ONTOLOGY-BASED REAL-TIME SENTIMENT ANALYSIS FOR PRODUCT REPUTATION

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Abstract
Social media platforms have become influential channels for user interaction, enabling the creation and exchange of content within virtual communities. E-commerce sites like Amazon, eBay, and CNET leverage user-generated reviews and ratings to influence purchasing decisions. However, current review systems are often centralized, static, and vulnerable to false evaluations, lacking the adaptability to reflect real-time consumer sentiment. This research proposes a dynamic, ontology-driven reputation system that continuously evolves to provide accurate and timely product ratings. The system collects online reviews, performs sentiment analysis to extract opinions, and uses a semantic layer to build contextual profiles for decision-making. An adaptive ontology integrates with a database to map relevant structures and generate semantic queries, delivering actionable insights. By enabling real-time adaptation and greater transparency, this approach empowers consumers and manufacturers to make informed decisions based on up-to-date reputational data.

INTRODUCTION

Reputation and influence in the digital age must be earned through genuine engagement and value. Social media serves as one of the fastest and most effective means for individuals and organizations to showcase their credibility and connect with audiences. It enables users to create, share, and exchange information, ideas, and content within virtual communities and networks. A significant application of social media today lies in the realm of e-commerce. Platforms such as Amazon, eBay, and CNET offer users the ability to review and rate products based on their personal experiences. These online rating systems have become essential tools for guiding purchasing decisions and building trust among consumers. Any product made available on such platforms can be reviewed and evaluated, contributing to its overall acceptance and reputation in the marketplace. Clients buy various items from these sites. The clients who bought the items share their experience concerning that item online as survey [1]. This review is vital for client and producer. At whatever point a client needs to take the choice for buying of any item it is assumed a significant part [2]. Prior to buying any new item, the new buyer needs to use the survey of post buyer who are now utilizing that item. Reviews are frequently valuable for the purchasers before buying items. The reviews of the items given by the clients are especially useful for the organizations to know the positive and negative places of their items to work on the nature of the items [3]. Clients can give their customized experiences as text or as appraisals. There are two kinds of client reviews, for example, client rating (numeric rating) and client assessment (text based depiction) [4]. Client rating is a numeric rating that allows individuals to rate an item or administration with various stars. The quantity of stars can differ from 1 to 5 stars.

Assessment is an assertion of counsel by a specialist on an expert matter.

A client assessment can be positive, negative, unbiased feeling or mentality about the item. The feelings present in the feedback in regards to the item includes give exhaustively in understanding the surveys and furthermore help in the investigation of the element opinions of the item. It is hard for the clients to extricate the significant data from the audits. Opinion investigation is the method involved with recognizing positive or negative feeling in verbal form. It is utilized to remove the significant data from the survey [5]. Ache and Lee indicated terms identified with the feeling examination [6]. The space of opinion examination is driven by regular language handling, man-made consciousness and data recovery framework. Feeling investigation is known as assessment mining. The assessment mining is to distinguish the gathering of individuals' viewpoint in regards to one issue or item. The point of opinion examination is to distinguish the direction of the feeling communicated in written form. This space of examination named as Subjectivity Investigation concentrates on the feelings, opinion, assessment, way and assessment [7]. The sentence which offers some viewpoint is called abstract, while the sentence which doesn't contain any assessment is called evenhanded or verifiable [8]. Both, the report level and the sentence level examinations didn't find the exact preference of the customers and what they disliked. Perspective level executed a better analysis. Previously, Perspective level used to be called the highlight level (as it included base assessment along with the rundown) [9]. Instead of taking the language develops into consideration like (reports, passages, sentences, provisos or expressions), angle level simply take into consideration only the actual assessment. It revolves around the probability that the evaluation consists of a feeling (i.e. good or bad) and an objective (of assessment) [10]. Sentiment analysis detects the opinion of people about product either it is good or bad. But on the other hand, product reputation method is used to aggregate both types of rating. In e-commerce sites, product reputation is also very important. In such websites, user can send the ratings and reviews of various products. These ratings are used to calculate the reputation. Reputation of the product is the measurement of its quality [9] and customer satisfaction [10]. Different reputation measures such as aggregated star value (also called five star or simply star value), feature reputation and product reputation are used to calculate the reputation of a product. People or companies can post fake ratings for various reasons like promoting their product or maybe discrediting the alternative products of competiter [12].

The Decay Principle was employed to check the latest ratings and compare them with previous ratings to establish latest viewer thinking. The reputation Model may be used to employ any of the methods in the user interface to compute the data. Similarly, the window selected in hybrid decay is based on parameters, which are also taken from users (who want to compute reputation value of a product) through a user interface. But, sometimes it can be difficult for ordinary users to decide the appropriate decay principle for a product. In addition, if they select hybrid decay, then sometimes they are not able to enter optimal values for the parameters [13]. But linear decay is centralized and whole process is static. Rating is changing with respect of time. Linear decay is not suitable for this type of rating. There is need of dynamic system [14]. This paved the way for constructing new ontology. Anew ontology is to be constructed to enable the continuous detection and taking into account latest reviews also [15]. Ontology structuring gives us real-time changes in different services which are already being stored in it.

Reasoner part uses semantic rules for the assessment of efficiency of ontologies. Ontologies record present or old intelligent techniques for decision making and their results, define the rules, and gives us a hierarchy system do decrease the time of searching. Ontologies present semantics and data together to help make easy information transfer. Ontology reasoning and modelling to help facilitate changing business needs within a time frame.

