Improved Agent based E-Brainstorming with Privacy Preference Ontology

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Abstract. E Brainstorming is a computerized version of sharing ideas and it replaces verbal communication. In Agent-based E-Brainstorming, Idea Ontology was used to map user’s knowledge with idea names and relationships between idea instances. It provided minimum privacy settings such as granting privileges to all people belonging to one social group to access their information. This paper incorporates Privacy Preference Ontology (PPO) that enables participants to create fine-grained creative ideas. PPO is a lightweight vocabulary on top of the web access control (WAC) Ontology aiming to provide access control privileges for specific data like user’s personal information. FOAF (Friend of a Friend) vocabulary is reused with Agents to share private data with similar groups or friends. This work further enhances Agent-based E-Brainstorming with privacy measures.

Keywords- E-Brainstorming, Intelligent agents, Privacy Preference Ontology (PPO), Web Access Control (WAC), FOAF (Friend of a Friend).

1 Introduction

E-Brainstorming (EB) is a computerized format of sharing ideas and it replaces verbal communication [3]. This technique allows all the participants to contribute their ideas at same time and it effectively eliminates Production Blocking [5] and reduces Social Loafing. [2] Briggs and Reining provided a theoretical explanation in Bounded Ideation Theory to clarify the relationship between idea quantity and idea quality. [1] Yuan and Chen integrated human thinking and intelligent agent techniques to create automatic decision makers. This agent based E-Brainstorming was applied to an intelligent care services (iCare) [6] projects.

In Agent-based E-Brainstorming technique, [1] Reinforcement Learning methods based on Q-Learning are used to design the SILA. This Agent-based E-brainstorming mechanism has limitations, owing to the confined scope of ideation Ontology and they do not consider the social aspects of users. An analysis of Brainstorming was done to gain more Knowledge about innovative idea generation. This work incorporates [7] Privacy Preference Ontology (PPO) a lightweight vocabulary on top of the Web Access Control (WAC) ontology aiming to provide or restrict the access for specific data between the agents [10]. By introducing PPO, [8] access control
privileges could be introduced to the users for accessing data. WAC (Web Access Control) Vocabulary defines the read and write access control privileges. A Literature survey is done on Q-Learning algorithms to enhance the reward function for choosing ideas [4]. This paper uses scalable and reusable ontology like FOAF, [9] to integrate agent based E-Brainstorming with Privacy Preference Ontology.

2 Social Web Ontology

In agent-based E-Brainstorming idea associations are made based on the representation of idea ontology. FOAF (Friend of a Friend) - It describes connections between social websites and aspects. SIOC (Semantically Interlinked Online Communities) - It describes information about online semantic web e.g. message boards and web logs.SKOS (Simple Knowledge Organization System) - It shares and links knowledge organization systems via the semantic web. It also maps the generated ideas.

![Social web ontology](image)

**Figure:** Social web ontology

In Fig: Social web Ontology is integrated together to form Privacy Preference Ontology. The Brainstorming session users will have social network information that is defined by FOAF. SIOC vocabulary will define online information. Further, SKOS keeps all generated ideas organized and it allows hierarchical organization of ideas. Through modeling comments, [9] [10] certain reviews and evaluations considered that ontology reuses different vocabularies for e.g. FOAF, SIOC & SKOS.

3 E-Brainstorming with PPO

This model can be applied to any Social data. Privacy preferences are applied with FOAF profiles and view others user’s profiles, filtered according to their privacy preferences. Privacy Preference defines, which resources, statement or named graph to restrict access, the condition to refine what to restrict, the access control type and an access space containing a graph pattern representing what must be satisfied by the requesting information. The access control type is defined by using the Web Access
Control (WAC) vocabulary which defines the Read and Write access control privileges.

In Fig: 2 PPO is integrated in between the user profile and agents to verify and authenticate user group. The Administrator manages the agent requestor’s request made on user data based on the privilege assigned. FOAF is used with user profile to identify the similarity of groups.

3.1 Module Description

- **Open Problem & valued idea component** - Here an initial idea is given to participants as open problem. Both participants & open problem sends two parameters, initial idea and client to PPO system.
- **User Profile** - User’s fundamental information is manipulated With FOAF (Friend of a Friend).
- **Agent Requestor** - It is an intelligent agent that requests and Retrieves information from the Administrator. For all the participants an individual web ID is created and then allowed to manipulate their information from the user profile. Administrator authenticates the participants with their web ID.
- **Functions of Agent Requestor** - Receiving input from Brainstorming session, accessing user’s domain knowledge, creating an innovative idea and returning creative ideas to Brainstorming session.
- **E-Brainstorming Session** - It receives initial idea and participants as parameters. It builds a communication platform to provide an environment in which agents can learn and share their knowledge.

![Figure 2: Agent-Based PPO Model](image)

- **Integrating PPO with Agents**
  Agents represent its participants to attend the brainstorming session and manage the process of idea associations. The functions of agents are receiving Input idea from the brainstorming session, accessing client’s domain knowledge, creative idea generation and returning creative ideas to brainstorming session. Here participant’s privacy preferences are manipulated using PPO.
• Idea chosen Module
The Brainstorming session assigns a numeric value, called the Idea Chosen Indicator, for every creative idea. This module can perform a valued idea selection according to the user’s criteria. (Sorting or Filtering) If the Idea Chosen Value is over a particular bound that creative idea is chosen and delivered to valued idea set.

4 Conclusion and Future Work
This paper presents the effective method of E-Brainstorming with security for the user’s data. The Agents are linked with social web ontology for ensuring privacy preferences. The access control mechanisms are carried out and a FOAF Ontology is reused here to restrict access to the controlled group of users. The user’s profile is integrated with the Privacy Preference Ontology to work with closed groups and authenticate friends groups. Future work will incorporate different privacy access permissions with device based environment e.g. mobile, smart phones and new association techniques. Semantic ideation ontologies could be used with idea evaluation system, Ideation map construction and Modified Neural network based agents.

References

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