

Goal-Oriented Requirements Engineering: A Systematic Literature Map – Paper Types and Topics

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Paper Types

Proposal. Any publication that proposes something new, e.g., a language, extension, integration, algorithm, etc. New evaluations of a language or method (e.g., case studies, experiments or experience reports) would not count as a proposal. We decided not to judge the degree of novelty ourselves, as this is very subjective, only to judge if something new was proposed.

Formalization. If the publication contains axioms, some formal logical language, relating to the proposal, it has a formalization. We particularly looked for logical operators (e.g., \neg , \vee , \Rightarrow). Again, it was not our task to judge the quality of the formalization, only if some formalization was present. We did not count pseudocode as a formalization.

Meta study. Publications which provided an significant overview of existing work or a study of existing research. Examples include surveys, reviews, and sometimes vision papers. We looked for publications that emphasized an analysis of existing work beyond the typical related work section.

Implementation. Publications that mention some tool or implementation which facilitates the contribution of the work. We gave no credit for being in the process of building a tool, or providing pseudocode without an implementation. The tool did not have to be implemented by the paper authors.

Integration/Transformation/Mapping. The category was assigned if the publication contribution described two different, distinct, named things, one of which was typically a goal model, which were integrated, transformed, or mapped.

Extension. Publications which focus on some concept which is not a named language or method being added to goal model. (e.g., capabilities, commitments).

Ontological Interpretation. A publication which maps ontologies onto some aspects of goal models. Formalizations are considered interpretations but not ontological interpretations.

We had several different tags for evaluation, which we divided into subcategories.

Evaluation (Benchmark). Evaluating a contribution using an established and shared measure or example.

Evaluation (Controlled Experiment). The publication includes a controlled study in order to evaluate their contribution.

Typically includes elements such as hypotheses, controlled variables, statistical significance, or threats to validity.

Evaluation (Questionnaire). The evaluation includes a questionnaire collecting answers from some target group and evaluating the results.

Evaluation (Case Study). The publication includes a case study which evaluates the contribution. Whether the case study is a case study or only an illustrative example depends on depth and realness. If the case is detailed, real, or if there is more detailed information available in another source, typically it is a case study. The authors do not have to have conducted the case study themselves, but could also use data from an existing case study.

Evaluation (Scalability). The publication evaluate the performance of a method; this could include computational scalability, model size, or scalability in terms of human effort.

Paper Topics

We describe each topic in the following. Many topics combine together related topics, this was particularly done when we found it was difficult to distinguish reliably between different topics, or the topics frequently co-occured. For each topic, we listed a set of helpful keywords. Although we performed keyword searches in the papers, these searches were intended to act as a helpful tool to the manual process. We had no formal category criteria for number of occurrences, but left the assignment of a tag to human judgment.

Agents. The publication uses or talks about agents or actors fairly significantly. *Keywords:* agent, actor

Aspects. Work that uses or talks about software aspects fairly significantly. *Keywords:* aspect

Business Intelligence/Modeling. The publication focuses on the use of analytics, software, or data to drive business decisions. Data is often connected to enterprise or business modeling, showing how the business works. *Keywords:* business intelligence, business modeling, KPI, indicator, enterprise modeling, strategic management

Conflicts. Publications involving all aspects of conflicts, including identification, management, discovery, and resolving. *Keywords:* conflict

Requirements Engineering. The paper focuses on or is in the field of RE. *Keywords:* Requirements Engineering, RE, requirements

Early Requirements Engineering. Publications dealing with the very early stages of RE, often with social, vaguely defined goals. *Keywords:* early, early RE, early requirements, early Requirements Engineering

Model Driven Development. Publications which focus significantly on some form of model-driven-*. The authors should use these words specifically. *Keywords:* MDD, MDE, MDA, model-driven

Non-Functional Requirements(NFRs)/Softgoals. The paper is primarily about NFRs or softgoals, using them significantly in the model, process or analysis. *Keywords:* softgoals, NFR, non-functional

Privacy & Security & Risk & Trust. The publications deals significantly with privacy, security, risk and/or trust. *Keywords:*privacy, security, risk, trust

Systematic Reasoning. The work contains algorithmic or mathematical analysis of a model to answer some question or find some property. This can be formal, qualitative, quantitative, automated, interactive, or manual, as long as it is systematic and repeatable. The reasoning should be demonstrated in the paper, not just just have the potential to do some reasoning. *Keywords:* reasoning, analysis, automated, propagation, evaluation, metrics

Compliance. The publication deals with evaluating compliance with some law, regulation or policy. *Keywords:* compliance, law, policy, regulations

Adaptation & Variability. The paper deals significantly with adaptation, variability, evolution or automatically changing systems and/or models. *Keywords:* adapt*, variability, evolution, autonomic

Architecture. The paper discusses or focuses on some type of architecture, either of software, systems or of a business. *Keywords:* architecture

Patterns. The publication discusses or uses in some significant way some type of pattern: software, design, requirements, etc. *Keywords:* pattern

Agile. A paper discusses, uses or applies all or part of an agile method. *Keywords:* agile, scrum, lean, extreme, XP

Scenario. The paper uses scenarios/use cases/sequences as a requirement engineering technique in conjunction with goal modeling. *Keywords:* scenario, sequence, use case