Peter VOJTEK

Moderated Iterative Multi–relational Classification

supervisor Proffesor. Mária BIELIKOVÁ

Attribute–based classification:
• assign one or more *classes*
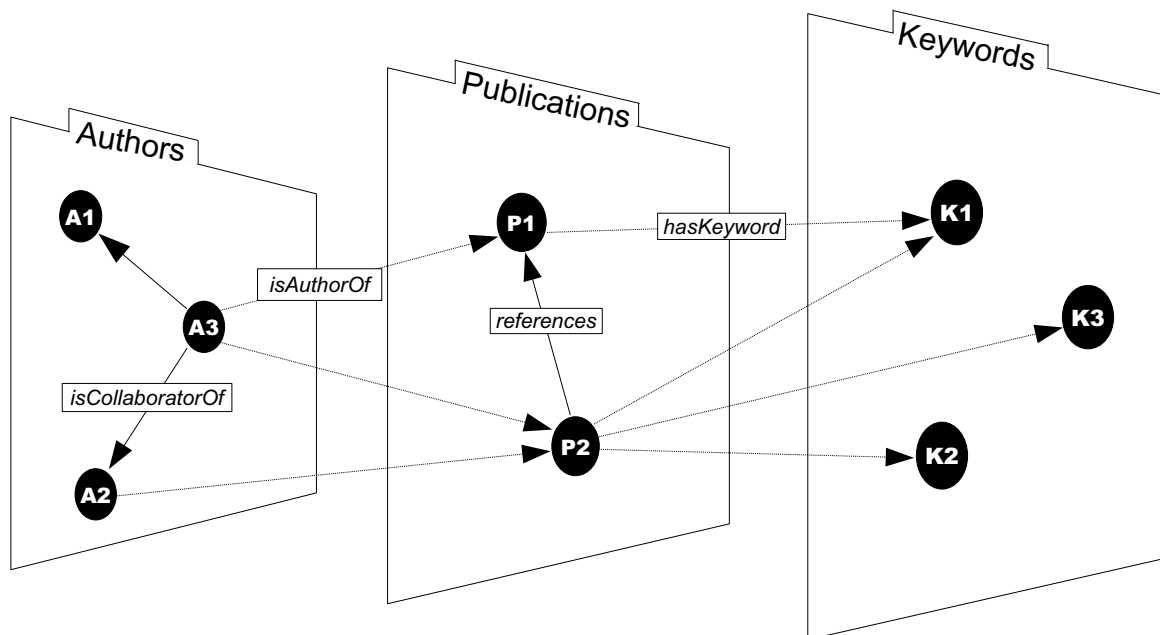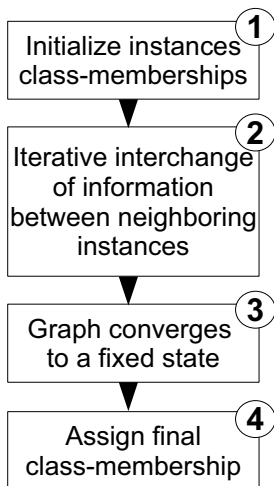• to a treated *instance*
• according to its *attributes*

Relational classification:
• use *graph* structure of data
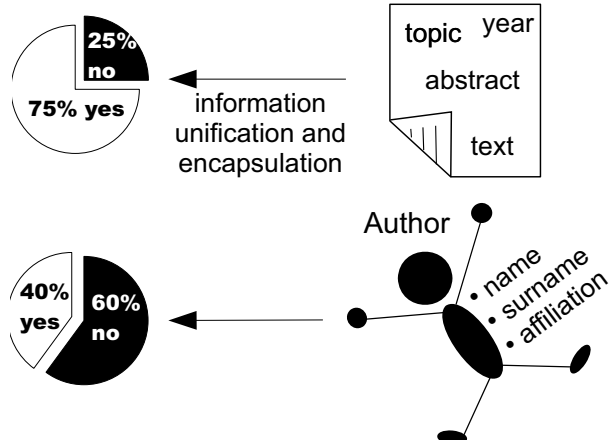• classify according to attributes and *neighboring* instances

Multi–relational classification:
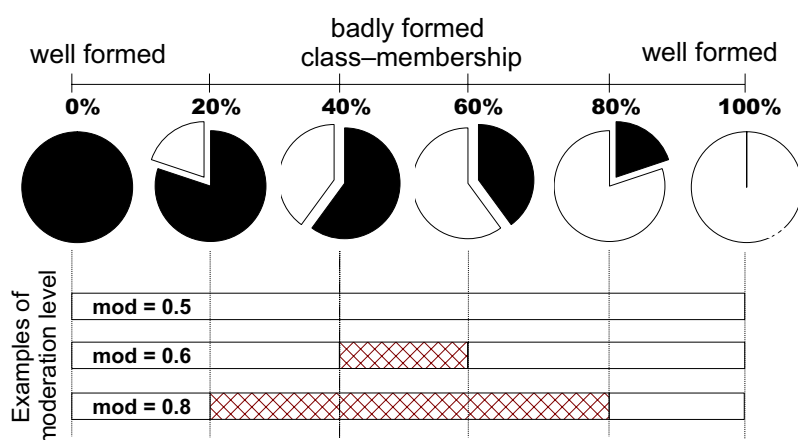• *many* different instance *types* and relation types in a *graph*

Algorithm

1. Initialize instances class-memberships
2. Iterative interchange of information between neighboring instances
3. Graph converges to a fixed state
4. Assign final class-membership

Authors — A1, A2, A3
Publications — P1, P2
Keywords — K1, K2, K3
isAuthorOf, isCollaboratorOf, references, hasKeyword

Binary class–membership of class:*Hardware*

25% no / 75% yes

information unification and encapsulation

Publication
topic year
abstract
text

40% yes / 60% no

Author
• name
• surname
• affiliation

Moderated class–membership interchange

well formed
badly formed class–membership
well formed

0% 20% 40% 60% 80% 100%

Examples of moderation level

mod = 0.5	
mod = 0.6	
mod = 0.8	

Experiments

MAPEKUS dataset
• digital publications from ACM
• 4 000 publications
• 7 600 keywords
• 9 700 authors
• 35 000 edges (relations)

21 300 instances

Change moderation level and observe *accuracy gain*

$$accuracy = \frac{truePositives + trueNegatives}{whole\ population}$$

Accuracy gain [%]
Moderation level
0,5 0,55 0,6 0,65 0,7 0,75 0,8 0,85 0,9 0,95 1

ACM classes
— General Literature
— Software
— Data

unmoderated (original) multi–relational classifier

highest gain when mod ∈ (0.85, 0.95)