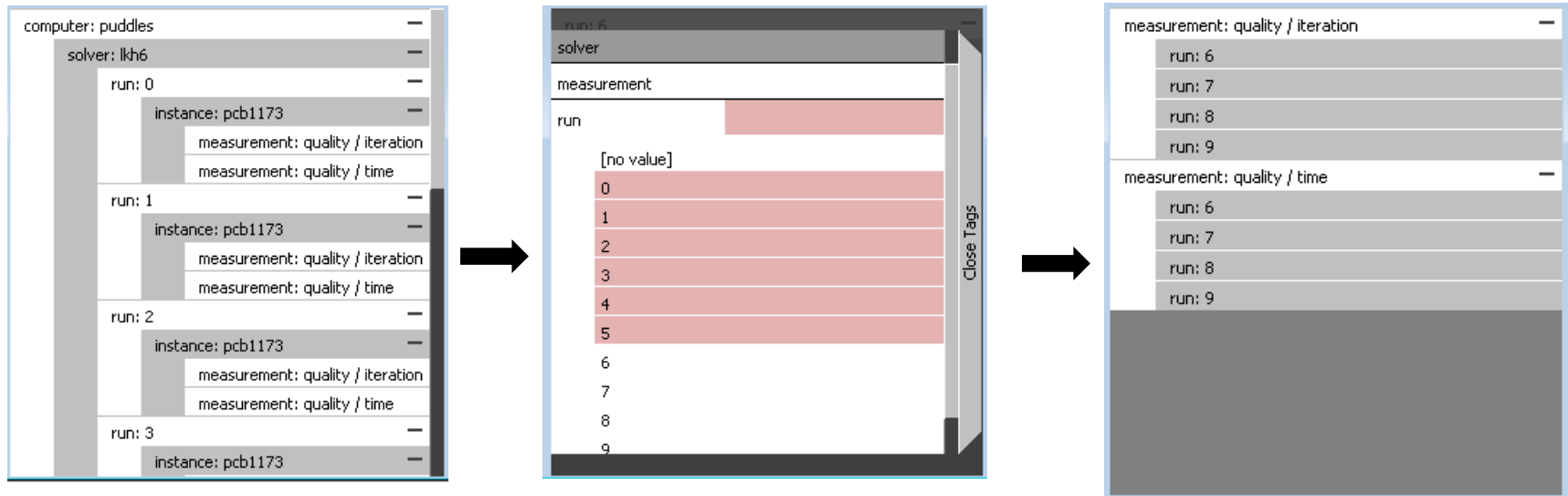
computer: puddles	—
solver: lkh6	—
run: 0	—
instance: pcb1173	—
measurement: quality / iteration	
measurement: quality / time	
run: 1	—
instance: pcb1173	—
measurement: quality / iteration	
measurement: quality / time	
run: 2	—
instance: pcb1173	—
measurement: quality / iteration	
measurement: quality / time	
run: 3	—
instance: pcb1173	—
measurement: quality / iteration	
measurement: quality / time	
run: 4	—
instance: pcb1173	—

measurement: quality / iteration	—
solver: lkh6	—
instance: pcb1173	—
run: 0	
run: 1	
run: 2	
run: 3	
run: 4	
run: 5	
run: 6	
run: 7	
run: 8	
run: 9	
measurement: quality / time	+



ORGANIZING DATA SETS

- Filtering based on tag value



DERIVED VALUES

- Often data recorded is either not directly usable or not what's interesting, allow the creation of derived values, ie
 - basic statistics (average, min, max, standard deviation, etc)
 - domain specific
 - quality / iteration => best quality observed / iteration
 - similarity to final solution

- Done using plugins

generator type: data set generator

time series type: step

dataset type: best of

dataset type: misc. stats

inputs:

measurement: quality / iteration
run: 0
run: 1
run: 2
run: 3
run: 4
run: 5

outputs:

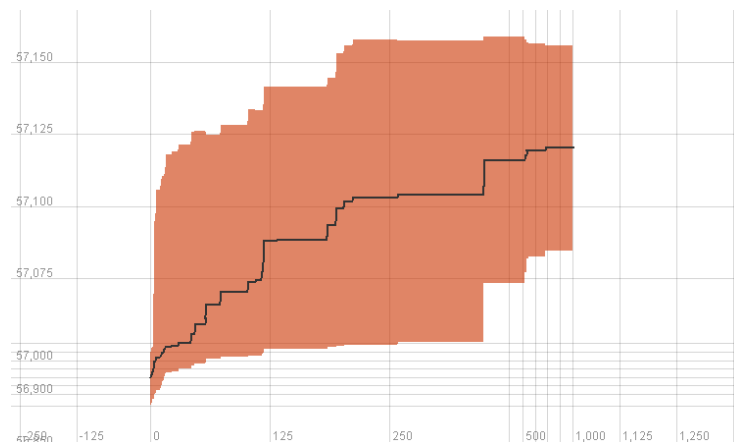
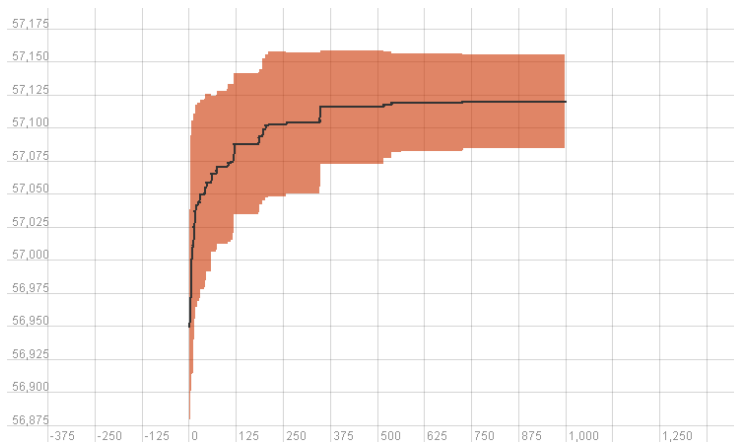
measurement: quality / iteration
derived value: average
derived value: average + std dev
derived value: average - std dev
derived value: maximum
derived value: minimum

apply generator



DISPLAYS

- Solution quality time series are typically either exponential decay or logarithmic growth (minimization vs maximization)
 - Large portions of the time series are uninteresting
- Allow the user to distort axis to exaggerate interesting regions



DEMO

- demo



FUTURE WORK

- Additional types of displays
 - Displaying solutions over time
- Additional types of derived values