Many websites here, available in network for online business such as Amazon, EBay, Cnet. These type websites are providers of an excellent rating system of products that is used by consumers for the rating of certain products according to their usage and experience. When, any new customer wishes to buy any product he goes through the reviews and ratings by the already existing customers and gets the idea of the efficiency of the product. The review of any product existing online or offline is also important to the developers and companies as they can analyze the

strengths and weaknesses of their product and those of its competitors. This analysis result in research to enhance the product quality and features. There are two type of review such as numeric review (Star) and other one is textual review (opinion). The number of stars can vary from 1 to 5 stars. A customer's rating can be good, bad, neutral, open or anonymous about the given product. However, the opinion or thinking towards the product may vary as the time passes. This variation in thinking and rating may arise due to different factors like advancement in technology, changed market trend, different customer requirement and quality changes in the given product. The existing product review systems are centralized and the whole process is static and product ratings change rapidly. It is easy to avoid false evaluation, handle new changes and reduce the time to obtain customer review from the perspective of customer and manufactures. Purpose of this research was to create a comprehensive and definite ontology which can evolve with the passage of time. Creation of an ontology that can evolve with time We propose a system those compute dynamic rating. The process was simplified into three layers in order to achieve the desired reputation model. First layer is data collection. We took a dataset which contain reviews of product from internet. Second layer is sentiment layer in which features are extracted from reviews of product. Sentimental analysis is applied in the base of these features. Third layer is semantic layer in which we create semantic profile. Semantic profile can provide central idea of the decision support concepts. Firstly, we make an ontology. In the second step, we build a database connection. The next step is to create mapping. Last step to generate query.

1. LITERATURE REVIEW
It's the age of technology, people are putting their ideas on social media whenever they want to do. Social media a platform for networking, association, social interaction, online evaluation and a great source of online chastity and trustworthiness indicators data. In online business, a product can be defined as a system or thing designed for the use of buyers. Anything which is available on an online store to fulfill the needs and requirements of the customer. The difference in the services delivered public and level of fulfillment of their requirements,

effect of the services plan public opinion either positive or negative.

2.1 Sentiment analysis
Text mining is further divided into different categories, one of which is Sentiment analysis, in which IT is used for estimating & elaborating feelings expressed in written form on media. Natural text processing are employed for this cause [16]. Sentiment analysis, also called opinion tracking, works on public's opinions, ideas, analysis, appreciations, behaviors, and mental approach about goods, services, institutions, persons, occurrences, public affairs, ideas and their elaboration [17]. The sentiment may be good, bad or neutral appreciation, feeling or behavior towards a specific context of the product from a person. Opinion dimensions are good, bad, and neutral. The review is categorized as good or bad by the opinion categorizer [18]. The sentence which expresses some opinion is called subjective, whereas the sentence which does not contain any opinion is called objective or factual [22-25].

2.2 Product Reputation Model
Olaleye et al explained in their article that sentiment analysis is a prerequisite for management of the services and product reputation online (an extension of public relations). Online reputation management is a long-running way of maintaining the image of an organization by online and printed media [27]. Reputation of the product is a perception of the future behaviors and quality of the product. Numerous reputation techniques including aggregated star system (ranging from one to five stars) [28], reputation of features [29] and product reputation on the basis of features [30] are used in the literature to evaluate a product's reputation. These values of reputation are useful in making decisions for both customers and organizations [31, 32, 33]. The decay principle is applied for supporting the new ratings in place of the previous ones to show the latest and new opinions. In peer to peer (P2P) and e-commerce environment this principle is applied in three methods or aspects: use of recursive algorithm, exponential decay and window-based system. The easiest method to apply the decay principle is selecting a specific period of time and use the ratings uploaded in that period of time to calculate reputation [35, 36, 40].

