

The Goal Behind the Action: Toward Goal-aware Applications

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GOAL-AWARE SYSTEMS

I. GOAL MODELING

MAIN ISSUES

- Which are the possible goals?
- How can they be operationalized?

BASED ON

- Expert-knowledge (complete records, closed-world assumption domains)
- Actions or variables organized in goal taxonomies
- Past goal implementations and action sets (corpuses)
- Hypotheses on what triggers user actions towards goal fulfillment based on observations or knowledge from other fields (e.g., sociology)

METHODOLOGIES

- Analysis/information Extraction from Resources
- Experimental Software Use
- Annotation/User studies conduction
- Rule Definition
- Hypotheses Formulation

II. GOAL RECOGNITION

MAIN ISSUES

- Which is the goal(s) the user is currently pursuing?
- Or which are the user *goals of interest*?

- Probabilistic Inference
- Graph Traversal
- Model Prediction

III. GOAL EXPLOITATION

- How should the system or monitored environment adapt? (Dynamic environment changes)
- How are system responses adapted? (Algorithmic Solutions)

HOW DO WE PERCEIVE PURSUED GOALS: EXAMPLES OF DIFFERENT CASES

I. BY MONITORING



Trees: yes
Ground: yes
Grass: yes
Cars: no
Road: no

Place: park
Clothes: training clothes
Shoes: running shoes
Briefcase: no

Location: Y1... Y2 ... Y3 ...

- Variable values through
 - Sensors
 - Internet-Connected Devices (IOT)
 - Interface Objects
 - GPS information

II. BY ANALYSING

...HP systemRAID 0 controller ...
disk ... JBOD.install Hadoop
perform.. disk degrade ...disks
asking ... wantinstall Linux

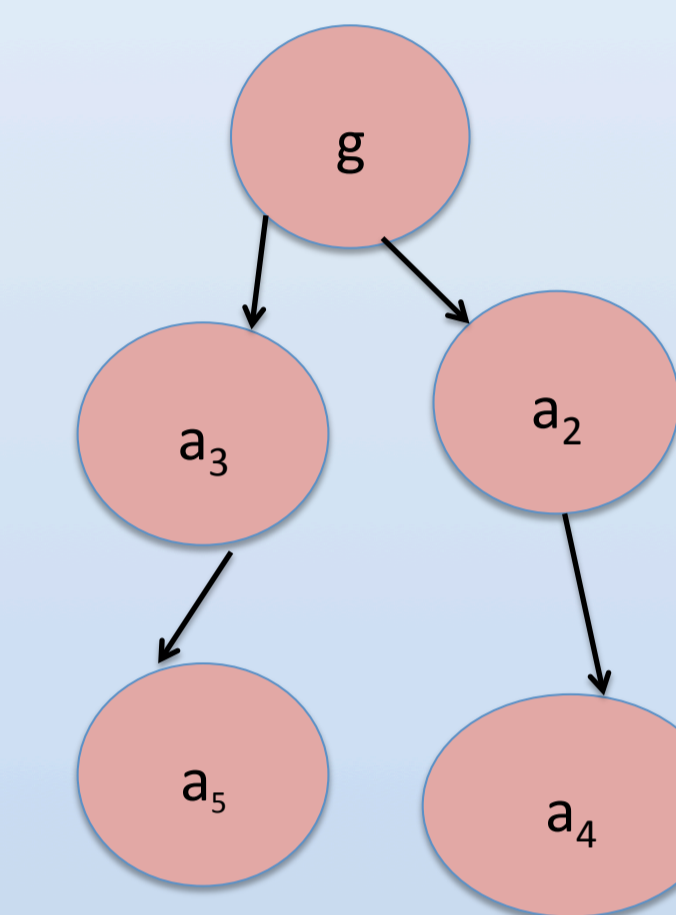
I have I would like to install ...
Do you know whether it would
performFriends have downloaded
... it didn't work. It stopped ...site was
suggesting

I am asking ... I do not want to install
...realize configuration is not

- Text characteristics
- User Annotations
- Text Structure

III. BY RECORDING

III. A



III. B

P (g): Prior probabilities a goal is pursued

P (S_t|S_{t-1}, g) : State transition probabilities

P (act_t|S_t, g) : Probabilities of action occurrences

- Action Sequences
- Action Sets
- Pursued Goals
- State Transitions and Actions
- State Transitions

GOAL-AWARE SYSTEM CASE

Finding Related Posts in Forums [3]
considering Content Similarity over Intention based Segmentation

MAIN STEPS

- Identify Segments Intended for different communication goals *within each post*.
- Identify Segments from *different posts* serving the same goal (Intention clusters).
- Match a *post-query* to the *related posts* considering their terms weighted based on the intention cluster(s) they belong (2 phases).

BENEFITS IN CLASSICAL SYSTEMS BY EXPLOITING GOALS

Going beyond classical data representation and analysis

- Rationalization, Context and Meaning to human actions (including selections, purchases, queries etc.)
- Better systems and novel services for the end-user

	Retrieval	Querying	Recommendation
Interestingness	✓	✓	✓
Personalization	✗	✗	✓
Serendipity	✓	✓	✓
Extra knowledge	✓	✓	✓
Effectiveness	✓	✓	✓

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ACKNOWLEDGEMENTS

Work partially supported by the ERC grant Lucretius 267856 and the Keystone Cost Action IC1302.