EDITORIAL: TKDE TOPIC AREA REVISIONS

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INTRODUCTION

With input from the Editorial Board, we have revised TKDE’s topic areas to 1) streamline the focus areas of the journal and 2) cover new emerging areas and technological advancements. We have also taken an inclusive approach when reviewing and revising existing topics.

Our revisions received “no objections” from the IEEE Computer Society Publications Board at its meeting on Wednesday, 9 March 2005, and this editorial documents the main changes in our revisions.

TKDE FOCUS AREAS

Based on the reputation TKDE has established in the past 16 years, we have identified three focus areas (in alphabetic order): 1) data mining, 2) databases and data modeling, and 3) knowledge engineering and intelligent systems. We strongly encourage paper submissions that contribute toward the integration of these focus areas.

In recent years, the journal has been receiving a large number of paper submissions in data mining. We believe TKDE is arguably (or inarguably) the best journal to publish data mining and database research. TKDE is also the premier journal in knowledge engineering.

UNDERLYING COMPUTATIONAL PLATFORMS AND EMERGING APPLICATIONS

In addition to the three focus areas mentioned in Section 2, we have also listed underlying computational platforms and emerging applications as two additional subject areas for TKDE, each of which can cover one or more of the three focus areas above. We have named these two subject areas, “underlying computational platforms for knowledge and data engineering” and “emerging knowledge and data engineering Applications” to clearly indicate that TKDE does not claim general topics such as distributed and parallel systems, bioinformatics, and Web services, but we do have very relevant areas, such as distributed data mining, distributed databases, distributed expert systems, and data analysis and knowledge processing in bioinformatics and Web services that are active research topics in TKDE.

These two subject areas have also simplified the original topic listing. For example, there were “distributed file systems,” “distributed control,” “distributed query processing,” and “distributed [knowledge] processing” in the original topic listing.

MAIN REVISIONS

Our revisions have been performed at two levels: one on the subject areas and the other on the itemized topics under each subject area.

As mentioned in Sections 2 and 3, there are now five subject areas:

1. Data mining, which is a shortened name for the original subject area of data mining and knowledge discovery.
2. Databases and data modeling, which consolidates the original subject areas of databases, data structures and algorithms, distributed databases, and object-oriented systems.
3. Knowledge engineering and intelligent systems, which covers the original subject areas of artificial intelligence, knowledge management, knowledge processing, and languages and interfaces.
4. Underlying computational platforms for knowledge and data engineering, which is basically a new subject area, and provides itemized topics that are relevant to the above three focus areas.
5. Emerging knowledge and data engineering applications, which is an existing subject area with more application domains.

After the above subject areas had been identified, we examined each topic in the original topic listing carefully to check the following possibilities:

- It is unclear or too general and needs to be renamed.
- It is too specialized or otherwise to be listed a research topic.
- It has been subsumed by other topics.
- There is no recent interest.

Appropriate action has been taken with each of these possibilities. For example, in databases and data modeling, we have taken out “database views” and “relational models” due to the lack of recent interest, and in knowledge engineering and intelligent systems, we have combined “inference control” and “logical inference” into “inference
engines.” Meanwhile, we have also added new topics in each of the five subject areas. For example:

1. In data mining: outlier detection and spatial and temporal data mining.
2. In databases and data modeling: caching and prefetching, data quality, mobile databases, and schema evolution.
3. In knowledge engineering and intelligent systems: case-based reasoning, evolutionary computing, information extraction, ontologies, soft computing, and semantic Web.
4. In underlying computational platforms for knowledge and data engineering: agent architectures and systems, hybrid computing, and mobile systems.
5. In emerging knowledge and data engineering applications: bioinformatics, business intelligence, digital libraries, health science and medical systems, privacy, security, social networks and graph analysis, streams and sensor databases, and Web services.

5 CONCLUDING REMARKS
We have taken an open approach in the topic area revisions and we believe the revised version is more relevant and more up-to-date in relation to the field of knowledge and data engineering, with clearly identified focus areas. Meanwhile, since knowledge and data engineering is still an evolving field, we need to update our topic listing with new emerging areas and technological advancements when the need arises again. Comments and advice are always welcome.

APPENDIX
REVISED TKDE TOPIC AREAS
This revised version has been put on the journal Web site http://www.computer.org/tkde/author_new.htm#Subject Areas and is given below for the record.

1. Data mining:
   • mining methods and algorithms (including classification, regression, clustering, probabilistic modeling, and association analysis),
   • machine learning,
   • data and knowledge representation,
   • mining of structured, textual and multimedia data,
   • data and knowledge visualization,
   • interactive data exploration and discovery,
   • outlier detection,
   • personalization,
   • spatial and temporal data mining,
   • Web mining,
   • complexity, efficiency and scalability issues in data mining, and
   • data mining systems and tools.

2. Databases and data modeling:
   • active databases,
   • caching and prefetching,
   • concurrency control,
   • data encryption,
   • data indexing and organization,
   • data quality,
   • database architectures,
   • database integration,
   • database models,
   • database query languages,
   • database semantics,
   • deductive databases,
   • file systems,
   • hashing methods,
   • main memory and cache aware databases,
   • mobile databases,
   • multimedia systems,
   • object-oriented databases,
   • physical database design,
   • query processing and optimization,
   • schema evolution,
   • secure databases,
   • semantic integrity,
   • spatial databases
   • statistical databases,
   • string matching,
   • temporal databases,
   • transaction processing, and
   • XML.

3. Knowledge engineering and intelligent systems:
   • application-oriented intelligent systems,
   • automatic programming,
   • case-based reasoning,
   • CASE tools,
   • constraint satisfaction,
   • decision support,
   • deductive reasoning,
   • evolutionary computing,
   • expert systems,
   • heuristics design,
   • inference engines,
   • information extraction,
   • knowledge acquisition,
   • knowledge management,
   • knowledge base verification,
   • knowledge-based software engineering,
   • knowledge-based systems,
   • knowledge integration,
   • knowledge representation,
   • logic programming,
   • rule-based processing,
   • nonmonotonic reasoning,
   • ontologies,
   • reasoning systems,
   • search engines,
   • soft computing (including neural networks, fuzzy logic, probabilistic reasoning, and rough set theory),
• uncertainty processing,
• semantic Web,
• theorem proving, and
• user interface.

4. Underlying computational platforms for knowledge and data engineering:

• agent architectures and systems,
• distributed and parallel systems,
• high-performance computing systems,
• hybrid computing, and
• mobile systems.

5. Emerging knowledge and data engineering applications:

• bioinformatics,
• business intelligence,
• digital libraries,
• electronic commerce,
• health science and medical systems,
• mobile data accesses,
• privacy,
• security,
• social networks and graph analysis,
• streams and sensor databases,
• Web data management, and
• Web services

ACKNOWLEDGMENTS
We would like to thank the following associate editors for their comments and advice during the revision process: Johannes Gehrke, Nick Koudas, Jiming Liu, Ling Liu, and Qiang Yang.

Xindong Wu, Editor-in-Chief
Christos Faloutsos, Associate Editor-in-Chief