2.3 Ontology in sentiment analysis

Ontology is a collection of features and concepts in a subject or domain area that shows relationship between concepts. Mining of opinion or Sentiment analysis is used for analyzing feedback, reviews and opinions given by customers about any services, the movies, and the products. When the buyers think about buying anything online, they have to see the online review of that product before buying that thing. Buyers around the globe using that specific product post their comments on the marketing websites from where the buyers can buy that specific product. Evaluation of all reviews is done on these websites and they are rated from zero to five. Pattern of reviews is the basis of this rating. Exact results are not awarded in this kind of ratings. Bandari et al [14] made a list of all the issues which different languages face using ontology while investigating the feelings and emotions of reviews of the buyers and tried to solve these issues. Kontopoulos et al [40] explains in their paper that advent of Web 2.0 has significantly changed the perception of net users through making a drastic improvement in sharing of information, interoperability, and collaboration. The author suggests the deployment of techniques based on actual ontology for more effective sentiment analysis regarding posts on Twitter. It increases efficiency. Bandari Et al [41] said there are many e-commerce websites available where products are bought and users give their reviews on the products given or the services provided. The purpose of this study is to use ontology to have a survey and analysis of product reviews by customers having different languages. Our purpose is also to highlight the issues present in analyzing products reviews of different languages. So, we performed an experiment by using ontology to sentiment analysis of product reviews on a Hindi mobile phone online platform and tried to decrease the issues in such previous systems. Ali et al[42] said in their study that traffic density is being increased in urban areas at a much faster pace, especially in big cities. This system gets all the transportation and city related tweets and reviews and from this taken data we extract the opinions and use fuzzy ontology to get different transportation and city features. They used OWL and java to devise an intelligent prototype and fuzzy ontology. The results obtained from the experiments show that the experiment was very much satisfactory. Nithish et al [43] said A lot of important information cannot be distinguished from documents because much data is present on the internet. People associated marketing and sales use online forms to conduct surveys and queries to analyze their products distribution. We use OWL format and store the product description and reviews together in domain ontology. After embedding the opinions in the ontology, this method can be used to do reasoning and solving intelligent questions. Sam et al [44] proposed a design which could be a generalized model. This model analyzed unstructured reviews of the users from social media posts related to electronic products. Positive and negative factors were added to increase precision of the model. Kumar [45] explained that WWW is a universal information platform which was at beginning read only but it innovated very fast and changed from 'read only' to 'read and write' and then it evolved into intelligent 'read write and execute' also known as semantic web. The initial experiment results show that the model was successful with 77% accuracy and we should focus on more sentiment analysis-based models. Zehra [46] suggested a system which would recommend schools having sentiment analysis on the basis of ontology. For this study, we used a private group on Facebook which reviews different schools and posts them. We designed a school ontology on the basis of taken reviews/posts manually. This increased reasoning. Ali et al [47] expressed in his paper, most products or services get more potential users due to user reviews present online. The key achievement of the suggested model is integration of Natural Language Processing model and ontology for recording reviews information by customers. The suggested model was experimentally expressed on the data from customers reviews of a digital camera by Amazon. Yergesh et al [48] states that sentiment analysis is vital and intriguing to use in natural languages. In this paper, we designed sentiment words Kazakh Dictionary. In this study, they did sentiment analysis of Kazakh language works using the dictionary based on ontology and phonological rules. A model was created which determined sentiment on basis of ontology and rule extraction. This method if used on common sentences gained 83% precision. Marstawi et al [49], argued that the existing firmware in sentiment analysis mainly sideline or remove the complex issues arising from the Lexicon based scores (SentiWordNet), while Lexicon analyses classifying the data on basis or word existence

and number of words are very less. So, there is automatically very low rate of detection. The result was an OBPSS system that performed better than already existing models in mining and sentiment rating. OBPSS gives linguistic rules working at level of sentences increases the overall efficiency and provides a precise sentiment analysis. Nagano et al [50] proposed designing of a model for analyzing opinions for market research named as WOM Scouter. Other function is the comparison of two products and their features by their link traffic and recurrence in the text. Assessment through experiment expresses blog viewers liked this presented algorithm more than TF-IDF. Abdel-Hafez et al [51] explained that much of the present reputed models use the customers ratings but mostly ignore customer's review texts. Therefore, they said that customer ratings of a product not actually express the original reputation of the product features. So, customer's review mandatory.They also provided experimental results and complete case study for comparison with other such models. Abaalkhail et al [52] explained that ontology can comprehend the relationships between concepts and the association within contents. Their experimental results show that that this ontology is as much efficient as machine learning techniques. Their presented model DFSMD has been accessible to everyone or anyone can use it to analyze different sentiment issues. Rekha [53] said about the semantic analysis that it is a technique which is devised to obtain customer opinions and reviews regarding to a certain product. These days, reviews of most of the products can be mined from web due to evolution of technology. The experimental results of presented algorithm were very satisfactory and presented features of cellphone. Polsawat [54] explained that much of the data in Social Media is being used to aid the users in selecting and buying products. The experimental results show almost 94% efficiency in sentiment analysis. Channa et al [55] explained that OWL-S and RDF-S were designed from Analytical Philosophy and their ideas about ontology and General semantics and techniques of product knowledge were assessed. Semantic languages have been famous and due to their flexibility techniques based on ontology and Semantics were suggested to design product knowledge. Ali et al [56] explained that social media have a vital role in collecting information about transportation and travel services. Systems for management and control of traffic make use of sentiment analysis which with its reasoning helps ITSs (intelligent transportation systems). The presented ontology was designed using OWL and the smart model was created with the help of Java. For the assessment of this model we used classifiers based on Machine learning. The experimental results show that model was effective and gained 93% accuracy.

2.4 Comparative Analysis

The comparison chart below is designed to check various factors such as Static, Dynamic, Efficient, Accuracy, Reasoning, Polarity, Reliability, Precision and recall. Static means not moving or changing. Dynamic Means continuous changing and developing. Efficiency is the ability to produce something with a minimum amount of effort. Accurate is exact and true. Accuracy is the degree of closeness to true value. Reasoning is a way of thinking about anything in a rational approach for forming an assumption or a conclusion. A performance is a way of presenting a show, or any other kind of theater. Polarity is commonly used to describe if an electrically charged stream is negative or positive, the direction of a battery, the polarity of a magnet, etc. Precision is the degree to which an instrument or process will repeat the same value.

