基于领域特定语义度量的价值管理研讨会的自动引导技术

Automated Facilitation Techniques in Value Management Workshops based on Domain-Specific Semantic Metrics

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24th Apr 2015，南京

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Outline

领域特定语义度量　价值管理研讨会　自动引导技术

1. Background & Opportunity
2. Domain-Specific Metrics for Text
3. Auto-Facilitation Techniques
4. Demo & Cases
5. Discussion & Future Works

Section 1

BACKGROUND & OPPORTUNITY

1.1 Introduction: Value Management

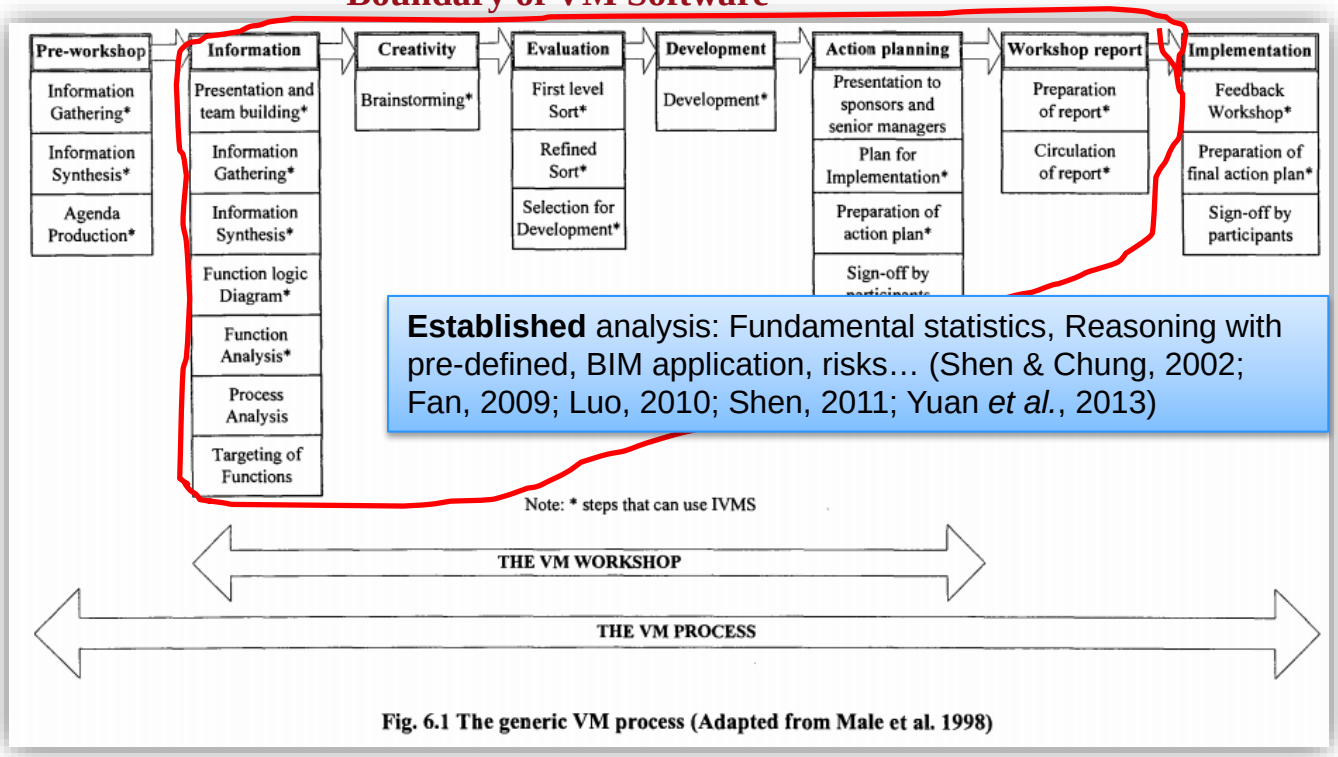
- Value Management (VM, or VE)
  - "to maximize the performance of an organization from the board room to the shop floor." (Lester, 2014)
  - Small VM problems encountered everyday, IMO
    - Quality *v.s.* price: A Toyota or a BMW? (e.g., P/P Ratio, R-C)
    - Eggs in baskets: Failsafe, hedge, MPF, etc.
- VM *workshop*
  - For early stage of big/mega project
    - Usually aims at: 1) Increase function; 2) reduce cost
  - Typical result (*general purpose*, SAP.com)
    - 1.6 × benefits,
    - 2.0 × projects on-time,
    - 1.9 × projects on-budget

