ABSTRACT

Emergency management system Necessitates for an IT infrastructure that facilitates to collaborate with multiple agencies, share data sources, and find appropriate services. Cloud is a “as a service” style of computing that enables on-demand self-service, network access to a shared pool of resources suitable to effectively deploy an emergency management system. Emergency responders and service providers can use the cloud to store data and applications, and can interact with the Cloud via the Internet. Cloud services are normally exposed as Web services that allow applications to be integrated more rapidly, following the industry standards such as WSDL, SOAP and UDDI. However with proliferation of web services, increasing number of selection parameters and constraints automatic discovery of relevant services has gained a research attention.

Agent systems are self-contained software programs embodying domain knowledge and having ability to behave with a specific degree of independence to carry out actions needed to achieve specified goals. Agents are well-suited for automation as they are autonomous, communicative and capable of operating without user intervention responding to changes in its environment. Semantic Web technologies pooled with agent technology can automate interactions between web services supporting discovery. The self organizing agents can produce a collective outcome resulting from local interactions among simple individual components. A Multi Agent System globally coordinates information from sources that are spatially distributed. It also enhances overall system performance, specifically along the dimensions of computational efficiency, reliability, extensibility, robustness,

maintainability, responsiveness, flexibility and reuse. Associated properties and characteristics of self-organization and Multi agent systems support the web service discovery.

The key limitations identified in current approaches for web services discovery are: (i) Clients cannot learn from past experiences to improve, up to date information on consumer's request. (ii) Clients have to search from web each time when they request for services which is time consuming task and requires lot of effort. (iii) Service providers and consumers don't use the same language for registration and discovery. This necessitates the development of dynamic automated semantic web service discovery framework with emphasis on the research issues namely (i) Automating web service discovery process, (ii) Addressing Scalability, (iii) Achieving Interoperability and (iv)incorporating Dynamism in web service discovery process.

Based on the investigation carried out on existing methods and considering the above research issues, this work attempts to design and development of the self organizing agent based architecture for semantic web service discovery in cloud. Cloud computing is chosen for realizing the architecture in order to achieve **scalability**. The 3 layers in the architecture are Preprocessing Layer, Interface Layer and Processing Layer. Each layer encompasses a set of self organizing agents to accomplish their tasks for achieving **automation.** **Preprocessing layer** deals with registration and clustering of services under a suitable domain using the agents namely Business Interface, OWL-S Converter Agent for addressing **Interoperability**, OWL-S Augmentation Agent and Clustering Agent. The **Interface layer** acts as a mediator to receive the query from the user, searches the history and communicates the details to the associated layers. The **processing layer** is responsible for the discovery of the relevant cloud and appropriate services.

Agents for leveraging automation and **dynamism** include Delegator Agent, Cloud search Agent, Functional Matching Agent, Non Functional Matching Agent, Monitoring Agent and Update Agent too. The semantic repository encompasses ontology that portrays the cloud and services, history credentials and index for the clustered services. The research also verifies various components of this architecture using the measures such as precision, recall, F-measure, accuracy and the statistical method called Analysis of Variance Technique.