Table 1. Comparative analysis of literature review

Study	Static	Dynamic	Reliability	Precision	Recall	Accuracy	Polarity
Twitter Reviews [41]	√					√	
Languages [42]	√			√		√	
Transportation [43]	√		√			√	
Mobile [44]	√		√	√	√		√
Electronic products [45]	√		√	√			√
social web [46]	√		√		√		√
Recommendation Systems [47]	√		√		√		

Online customers' review [48]	√			√		√	
kazakh sentences [49]	√			√		√	
Product reviews [50]	√		√		√		√
Ontology-based topic extraction [51]	√			√		√	√
Ontology product's reputation model [52]	√			√			√
Multimedia [53]			√			√	
Online mobile reviews [54]	√		√	√	√	√	
Customer Reviews [55]	√		√	√		√	√
constructing product knowledge [56]	√		√	√	√	√	

2.5 Analysis

From the analysis of the papers mentioned in table 1, we observe that sentiment analysis or opinion mining is used to analyze the opinions, reviews, and feedback given by the customer about product. Different author uses different techniques to improve Accuracy, Efficiency, Reasoning, Performance, Reliability, Precision and Recall. Current product reputation is used to make an ontology to compute twitter post, languages, review on mobile phones, review on electronic devices and different products. Current product reputation system is centralized and the whole process is static. However, Product Ratings are change rapidly. Therefore, there is a need of dynamic system. Ontology construction is the work of this experiment. By constructing the ontology, automatic identification and extraction of the user opinions from the reviews are possible.

3. PROPOSED METHODOLOGY

3.1 Proposed approach

In the previous section, we have discussed the product reputation system. Based on the need for a dynamic product reputation approach, we propose a semantic product reputation system answering the research issues highlighted in the state of the art. Figure 1 shows the whole process of the semantic product reputation model which is divided into three phases. First phase is data acquisition in which review is collected from internet. Second phase is sentiment layer in which features are extracted from reviews. Sentimental analysis is applied in the base of these features. In third phase, we use semantic knowledge for purpose of making an automatic system. we develop inference based semantic rules for Dynamic product reputation while query generation has been done.
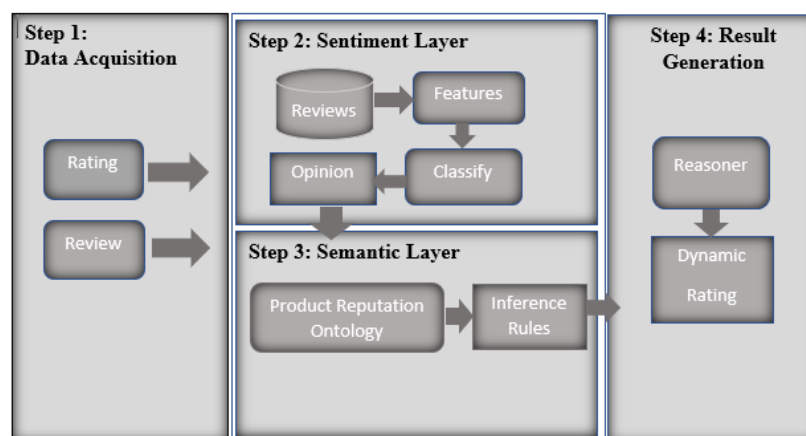
Figure1. Semantic Product Reputation System

3.2 Data Acquisition

First of all, we took a dataset of product reviews of Amazon from kaggle.com [57]. The dataset was

designed specially to show user reviews and opinion, how it is viewed in various countries and its

promotional potential. We used musical instruments as our product.

The dataset consists of:
- **ID:** Review ID
- **Manufacturer:** Amazon
- **Types:** Product Type
- **Asin:** Product Asin
- **Reviewer:** Reviewer name
- **Helpful:** Helpful for customer
- **Review Text:** Review in Text
- **Rating:** Rating of product (1-5)
- **Review Date:** Review time
- **Opinion:** Customer opinion

The extracted reviews contain opinion about customer service, review about the product, comparison with other products and suggestions to improve features of the product. There are two type of customer review such as customer rating and customer opinion. Customer rating is a numeric rating such as star rating 0-5. A customer opinion can be positive, negative or neutral appraisal, emotion or attitude about an aspect of the entity from an opinion holder. Opinion orientations are positive, negative, and neutral.

3.3 Sentiment Layer

The customer opinion from this dataset consists of sentences that are provided by the customer. Different online tools are available in internet for sentiment analysis. We use MonkeyLearn [56] for classifying positive, neutral and negative reviews. We create a new model. There are two types of models available. First one is classifier in which we define some tags (features) in review sentences. The other one is extractor which extract specific pieces of data from review sentence. We will create a classifier. Then, there are three kind of classifications such as topic classification, sentiment analysis and intent classification. Topic classification classifies texts based on topic and aspects. Sentiment analysis detects sentiment in text such as positive, negative or neutral. Intent classification classifies text based on intent such as complaint or feedback. We will choose sentiment analysis. Then we import our dataset here in CSV column. Our complete dataset was uploaded to the classifier. Then, we extract the features in the review. There are several features of product such as project

display, product size, product function, product price and product type. This tool distinguishes positive, negative or neutral reviews based on their features of product.

3.4 Semantic Layer

A semantic profile can capture and represent the core concepts of a decision support system. The process begins with the development of an ontology to define the domain knowledge. Next, a connection to the relevant database is established. In the following step, semantic mappings are created to link ontology concepts with database elements. Finally, using OWL and SPARQL, we perform queries to extract meaningful insights from the data. As time passes, product reviews given by different people change. These variations might be due to different reasons like change in user requirements, improvement in product quality, market trend and evolution of technology. Mobile phone reviews might not remain same now compared to a few days back due to reason that new phones with better specifications and sophisticated hardware might be available in market. Due to this problem, we make an ontology to automatically compute dynamic reviews. If the new product is introduced with high camera and high video speed, then people will definitely change their review. This changing review is computed by our semantic product reputation system.