(From www.photobucket.com)


(From www.valuebaseddesign.com)

1.2 VM Workshop: Roles, Job Plan & Software

- 3 main roles
  - Facilitator × 1
  - Participants × *N*
  - Helpers
- Job Plan
  - Preparation
  - Information
  - Creativity
  - Evaluation
  - Development
  - Action planning
  - Report



Established analysis: Fundamental statistics, Reasoning with pre-defined, BIM application, risks… (Shen & Chung, 2002; Fan, 2009; Luo, 2010; Shen, 2011; Yuan *et al.*, 2013)

Fig. 6.1 The generic VM process (Adapted from Male et al. 1998)

1.3 VM Software: DSS or MIS

- Decision Support System (DSS)
  - Definition by characteristics (Sprague, 1980)
    - For: easy use by upper level, non-computer managers
    - From: less well structured problem
    - By: data analytic techniques
    - With: flexibility / adaptability to tolerant environment
  - Examples: Airfare pricing, customers behavior analysis (e.g. US TV series *House of Cards*)
- DSS v.s. Management Information System (MIS)
  - The first emphasizes analysis
  - The latter focuses on efficient storage/ management

(From www. myihub.com)

1.4 Problems & Opportunity

- Problems
  - In Creativity: *Not enough* / comprehensive / in-depth ideas
  - In following phases: *Too many* ineffective ideas to handle
- Objectives
  - Increase the quantity and quality of ideas
- Subject to
  - Responsibilities of attendants

1. **Quantification**
2. **Auto–facilitation**

(From www. katerawlings.com)

Section 2

DOMAIN-SPECIFIC METRICS FOR TEXT

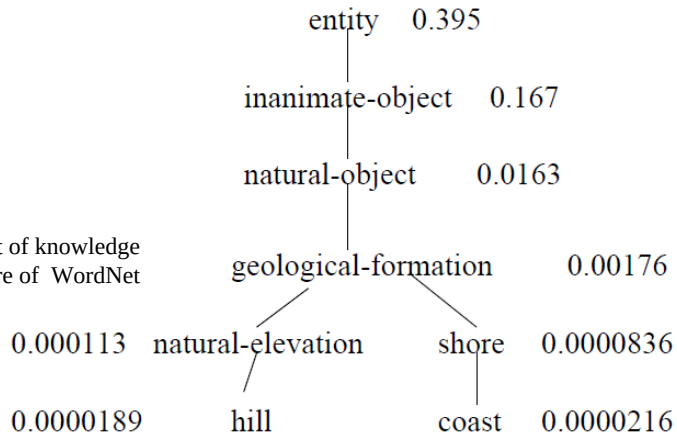
2.1 Semantics & A Web of Words

- Semantics
  - From ancient Greek: “σημαντικός”, *significant*
  - Linguistic semantics: human expression through language.
- WordNet®
  - Princeton Univ.: 1985 – *current*
  - Version 3.1: 155k words in 118k *synsets*
  - **中文版：东大计算机 / 台湾国立**

Hamburger

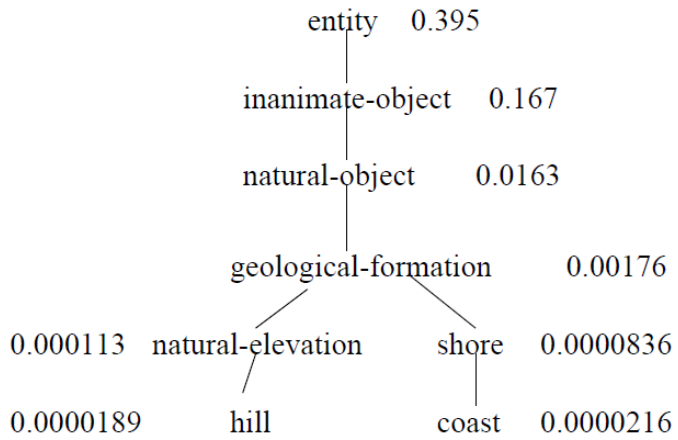
- Hamburger (an inhabitant of Hamburg)
  - direct hypernym:
    - German (a person of German nationality)
  - sister term
    - German (a person of German nationality)
      - East German (a native/inhabitant of the f
      - Bavarian (a native/inhabitant of Bavaria)
  - derivationally related form
    - Hamburg (a port city in northern Germany c
      River that was founded by Chalemagne in

