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SEMANTICS OF DATA MINING SERVICES IN CLOUD COMPUTING

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Abstract

The recent addition of new Data Mining and Machine Learning services inside Cloud Computing providers empowers users with incredibly broad data analysis capabilities that include all of the benefits of this kind of environment. Cloud Computing service providers for Data Mining offer descriptions and definitions in a variety of formats that are often incompatible with the formats of other providers. From a practical standpoint, the ability to describe entire Data Mining services is critical for maintaining usability and, notably, portability of these services regardless of software/hardware support or even variations across cloud platforms. In this work , We design two applications such as cloud and user. The cloud application get a trained random forest machine learning algorithm on diabetes dataset after preprocessing the data set. After training random forest algorithm, we can publish this services by start cloud server. Any user from same or different system can upload test data from 'User' application and then this user application will connect to cloud machine learning service and then send input dataset to cloud and cloud application will predict disease from test dataset.

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I INTRODUCTION

Cloud Computing has been introduced into our daily lives in a completely transparent and friction-less way. The ease of Internet access and the exponential increase in the number of connected devices has made it even more popular. Adopting the phenomenon of CC means a fundamental change in the way Information Technology (IT) services are explored, consumed or deployed. CC is a model of providing services to companies, entities and users, following the utility model, such as energy or gas. CC can be seen as a model of service provision where computer resources and computing power are contracted through the Internet of services (IS). A big part of the CC services providers are currently leveraging their wide computing infrastructure to offer a set of web services to enterprises, organizations and users. The increase in the volume of data generated by companies and organizations is growing at an extremely high rate. According to Forbes, in 2020, the growth is expected to continue and data generation is predicted to increase by up to 4,300%, all motivated by the large amount of data generated by service users. By 2020, it is estimated that more than 25 billion devices will be connected to the Internet, according to Gartner, and that they will produce more than 44 billion GB of data annually. In this scenario, CC providers have successfully included data analysis services in their catalogue of services for massive processing of data and DM.These services allow the application of Artificial Intelligence (AI) and Machine Learning (ML) techniques on a large variety of data, offering an extensive catalogue of algorithms and workflows related to DM. Services, such as Amazon Sage Maker 1 or Microsoft Azure Machine Learning Studio 2 (Table 1), offer a set of algorithms as services within CC platforms. Following this line, other CC platforms such as Algorithmia3 or Google Cloud ML4 , offer ML services at the highest level, providing specific services for the detection of objects in photographs and vid**eo,** sentiment nalysis, text mining or forecasting, for instance. Each CC service provider offers a narrow definition of these services, which is generally incompatible with other service providers. For instance, where one provider has a service for RF algorithm, another provider has another name, features, or parameters for that algorithm, although the two might be the same. This makes it difficult to define services or service models independent of the provider as well as to compare services through a CC service broker. Indeed, a standardization of the definition of services would boost competitiveness, allowing third parties to operate with these services in a totally transparent way, skipping the individual details of the providers. The effectiveness of CC would be greatly improved if there were a general standard for services definition

II LITERATURE SURVEY

Literature surveys on semantics of data mining services in cloud computing typically cover various aspects of the topic, including definitions, challenges, existing solutions, and future directions. Here's a general outline of what such surveys might include: Introduction to Semantic Data Mining Services in Cloud Computing: Define the concept of semantics in the context of data mining services. Discuss the importance of semantics for enhancing interoperability, reusability, and integration of data mining services in cloud computing environments.

Challenges and Requirements:

Identify the challenges and requirements associated with semantics of data mining services in cloud computing, such as interoperability, data integration, scalability, and privacy.

Existing Solutions and Approaches:

Review existing research and literature on semantics of data mining services in cloud computing. Discuss various approaches and methodologies proposed by researchers and practitioners to address the challenges and requirements identified.

Semantic Modeling and Representation:

Explore different semantic modeling and representation techniques used for describing data mining services in cloud computing, including ontologies, taxonomies, and knowledge graphs.Discuss the advantages and limitations of each approach in terms of expressiveness, scalability, and interoperability.

Semantic Interoperability and Integration:

Examine methods and technologies for achieving semantic interoperability and integration of data mining services in cloud computing environments. Discuss standards, protocols, and frameworks that facilitate semantic data exchange and communication between heterogeneous systems.

