

Paper Summary

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Title: Towards an Extensible Web Usage Mining Framework for Actionable Knowledge

Authors: N. Pushpalatha, S. Sai Satyanarayana Reddy

DOI: n/a

Year: 2017

Publication Type: Conference Paper

Discipline/Domain: Computer Science / Data Mining

Subdomain/Topic: Web Usage Mining, Actionable Knowledge, Fuzzy Clustering

Eligibility: Eligible

Overall Relevance Score: 78

Operationalization Score: 82

Contains Definition of Actionability: Implicit

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Partial

Contains Interpretability: Partial

Contains Framework/Model: Yes (XWUMF)

Operationalization Present: Yes

Primary Methodology: Conceptual + Experimental (Prototype implementation)

Study Context: Web log analysis for user behaviour and business intelligence

Geographic/Institutional Context: India (JNTU Hyderabad, Vardhaman College of Engineering)

Target Users/Stakeholders: Businesses, Web Analysts, Decision-Makers

Primary Contribution Type: Framework and Algorithm Proposal (XWUMF, SWUM)

CL: Yes

CR: Yes

FE: Yes

TI: Partial

EX: Partial

GA: Yes

Reason if Not Eligible: n/a

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Towards an Extensible Web Usage Mining Framework for Actionable Knowledge

****Authors:****

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****Publication Type:****

Conference Paper

****Discipline/Domain:****

Computer Science / Data Mining

****Subdomain/Topic:****

Web Usage Mining, Actionable Knowledge, Fuzzy Clustering

****Contextual Background:****

The study focuses on developing a flexible, extensible web usage mining framework (XWUMF) to transform

****Geographic/Institutional Context:****

India (JNTU Hyderabad, Vardhaman College of Engineering)

****Target Users/Stakeholders:****

Businesses, Web Analysts, Decision-Makers

****Primary Methodology:****

Conceptual + Experimental (Prototype implementation with empirical evaluation)

****Primary Contribution Type:****

Framework and Algorithm Proposal (XWUMF, SWUM)

General Summary of the Paper

The paper introduces the eXtensible Web Usage Mining Framework (XWUMF) designed to process web

Eligibility

Eligible for inclusion: ****Yes****

How Actionability is Understood

The authors implicitly define actionability as the transformation of web usage patterns into “business intel

> “The patterns when interpreted by domain experts can result in business intelligence.” (p. 1)

> “Our empirical results revealed that the framework helps in discovering actionable knowledge.” (p. 1)

What Makes Something Actionable

- Derives from **meaningful usage patterns** that reflect actual user behaviour.
- Must be interpretable by **domain experts** to support decision-making.
- Should enable **customer-centric strategies** in competitive environments.
- Requires **quality thresholds** (MinTime, MinConfidence) to ensure reliability of patterns.

How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** XWUMF (eXtensible Web Usage Mining Framework)
 - **Methods/Levers:** Hybrid fuzzy clustering + user behaviour analysis; sequential mining with quality thresholds
 - **Operational Steps / Workflow:** Pre-processing → Fuzzy clustering → Usage mining → Pattern discovery
 - **Data & Measures:** Execution time, memory usage; MinTime and MinConfidence thresholds.
 - **Implementation Context:** Tested on WDC dataset + 3 synthetic datasets.
- > “The framework supports a hybrid approach which can have fuzzy clustering techniques and web mining techniques.” (p. 3)
- > “Sequential Web Usage Miner... generates patterns that reflect user behaviour.” (p. 3)

Dimensions and Attributes of Actionability (Authors' Perspective)

- **CL (Clarity):** Yes – Patterns must be interpretable by domain experts.
- **CR (Contextual Relevance):** Yes – Patterns tied to customer behaviour for strategic business use.
- **FE (Feasibility):** Yes – Extensible design allows integration of algorithms suitable for different domains.
- **TI (Timeliness):** Partial – Execution time evaluated, but real-time capability not central.
- **EX (Explainability):** Partial – Domain expert interpretation required; not fully automated explainability.
- **GA (Goal Alignment):** Yes – Focused on customer-centric business intelligence.
- **Other Dimensions Named by Authors:** Extensibility, personalization, performance efficiency.

Theoretical or Conceptual Foundations

- Business intelligence theory (data-to-decision processes)
- Web usage mining and fuzzy logic principles

Indicators or Metrics for Actionability

- Execution time
- Memory usage
- Minimum time threshold (MinTime)
- Minimum confidence threshold (MinConfidence)

Barriers and Enablers to Actionability

- **Barriers:** Domain dependence for interpretation; quality of raw web logs; computational constraints.
- **Enablers:** Extensible framework; hybrid methodology; performance tuning via parameters.

Relation to Existing Literature

The authors situate their work in the context of prior research in fuzzy logic, neural networks, case-based

Summary

Pushpalatha and Reddy (2017) propose XWUMF, an extensible, hybrid framework for mining actionable

Scores

- **Overall Relevance Score:** 78 – Strong implicit definition and explicit feature linkages, but lacking for
- **Operationalization Score:** 82 – Clear operational workflow and algorithm with performance metrics; h

Supporting Quotes from the Paper

- “The patterns when interpreted by domain experts can result in business intelligence.” (p. 1)
- “The framework supports a hybrid approach which can have fuzzy clustering techniques and web mining
- “Sequential Web Usage Miner... generates patterns that reflect user behaviour.” (p. 3)
- “Our empirical results revealed that the framework helps in discovering actionable knowledge.” (p. 1)

Actionability References to Other Papers

- Lin & Hong (2013) – Fuzzy web mining survey
- He (2013) – Case-based reasoning + text mining for UX improvement
- Abello et al. (2015) – Semantic web for OLAP exploration