3.5 Product reputation Ontology

In this section, we present the ontology developed using Protégé to model and highlight dynamic product reputation. The ontology captures the core concepts related to products and their associated reputations. A product is defined as a tangible good or item available on various e-commerce platforms. For illustration, we focus on Amazon, a widely used online marketplace where users can post reviews and ratings for purchased products. These user-generated reviews significantly contribute to the perceived reputation of products. Ontology, in this context, refers to a structured representation of knowledge that defines concepts and the relationships between them. Our product reputation ontology is designed to formalize these relationships and is depicted in Figure 3. The ontology incorporates multiple classes to represent different concepts within the domain.
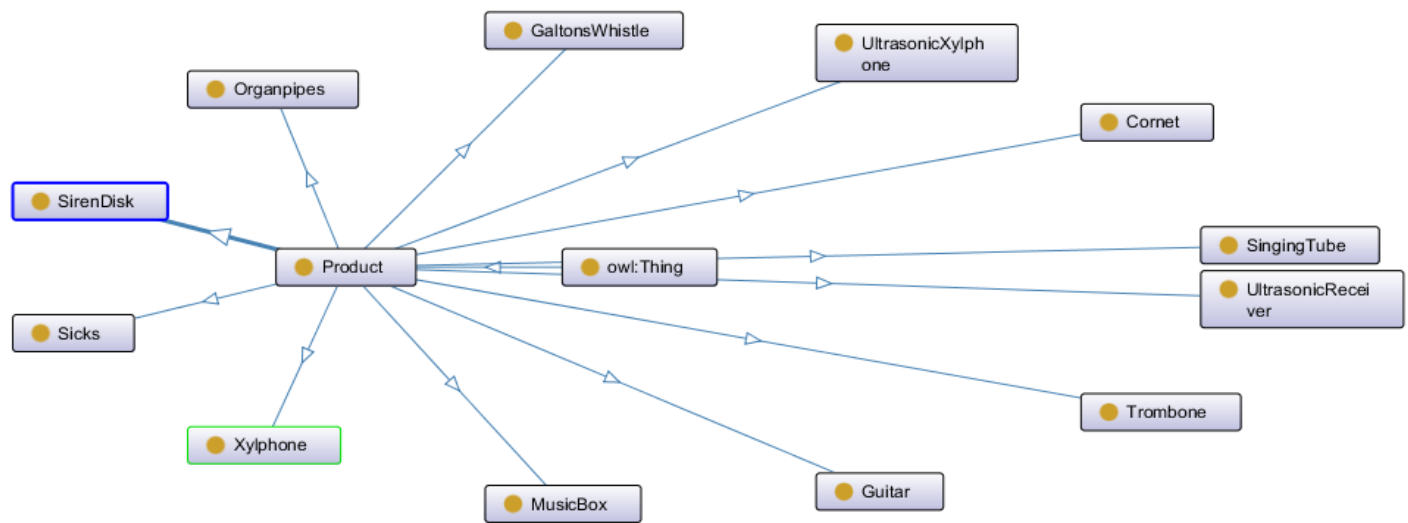
Figure 3. Product Reputation Ontology

3.6 Product Reputation Classes

In an ontology, classes are organized hierarchically into two types: superclasses and subclasses. The 'Product' class serves as a superclass, encompassing various specific product types as its subclasses. These include Guitar, Cornet, Sticks, Singing Tube, Music Box, Trombone, Xylophone, UltrasonicXylophone, Galton's Whistle, Siren Disk, and Ultrasonic Receiver. Object properties are used for making relationship between two individuals. If we want relationships between individual to individual, then we make object properties.

3.7 Product Reputation Data Property:

In Protégé, data property is used to describe relationship between individual to literal. Our data property is Id, Manufacturer, Opinion, Rating, Review date seen, Reviewer Name, Reviews Date, Review Text, Summary, Types and Unix Review Time as shown in figure 4.
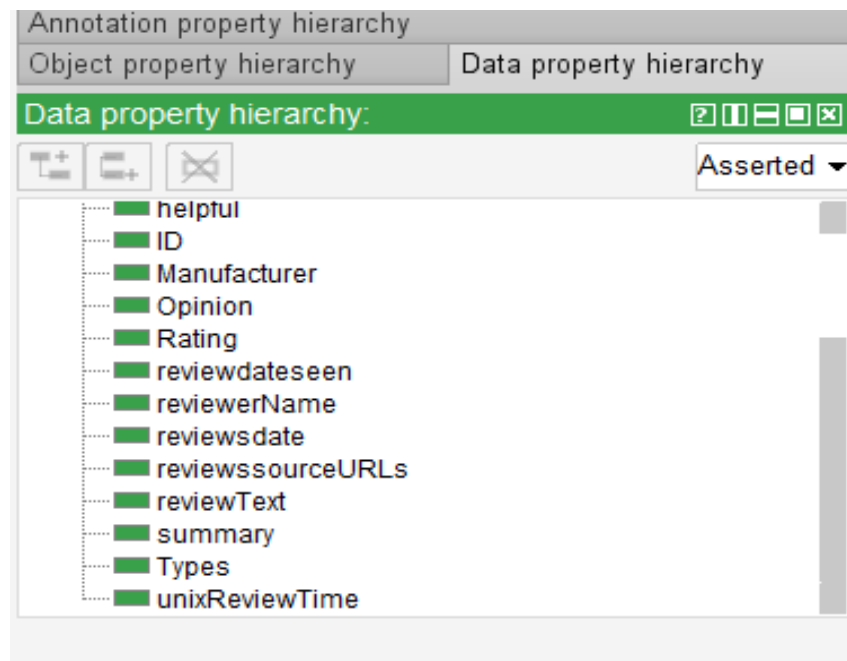
Figure 4. Product Reputation Ontology Data Property

3.8 Database Connectivity and Query

We uploaded the dataset in workbench, then attached the workbench to protégé. Here, we need jdbc driver, Database Username, Database Password and connection URL. Then click on Test Connection and our database connection is created. JDBC driver is used in protégé. JDBC stands Java Database Connectivity Framework. It is used to connect data sources. First download the jdbc driver. Open the protégé, go to files, click the preference and move to JDBC Driver and then add it.

