# Paper Summary

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Title: Evidential Reasoning Approach for Predicting Popularity of Instagram Posts

Authors: L. Rivadeneira, I. Loor

DOI: 10.1109/ACCESS.2024.3510637

Year: 2024

Publication Type: Journal

Discipline/Domain: Computer Science / Social Media Analytics

Subdomain/Topic: Predictive modelling of social media engagement using evidential reasoning

Eligibility: Eligible

Overall Relevance Score: 78

Operationalization Score: 85

Contains Definition of Actionability: Yes (implicit)

Contains Systematic Features/Dimensions: Yes

Contains Explainability: Yes

Contains Interpretability: Yes

Contains Framework/Model: Yes (MAKER)

Operationalization Present: Yes

Primary Methodology: Quantitative / Predictive Modelling (Machine Learning)

Study Context: Instagram post popularity prediction using visual and textual features

Geographic/Institutional Context: Harvard University (USA) & University of Oxford (UK) Instagram accour

Target Users/Stakeholders: Social media managers, marketing professionals, academic institutions, cont

Primary Contribution Type: Methodological framework and comparative evaluation

CL: Yes

CR: Yes

FE: Partial

TI: No

EX: Yes

GA: Partial

Reason if Not Eligible: N/A

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Evidential Reasoning Approach for Predicting Popularity of Instagram Posts

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**Discipline/Domain:**

Computer Science / Social Media Analytics

**Subdomain/Topic:**

Predictive modelling of social media engagement using evidential reasoning

**Contextual Background:**

The paper evaluates the MAKER (Maximum likelihood evidential reasoning) approach for predicting Insta

**Geographic/Institutional Context:**

United States (Harvard University) and United Kingdom (University of Oxford).

**Target Users/Stakeholders:**

Social media managers, marketing teams, academic communication officers, influencers, and analytics re

**Primary Methodology:**

Quantitative — predictive modelling with machine learning algorithms (MAKER, DT, SVM, KNN).

**Primary Contribution Type:**

Methodological framework and empirical validation.

## General Summary of the Paper

The study applies the MAKER algorithm, grounded in evidential reasoning, to predict the popularity of Ins

## Eligibility

Eligible for inclusion: **Yes**

## How Actionability is Understood

Implicitly defined as the capacity of model outputs to guide content strategy decisions through transparen

> “MAKER’s interpretability means that it provides actionable insights… help users make informed decisi

> “While this study focuses on proposing a model for prediction purposes, it is essential to translate these

## What Makes Something Actionable

- Ability to identify specific post attributes correlated with higher popularity.
- Transparency in reasoning (weights, reliabilities, evidence interdependencies).
- Interpretability enabling justification of model outputs.
- Context-specific feature patterns rather than one-size-fits-all rules.

## How Actionability is Achieved / Operationalized

- **Framework/Approach Name(s):** MAKER (Maximum likelihood evidential reasoning).
- **Methods/Levers:** Integration of textual and visual post features into interpretable evidential reasonin
- **Operational Steps / Workflow:** Data collection → Preprocessing → Feature extraction (textual/visual)
- **Data & Measures:** Median likes threshold, emoji/hashtag/mention counts, sentiment, season, image
- **Implementation Context:** Official university Instagram accounts.

> “This transparency yields an interpretable model… examining the relationship between output and inpu

## Dimensions and Attributes of Actionability (Authors’ Perspective)

- **CL (Clarity):** Yes — outputs are interpretable and grounded in transparent parameter assignment.
- **CR (Contextual Relevance):** Yes — feature influence patterns are institution-specific.
- **FE (Feasibility):** Partial — focuses on achievable content adjustments but omits resource constraints
- **TI (Timeliness):** No explicit link.
- **EX (Explainability):** Yes — full traceability of decision process.
- **GA (Goal Alignment):** Partial — aligns model with engagement improvement goals but not broader c
- **Other Dimensions Named by Authors:** Transparency, interpretability, data completeness handling.

## Theoretical or Conceptual Foundations

- Evidential reasoning (ER) rule, based on Dempster-Shafer theory.
- Transparency and interpretability in AI (Rudin, 2019).
- Multimodal content engagement theory from prior social media analytics research.

## Indicators or Metrics for Actionability

- Precision, recall, F1-score, AUC, RMSE (used to assess predictive reliability).
- Likelihood scores for evidence patterns.

## Barriers and Enablers to Actionability

- **Barriers:** API restrictions limiting automated data collection; exclusion of non-picture post formats; lim
- **Enablers:** MAKER’s robustness to incomplete data; integration of multimodal features; transparent m

## Relation to Existing Literature

Extends prior predictive models for Instagram by addressing interpretability and transparency gaps. Unlik

## Summary

The paper demonstrates how MAKER—a maximum likelihood evidential reasoning approach—can delive

## Scores

- **Overall Relevance Score:** 78 — Strong implicit definition of actionability and systematic feature linka
- **Operationalization Score:** 85 — Clear step-by-step operational process tied directly to achieving acti

## Supporting Quotes from the Paper

- “MAKER’s interpretability means that it provides actionable insights… help users make informed decisio
- “Transparency yields an interpretable model… examining the relationship between output and input vari
- “It is essential to translate these findings into actionable strategies for decision-makers…” (p. 13)
- “Harvard’s popular posts typically show positive or neutral sentiment… Oxford’s popular posts… use mo

## Actionability References to Other Papers

- Rudin, C. (2019) on interpretable models vs. black-box AI.
- Yang & Xu (2017) on inferential modelling with data in evidential reasoning.
- Aramendia-Muneta et al. (2021) on key image attributes for engagement.