Semantic-driven Data Preprocessing and Analysis:

Investigate how semantics can be leveraged to improve data preprocessing and analysis tasks in data mining services. Discuss techniques for semantic annotation, enrichment, and alignment of data to enhance its quality and relevance for mining.

Semantic-aware Resource Management:

Explore approaches for semantic-aware resource management in cloud computing environments, including dynamic provisioning, allocation, and optimization of computational resources based on semantic metadata.

Semantic-driven Decision Support and Visualization:

Discuss how semantics can be used to enhance decision support and visualization capabilities in data mining services.Explore methods for semantic-based knowledge discovery, pattern recognition, and visualization of mining results.

Use Cases and Applications:

Provide examples of real-world use cases and applications where semantics of data mining services have been successfully applied in cloud computing environments. Highlight the benefits and impact of semantic technologies on improving the efficiency,accuracy, and usability of data mining services.

Future Directions and Open Challenges:

Identify emerging trends, future research directions, and open challenges in semantics of data mining services in cloud computing.Discuss potential areas for innovation and advancement, such as semantic-driven machine learning, federated data mining, and privacy-preserving analyti**cs**

III EXISTING SYSTEM

There are several proposals for the definition of services. These proposals cover an important variety of both syntactic and semantic languages in order to achieve a correct definition and modeling of services. For the definition of this type of DM services, there is no specific proposal, due to the complexity of the services represented. Solutions based3 on the proposal offered by Linked Data can solve the problem of defining services from a perspective more comprehensive. Linked Data undertakes models and structures from the Semantic Web, a technology that aims to expose data on the web in a more reusable and interoperable way with other applications. The Linked Data proposal allows you to link data and concept definitions from multiple domains through the use of the Semantic Web articulated with RDF or Turtle languages

Disadvantages

➢ May be loss of data occurs. The complexity of DM/ML services requires a complete specification

➢ Expose data on the web in a more reusable and interoperable way with other application was not applicable

IV PROBLEM STATEMENT

Existing schemata and vocabularies that have been modified for the challenge of defining DM services have been utilized for the modeling of the various service components. Furthermore, previously unavailable new vocabularies covering particular aspects of the domain have been developed. We introduce dmcc-schema, a proposal built on Linked Data that encompasses the full scope of DM/ML cloud services definition and enables their interchange, search, and integration within CC**.**

V PROPOSED SYSTEM

the main objective of this work is the definition of DM services for CC platforms taking into account the Linked Data principles. The definition of the service is not only focused on the main part of the service (algorithms, workflow, parameters or models), but also allows the definition and modeling of prices, authentication, SLA, computing resources or catalogue. The dmcc-schema proposal provides a complete vocabulary for the exchange, consumption and negotiation of DM services in CC. With this schema it is possible to make queries in SparQL [10] about this type of CC DM services and obtain,for example, the set of providers that offer a certain algorithm, as well as the economic cost of the service. This allows for the comparison between different providers and DM services from varying points of view (costs, regions, instances, algorithms, etc). For the modelling of the different components of the service, existing schemata and vocabularies have been used, which have been adapted to the problem of the definition of DM services. In addition, new vocabularies have been created to cover specific elements of the domain that have not been available up until now. We present dmcc- schema, a proposal based on Linked Data to cover the entire definition of DM/ML cloud

services and that allows the exchange, search and integration of this type of services in CC

Advantages:

Comprehensive Definition dmcc-schema provides a comprehensive vocabulary for defining DM/ML cloud services, covering not only the core aspects such as algorithms, workflows, and parameters but also ancillary components like pricing, authentication, service level agreements (SLAs), and computing resources. This holistic approach nables a thorough description and modeling of DM/ML services, facilitating their consumption and integration within CC platforms Linked Data Principles: By adhering to Linked Data principles, dmcc-schema ensures the interoperability, reusability, and extensibility of service definitions. Linked Data technologies such as RDF enable the creation of semantically rich and interconnected service descriptions, allowing for efficient querying, discovery, and integration of DM/ML services across heterogeneous environments.Query Capabilities: The use of SPARQL queries enables powerful search and retrieval capabilities for DM/ML cloud services based on various criteria such as algorithms, providers, pricing, regions, and instances. This facilitates the comparison and evaluation of different service offerings, empowering users to make informed decisions based on their specific requirements and preferences.