In protégé, we move to ontop Mapping, three tabs are available here on the top including Datasource manager, Mapping manager and Mapping Assistant. Datasource is used to make database connection. Mapping manager is used to store mappings. Mapping assistant is used to make mapping. We select table form database.

4. RESULTS AND DISCUSSION

In this section, we present the semantic rule-based framework developed for modeling dynamic product reputation. The ontology was constructed using Protégé in the Ontology Web Language (OWL), enabling formal representation of domain knowledge. For experimentation and simulation, a structured dataset was utilized, and an intermediate software component was developed to support OWL/XML parsing and integration for implementing the dynamic product reputation model, as illustrated in Figure 1. To facilitate semantic integration, ontology-to-dataset mappings were created for a variety of products including Guitar, Cornet, Galton's Whistle, Music Box, Organ Pipes, Sticks, Singing Tube, Siren Disk, Trombone, Ultrasonic Receiver, Ultrasonic Xylophone, and Xylophone. Inference-driven semantic rules were defined to capture the evolving nature of product reputation based on user-generated reviews and product attributes.

SPARQL queries were formulated to extract and validate semantic insights derived from the ontology. These queries were executed within the Protégé environment, and the Reasoner was configured and initiated via the Reasoner menu to ensure logical consistency and derive inferred knowledge. The use of semantic rules in conjunction with SPARQL enabled dynamic and explainable evaluation of product reputation across multiple product instances.

4.1 Guitar

After developing the ontology in Protégé, we established mappings and applied inference-based

semantic rules to distinguish between positive and negative product reviews. The Reasoner was utilized to infer and validate these classifications. The output for the 'Guitar' product is presented in Figure 5.

Figure 5, Output of Guitar

4.2 Cornet

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Cornet is shown below figure 6.

Figure 6. Output of Cornet

4.3 Galton's Whistle

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Galton's Whistle is shown in figure 7.

