

**ONTOLOGY-DRIVEN PERSONALIZED EXPERT  
RECOMMENDER SYSTEM FOR IT SERVICE  
MANAGEMENT**

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## Declaration

I declare that this is my own work and this dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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## **Dedication**

I dedicate this work to my dear parents who are always supporting and encouraging me to achieve better in academics.

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## **Abstract**

**Finding experts related to a given query in an industrial environment is a time-consuming manual task. Much research has been conducted in this area using multiple intelligent techniques, but still, there are research gaps with personalizing the recommendation accurately. In this context, an expert recommender system should consider the expert's preference, experience, and other factors as well as complex organizational processes involved in the recommendation task. Also achieving high accuracy with other conflicting conditions simultaneously is a popular topic in recent research related to recommender systems.**

**This thesis presents our hybrid approach to enhance the personalized expert recommendation problem in enterprise context. We integrate semantic-based ontology with the TOPSIS based Artificial Bee Colony algorithm to achieve high accuracy in this problem domain. Ontology is used for knowledge modeling of the expert profiles and the TOPSIS-ABC algorithm is used for ranking the profiles for a given query based on the distance to the ideal solution.**

**Key words: Expert Recommender Systems, Multiobjective Optimization, ABC Algorithm, TOPSIS Method**

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## List of Abbreviations

Abbreviation	Description
ABC	Artificial Bee Colony
ACM	Association for Computing Machinery
ACO	Ant Colony Optimization
ACT	Author Conference Topic
ADJ	Adjective
ADV	Adverb
AHP	Analytic Hierarchy Process
AI	Artificial Intelligence
API	Application Programming Interface
APT	Author Persona Topic
ARM	Author and Co-Author Relationship Model
ARS	Answerer Recommendation System
ASN	Academic Social Network
ATM	Author Topic Model
AWS	Amazon Web Services
BAT	Bat Algorithm
BOW	Bag of Words
CONJ	Conjunctions
CPU	Central Processing Unit
DBLP	Digital Bibliography & Library Project
DE	Differential Evaluation
DEMOIR	Dynamic Expertise Modeling from Organizational Information Resources
DL	Description Logic
ELK	ELK is a reasoner for OWL 2 ontologies that currently supports a part of the OWL EL ontology language
ERS	Expert Recommender System
FSS	Fish School Search
GSA	Gravitational Search Algorithm
HITS	Hyperlink-Induced Topic Search
ID	Identity
TF-IDF	Term Frequency–Inverse Document Frequency
IT	Information Technology
ITIL	Information Technology Infrastructure Library
ITSM	Information Technology Service Management
IWO	Invasive Weed Optimization
JIRA	Proprietary Bug Tracking Tool
JQL	Jira Query Language
L1	Level 1 support

L2	Level 2 support
L3	Level 3 support
LDA	Latent Dirichlet Allocation
LSA	Latent Semantic Analysis
LSI	Latent Semantic Index
MAP	Mean Average Precision
MITRE	American not-for-profit organization
NER	Named Entity Recognition
NLP	Natural Language Processing
NLTK	Natural Language Toolkit
NMF	Non-negative Matrix Factorization
ORG	Organization
OS	Operating System
OWL	Web Ontology Language
PCA	Principal Component Analysis
PLSA	Probabilistic Latent Semantic Analysis
POC	Proof of Concept
POS	Part-of-speech
PREP	Prepositions
PSO	Particle Swarm Optimization
RAF	Research Analytics Framework
RAM	Random Access Memory
RDF	Resource Description Framework
RP	Random Projection
RR	Reciprocal Rank
RRF	Reciprocal Rank Fusion
RTM	Rough Threshold Model
SI	Swarm Intelligence
TOPSIS	Technique for Order of Preference by Similarity to Ideal Solution
TRM	Topic-document Relationship Model