A fragment of knowledge structure of WordNet



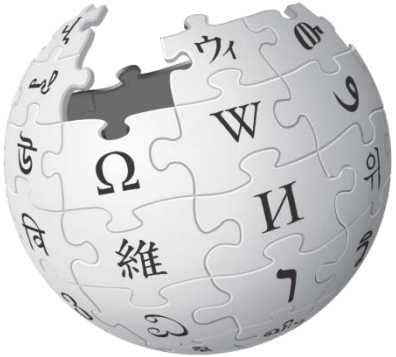
2.2 Semantic Metrics (Domain-Free)

- Similarity
  - More closely connected → more similar
- Metrics
  - Path: Inverse of (path length + 1)
    - × sim(hill, coast) = 1/(1+4) = 0.20
  - Resnik (1995):
    - × sim = ½ × Information of common
    - × sim(hill, coast) = -ln(0.00176)=6.34**
  - Lin (1998): ✓ ✓ ✓
    - × sim = Info of common / Info of description
    - × sim(hill, coast) = 2×ln(0.00176)/(ln(0.000189)+ln(0.0000216)) = 0.59
    - × Best correlated (p=0.834) to linguistic experts



2.3 Metrics with Domain Data

- Wikipedia
  - Open, high-quality encyclopedia
  - 4,853,000+ articles (English)
- Fan et al (2014) Has adopted Wikipedia to reweight domain words from common English to improve text search
- In this research
  - $P'(w) = P(w) \times \frac{P(w|\text{theme in Wiki})}{P(w|\text{Wiki})} \times \frac{N_{\text{Wiki}}}{N_{\text{theme in Wiki}}}$



WIKIPEDIA
The Free Encyclopedia

Section 3

OUR PART, PROGRESS & FUTURE WORKS

3.1 Our Part

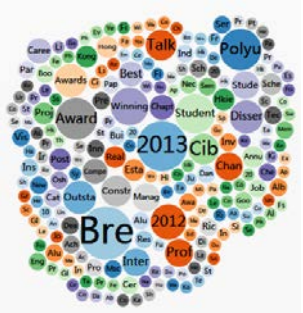
- Main users
  - Gammon Construction Ltd.
  - Also: HA, WHS, 3PL
- Hardware/service support
  - HKU
- Data support (partial)
  - HA, Gammon, WHS
- Main functions
  - Real-time supervision
  - Data-capturing
  - Real-time (events) feedback
  - On-site assets management

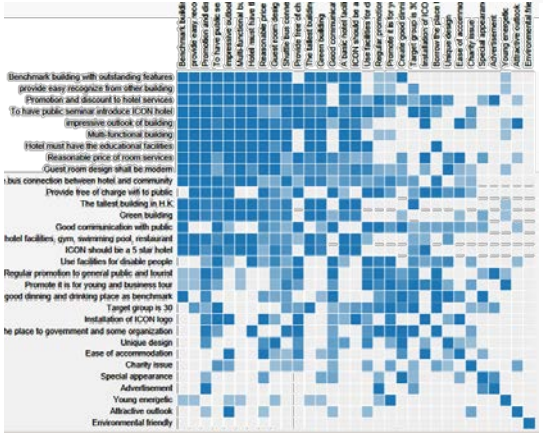
3.2 Two Baselines of the Final Version

- Baseline 1 (RFID Plan A)
  - Facilitate users and existing systems with GUI and analysis
  - No changes to Gammon's operation/work flow
  - Predict/identify and track/notify events such as component faults, project delay
- Baseline 2 (RFID Plan B)
  - Add new data gathering and instructions to on-site labors/operators
    - Receiving: where to store; Erection: show target position;…
  - Try to automate some processes
- Estimated KPIs:
  - Paper work: -20- -50%;
  - Efficiency and effectiveness: +5-20%;
  - Space utilization: +10-30%;
  - On-site WIP inventory: -5-10%

3.3 Demo time

- Done:
  - User requirements
  - System architecture
  - Module/Function design
  - UI design (Demo 2)
  - Function implementation (1/3)
  - Function test (1/3)
- In Progress
  - Functions and further tests
- Next 4 months
  - Release Alpha test version
  - Construction pilot practice (Apr.)





Yet Another Section

SHARING OF TWO NEW PAPERS

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