Mapping ID: MAPID-791cb3751cd046dc951fcf26469666e6

ID	Manufacturer	Types	asin	reviewerNa...	helpful	reviewText	Rating	summary	unixReview...	reviewsdate	reviewdates...	reviewssour...	Opinion	FIELD15	FIELD16	FIELD17
400	Amazon	Galtons Wh...	B0002CZV7I	JoseAlmanya	[0, 0]	Man this is ...	5	just perfect!	1340150400	2016-12-12...	2017-07-03...	http://review...	Positive	null	null	null
401	Amazon	Galtons Wh...	B0002CZV7I	SoundSteeler	[1, 2]	The Boss C...	4	Boss CS3 ...	1332374400	2016-12-12...	2017-07-03...	http://review...	Positive	null	null	null
402	Amazon	Galtons Wh...	B0002CZV7I	StormJH1	[3, 5]	It really pain...	4	Good, but n...	1346112000	2017-03-30...	2017-07-03...	http://review...	Positive	null	null	null
403	Amazon	Galtons Wh...	B0002CZV7I	William J. S...	[7, 8]	As a pro mu...	5	Great Unit	1315785600	2017-03-28...	2017-07-03...	http://review...	Positive	null	null	null
404	Amazon	Galtons Wh...	B0002CZV82	AF "Whigs"	[0, 0]	Guitarists h...	5	Does what i...	1298592000	2017-03-28...	2017-07-03...	http://review...	Positive	null	null	null
405	Amazon	Galtons Wh...	B0002CZV82	Charlo	[0, 1]	Think of this...	4	Solid pedal	1360540800	2017-03-28...	2017-07-03...	http://review...	Positive	null	null	null
406	Amazon	Galtons Wh...	B0002CZV82	D. Blackburn	[2, 2]	I have had t...	5	Distorts so...	1219449600	2017-03-27...	2017-07-03...	http://review...	Positive	null	null	null
407	Amazon	Galtons Wh...	B0002CZV82	fendertele67	[1, 1]	This pedal i...	5	Must have	1397692800	2017-03-27...	2017-07-03...	http://review...	Positive	null	null	null
408	Amazon	Galtons Wh...	B0002CZV82	From Detroit	[2, 3]	This was th...	5	Classic ped...	1255737600	2017-03-27...	2017-07-03...	http://review...	Positive	null	null	null
409	Amazon	Galtons Wh...	B0002CZV82	James Mou...	[2, 30]	This is a ch...	1	It distorts	1258070400	2017-03-27...	2017-07-03...	http://review...	Negative	null	null	null
410	Amazon	Galtons Wh...	B0002CZV82	Jared Burdi...	[0, 0]	This is a di...	4	The go to di...	1313798400	2016-12-30...	2017-07-03...	http://review...	Positive	null	null	null
411	Amazon	Galtons Wh...	B0002CZV82	Jerry	[1, 2]	I find that if l...	5	I like the so...	1375920000	2017-01-07...	2017-07-03...	http://review...	Positive	null	null	null
412	Amazon	Galtons Wh...	B0002CZV82	MetalFan	[0, 0]	This pedal ...	5	The classic ...	1332892800	2017-01-07...	2017-07-03...	http://review...	Positive	null	null	null
413	Amazon	Galtons Wh...	B0002CZV82	Otto Correct	[142, 150]	From Greg ...	2	Wish I knew...	1309392000	2017-01-07...	2017-07-03...	http://review...	Negative	null	null	null
414	Amazon	Galtons Wh...	B0002CZV82	Sam	[1, 4]	Here's the d...	1	Beginners ...	1392940800	2017-01-07...	2017-07-03...	http://review...	Negative	null	null	null
415	Amazon	Galtons Wh...	B0002CZV82	Shady Neig...	[0, 0]	This is a littl...	4	Nice pedal	1345161600	2017-01-07...	2017-07-03...	http://review...	Positive	null	null	null
416	Amazon	Galtons Wh...	B0002CZV82	Sherwin Ra...	[0, 0]	This is the ...	5	Boss is the ...	1332115200	2017-01-07...	2017-07-03...	http://review...	Positive	null	null	null
417	Amazon	Galtons Wh...	B0002CZV82	Slashaholic...	[3, 4]	This pedal ...	3	The most b...	1294444800	2017-01-07...	2017-07-03...	http://review...	Neutral	null	null	null
418	Amazon	Galtons Wh...	B0002CZV82	StevenEddy...	[0, 0]	I love these ...	5	Great pedal	1325462400	2017-01-07...	2017-07-03...	http://review...	Positive	null	null	null
419	Amazon	Galtons Wh...	B0002CZV82	StormJH1	[0, 0]	There's so...	4	Nostalgia, ...	1343174400	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
420	Amazon	Galtons Wh...	B0002CZV82	StratDude	[2, 2]	...it's a very ...	3	It's been ar...	1350777600	2016-12-23...	2017-07-03...	http://review...	Neutral	null	null	null
421	Amazon	Galtons Wh...	B0002CZV82	StudioDude	[1, 2]	I know, I kn...	5	Truly one of ...	1394755200	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
422	Amazon	Galtons Wh...	B0002CZV82	Victor	[0, 0]	This is an e...	5	Great for ol...	1292716800	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
423	Amazon	Galtons Wh...	B0002CZV82	Walter NYC	[0, 0]	First off I a...	5	Great 1st P...	1324339200	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
424	Amazon	Galtons Wh...	B0002CZVA0	aceofbase	[1, 2]	Good metal...	4	Good metal...	1305072000	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
425	Amazon	Galtons Wh...	B0002CZVA0	Alexander V...	[0, 0]	I've had this...	4	Still the best.	1265846400	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
426	Amazon	Galtons Wh...	B0002CZVA0	Anon	[4, 6]	To be hone...	4	THE Metal ...	1314316800	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
427	Amazon	Galtons Wh...	B0002CZVA0	From Detroit	[5, 5]	I have a lot ...	5	Very useful ...	1270857600	2016-12-24...	2017-07-03...	http://review...	Positive	null	null	null
428	Amazon	Galtons Wh...	B0002CZVA0	H town	[3, 4]	I bought mi...	5	Great for m...	1192579200	2016-12-24...	2017-07-03...	http://review...	Positive	null	null	null
429	Amazon	Galtons Wh...	B0002CZVA0	J.A	[0, 0]	Its a great p...	5	Great	1299024000	2016-12-24...	2017-07-03...	http://review...	Positive	null	null	null
430	Amazon	Galtons Wh...	B0002CZVA0	Josh Leger	[0, 0]	BY FAR the ...	5	BEST PEDA...	1395273600	2016-12-23...	2017-07-03...	http://review...	Positive	null	null	null
431	Amazon	Galtons Wh...	B0002CZVA0	Matt32 "J.G...	[3, 4]	First of all I ...	4	One of the b...	1303084800	2016-12-23	2017-07-03	http://review	Positive	null	null	null

Test SQL Qu... (100 rows)

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Figure 7. Output of Galton's Whistle

4.4 Music Box

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Music Box is shown in figure 8.

