Engineered Dependability Requirements: An Environment Modeling based Approach

Zhi Jin

Key Lab of High Confidence Software Technologies (MoE)
Peking University
zhijin@pku.edu.cn

QR5, 2017.07.28, Prague, Czech Republic
Motivation: Trend in Computing

Traditional Application Scenario
Software: be in charge of information processing

New Application Scenario
Software: be carrier of application values

In a world of the information society, software needs to react to the new requirements of the dynamic environment. It needs to meet the diverse and varied needs of users.
Challenges Remained

- What form of process and testing should take that can offer just enough dependability considering the cost, usability, performance, etc.?
  - make balance
- The adoption of rigorous processes and testing has an indirect impact on dependability, evidence of a direct link between dependability and design is missing.
  - build trace links
- Developers find interweaving the business needs and dependability needs is still real headache
  - help operationalization

S. Zaiden (2007), A Direct Path to Dependable Software, Communications of ACM, 50(6), 78-86
Improving MC/DC and Fault Detection Strength Using Combinatorial Testing

Dong Li, Linghuaan Hu, Ruizhi Guo
W. Eric Wong, D. Richard Kuhn, Rughu N. Kacker
Variation of SaaS Delivery Model

- **Single software instance mode**
  - All clients use a single software instance using same work flow and code on the same infrastructure.
  - This is the most restricted pattern of SaaS

- **Single customizable software instance**
  - All clients use the same code but the instance is customizable
  - This is the most difficult use pattern.
  - A SaaS application serving numerous clients may have hundreds, even thousands customization points with each of them providing multiple options

- **Single software instance for single client**
  - This is the most flexible mode
  - Each client can customize its code instance without affecting other clients
  - This mode does not retain the characteristics of SaaS, rather the model becomes a PaaS (Platform-as-a-Service).
Trace analysis

- Users can play recorded program executions.
- Available in trace mode (HelloMon maps).
- Trace recorded by Eclipse plugin inline.
- Each method invocation:
  - highlights respective flow.
  - colonizes the floor per drawn risks.
  - increases the opacity of building.
- Could be used to identify fragile/stressed/optional feature, to determine test coverage or for profiling.
The relative performances among speakers are inconsistent with that in DV and Lebesque-A & -C.
Generating Features

- The architecture

Word Embedding: simple index -> feature vector
Assessing the Quality of Tabular State Machines through Metrics

Ammar Osalveran, Jelena Marincic and Jan-Friso Groote

28-07-2017 Prague
Motivation

- Provide a configurable and extensible experimental platform for the study of combinatorial testing.

- Provide a lightweight, usable test tools by combinatorial testing technology.
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Investigating the Significance of Bellwether Effect to improve Software Effort Estimation

By
Solomon Mensah*, Jadry Kating*, Stephen MacDonell*, Michael Bouz* & Heshama Ivensin *
*Ch. University of Hong Kong
†University of Otago, New Zealand
*Centre for Business, Information Technology and Enterprises, New Zealand

July, 2017
Motorized Valve
Conclusion (2/3)

- We made two key discoveries in our analysis:
  - The first is the difference in evaluation of research environment between student and teacher. The students did not rate the environment as high as the teachers did.
  - The second finding is the difference in self-evaluation of research ability between female students and male students. Female students rated their research abilities considerably lower compared to male students.

Considering these two facts, we note the following:

- One is to devise a method of assessing quality/quantity of student performance, which is more beneficial to the research environment, and
- The other is to devise a statistical method to select the differences of self-assessment between female and male students in future career.
Part Two Emergency Travel Plan Generation Process

Information Formulation Process:

1. Input Original Travel Information
2. Formulate travel factors, permitted fluctuation range

Validation → Pre-Set Up Permit → Fluctuation Range → Monitoring
Dynamic & Continuous Behaviors Preservation

- Traffic Sign Recognition
- Simulink Model
- Image Processing
- UPPAAL-SMC Function
- Matlab Function
- Matlab Calculation
- MatlabCoder
- C-Code
Neural Networks

The output of the output layer, which is the output of the neural network, is:

\[ y = f(s) = f \left( \sum_{j=1}^{n} w_j \alpha_j \right) \]

1.2 Backward propagation of the propagation's output activations through the neural network using the training pattern target to generate the deltas (the difference between the targeted and actual output values) of all output and hidden neurons.