

Measuring Design Volatility against Design Rule Stability

Yuanfang Cai, Kanwarpreet Sethi
Drexel University

Metrics

- Aspects to consider
 - The number of modules
 - The sizes of each module
 - A module can't be too large and can't be too small
 - How likely a module will change
 - How other modules depend on the module
- Net Option Value Analysis

$$NOV_i = \max_{k_i} \{ \sigma_i n_i^{1/2} Q(k_i) - C_i(n_i) k_i - Z_i \}$$

$$V = S_0 + NOV_1 + NOV_2 + \dots + NOV_n$$

A New Metric: The Level of Independence (LI)

- A Simplified Metric consistent with NOV
 - Maze Game: 46%
- Comparative Analysis
 - KWIC:
 - Information Hiding: 60%
 - Sequential: 44%
- Better be with a DSM

A Set of New Metrics Based on DSMs

- Stability

- Decision Volatility

- $$DecisionVolatility(x) = EnvImpact(x) \times ImpactScope(x)$$

- Design Rule Volatility

- Design Volatility

- $DesignVolatility(d) = \sum_{x \in Env} DecisionVolatility(x)$

- Concern Scope

- Concern Overlap

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
envr_input_forma	1	.																			
envr_core_size	2		.	x																	
envr_input_size	3			x	.																
envr_alph_policy	4				.																
alph_ADT	5					.															
linestorage_ADT	6						.														
output_ADT	7							.													
circ_ADT	8								.												
master_ADT	9									.											
input_ADT	10										.										
master_impl	11					x	x	x	x	x	x	.									
circ_ds	12		x	x								.	x								
circ_impl	13					x		x				x	.								
output_impl	14					x	x	x					.	x							
output_ds	15												x	.							
linestorage_ds	16		x	x										.	x						
linestorage_impl	17			x										x	.						
input_impl	18	x						x			x										
alph_impl	19				x	x	x		x									.	x		
alph_ds	20				x														x	.	

Design Rule Volatility = 0

Design Rule Volatility = 30

		x	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
envr_core_size	x	.	x																
envr_input_forma	2		.																
envr_input_size	3	x		.															
envr_alph_policy	4				.														
alph_sig	5					.													
output_sig	6						.												
input_sig	7							.											
circ_sig	8								.										
circ_ds	9	x		x						.	x	x							
input_ds	10	x		x							.	x	x						
alph_ds	11			x	x							.	x	x					
master_impl	12					x	x	x	x				.	x					
master_sig	13													.					
output_impl	14			x	x		x			x	x	x			.	x			
output_ds	15															.			
circ_impl	16			x					x	x	x						.		
input_impl	17	x	x					x			x							.	
alph_impl	18			x	x	x				x	x	x							.