Standardization and Consistency: dmcc-schema promotes standardization and consistency in the definition and exchange of DM/ML services within CC platforms. By leveraging existing schemata and vocabularies while also introducing new ones to address domain-specific elements, dmcc-schema ensures uniformity and compatibility across service descriptions, fostering interoperability and ease of integration.Integration and Interoperability: The use of dmcc-schema enables seamless integration and interoperability of DM/ML services with other CC resources and applications. Service descriptions encoded in dmcc-schema can be easily consumed and integrated into existing CC platforms, enhancing their functionality and value.

VI IMPLEMENTATION

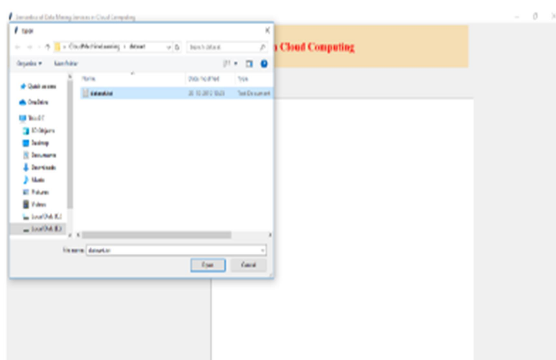
Cloud: this module will upload diabetes dataset and then train random forest algorithms and then publish cloud service. This service will accept input from user and then apply random forest to predict disease from test data.

User: this application will upload test data and then connect to cloud servicesand then send test data to cloud and cloud service will predict disease from test data.

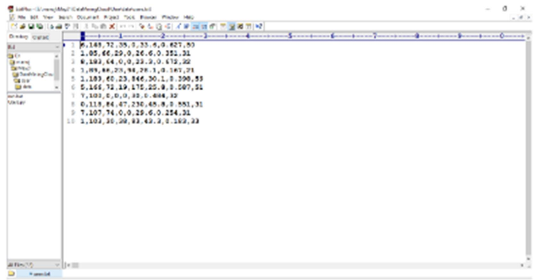
Algorithms:

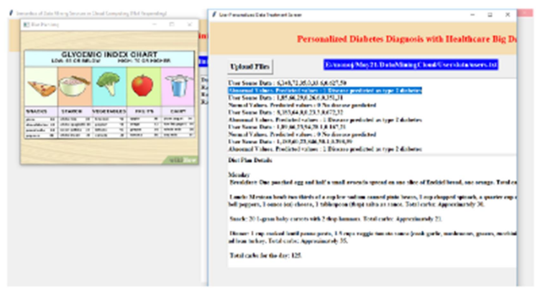
Random Forest -Random fore st is a commonly-used machine learning algorithm trademarked by Leo Breiman and Adele Cutler, which combines the output of multiple decision trees to reach a single result. Its ease of use and flexibility have fueled its adoption, as it handles both classification and regression problems.

VII RESULTS



Screenshort-8.1.6 Run Start Cloud Server And Publish Ccdm Services





VIII CONCLUSION

In this article we have presented dmcc-schema, a simple and direct schema for the description and definition of DM services in CC. Our proposal tries to gather, on the one hand, everything related to the definition of the experimentation, workflow and algorithms and on the other hand, all the other aspects that compose a complete CC service. Our schema has been built on the basis of Semantic Web, using an ontology language to implement it and following the Linked Data directives regarding the re-use of other schemata, which perfectly enrich the service modelling that has been designed. dmcc-schema is presented as a light-weight tool for services modelling that allows the creation of a complete DM service that includes all providers of the CC platforms, adapting in a flexible way to the differences of definition and description of services of the most well-known providers.o The example of use shown, illustrates the effortless definition of a servicewhose objective is to execute a simple RF algorithm, and indicating other aspects related to the CC service itself. o One of the advantages of using dmcc-schema is that it abstracts differences between heterogeneous CC providers for DM services in order to have a single and unique specification that can bring together different services specifications. o In this way the differences between the definitions are balanced, allowing to dmcc-schema to be used as an integral part of a CC Services Broker, storing such services from different providers. t is important to highlight that dmcc-schema is being used successfully within a computing and workflow platform for DM, called OCCML. As part of the platform, dmcc-schema is used to define and describe complete DM services, allowing a high degree of flexibility and portability.

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