Mapping ID: MAPID-7f89ca91136444278ce0fcf09c43907b

ID	Manufacturer	Types	asin	reviewerNa...	helpful	reviewText	Rating	summary	unixReview...	reviewsdate	reviewdates...	reviewssour...	Opinion	FIELD15	FIELD16	FIELD17
1275	Amazon	Music Box	B0002E1G...	EYE4GET	[0, 0]	This produc...	5	I must have ...	1317686400	2017-01-02...	2017-05-21...	http://review...	Positive	null	null	null
1276	Amazon	Music Box	B0002E1G...	frank arcidi...	[0, 0]	No messin...	5	Nice	1363824000	2017-01-02...	2017-05-21...	http://review...	Positive	null	null	null
1277	Amazon	Music Box	B0002E1G...	Fred Smith	[0, 0]	This winder...	5	Great produ...	1368748800	2017-01-02...	2017-05-21...	http://review...	Positive	null	null	null
1278	Amazon	Music Box	B0002E1G...	Gregory Ma...	[0, 0]	I have had o...	5	so useful	1389139200	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1279	Amazon	Music Box	B0002E1G...	Gridley	[0, 0]	This guitari...	5	A Gem	1377993600	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1280	Amazon	Music Box	B0002E1G...	G. Thomas ...	[2, 4]	Not much b...	2	OK, but!	1212537600	2017-01-01...	2017-05-21...	http://review...	Negative	null	null	null
1281	Amazon	Music Box	B0002E1G...	Guitar Oper...	[0, 0]	Terrific All-I...	5	Terrific All-i...	1389916800	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1282	Amazon	Music Box	B0002E1G...	Gustavo Po...	[0, 0]	After years ...	5	A must hav...	1388016000	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1283	Amazon	Music Box	B0002E1G...	Hagen LeBr...	[0, 0]	I've been pl...	5	The Handie...	1366416000	2017-01-03...	2017-05-21...	http://review...	Positive	null	null	null
1284	Amazon	Music Box	B0002E1G...	Handsome ...	[0, 0]	Not as stur...	4	Not as stur...	1297900800	2017-01-03...	2017-05-21...	http://review...	Positive	null	null	null
1285	Amazon	Music Box	B0002E1G...	Home in N.J.	[0, 0]	It is a string ...	5	Works fine	1338508800	2017-01-03...	2017-05-21...	http://review...	Positive	null	null	null
1286	Amazon	Music Box	B0002E1G...	Howard J. ...	[0, 0]	I have one o...	5	Put one in y...	1394064000	2017-01-03...	2017-05-21...	http://review...	Positive	null	null	null
1287	Amazon	Music Box	B0002E1G...	Huevos Ra...	[0, 0]	This bad bo...	5	Strange Co...	1368489600	2017-01-03...	2017-05-21...	http://review...	Positive	null	null	null
1288	Amazon	Music Box	B0002E1G...	jason	[0, 0]	everything y...	5	excellent	1389657600	2017-01-02...	2017-05-21...	http://review...	Positive	null	null	null
1289	Amazon	Music Box	B0002E1G...	J. Barrera	[0, 0]	nothing fan...	5	it works	1366156800	2017-01-02...	2017-05-21...	http://review...	Positive	null	null	null
1290	Amazon	Music Box	B0002E1G...	J. Edgar Mi...	[0, 0]	I'm not sure...	4	Capable cut...	1376524800	2017-01-02...	2017-05-21...	http://review...	Positive	null	null	null
1291	Amazon	Music Box	B0002E1G...	jeff h	[0, 0]	What a grea...	5	fantastic tool	1399766400	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1292	Amazon	Music Box	B0002E1G...	Jeremy D.	[0, 2]	Stripped do...	4	Well made ...	1400198400	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1293	Amazon	Music Box	B0002E1G...	Jerry Cunni...	[0, 0]	This is a pr...	4	cool	1360195200	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1294	Amazon	Music Box	B0002E1G...	Jerry Rober...	[0, 0]	Does what i...	5	Works	1402617600	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1295	Amazon	Music Box	B0002E1G...	jimmpannzee	[0, 0]	Works great...	5	Effective stri...	1326844800	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1296	Amazon	Music Box	B0002E1G...	J. Kim	[1, 1]	I bought thi...	5	Excellent str...	1283731200	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1297	Amazon	Music Box	B0002E1G...	Josh Leger	[0, 0]	This tool de...	5	works wond...	1359504000	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1298	Amazon	Music Box	B0002E1G...	Josiah Spri...	[0, 0]	A must hav...	5	Nice.	1368848800	2017-01-01...	2017-05-21...	http://review...	Positive	null	null	null
1299	Amazon	Music Box	B0002E1G...	J. Parks Ha...	[0, 0]	Great tool. I ...	5	Nice tool	1404864000	2016-12-31...	2017-05-21...	http://review...	Positive	null	null	null
1300	Amazon	Music Box	B0002E1G...	J. Perry "Zak"	[0, 0]	It cuts the st...	5	A Handy Ga...	1361318400	2016-12-31...	2017-05-21...	http://review...	Positive	null	null	null
1301	Amazon	Music Box	B0002E1G...	Julian	[0, 0]	Really helpf...	5	Practical	1399852800	2016-12-31...	2017-05-21...	http://review...	Positive	null	null	null
1302	Amazon	Music Box	B0002E1G...	Kazmir	[0, 0]	Its great for ...	3	ehhh!	1403308800	2016-12-31...	2017-05-21...	http://review...	Neutral	null	null	null
1303	Amazon	Music Box	B0002E1G...	Kodack	[0, 0]	The winder ...	4	does the jo...	1388880000	2016-12-31...	2017-05-21...	http://review...	Positive	null	null	null
1304	Amazon	Music Box	B0002E1G...	L. Dustin	[0, 0]	Nice quality ...	4	Winder is a ...	1358035200	2016-12-31...	2017-05-21...	http://review...	Positive	null	null	null
1305	Amazon	Music Box	B0002E1G...	Leon2142	[0, 0]	When i bou...	5	This thing i...	1387497600	2016-12-31...	2017-05-21...	http://review...	Positive	null	null	null

Test SQL Qu... (100 rows)

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Figure 8. Output of Music Box

4.5 Organ Pipes

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Organ Pipes is shown below figure 9.

Mapping ID: MAPID-b1626158cb0041f3b2e98852c0ee9ad3

ID	Manufacturer	Types	asin	reviewerNa...	helpful	reviewText	Rating	summary	unixReview...	reviewsdate	reviewdates...	reviewssour...	Opinion	FIELD15	FIELD16	FIELD17
510	Amazon	Organ pipes	B0002CZV...	Rick from W...	[1, 1]	It's a good b...	4	It's a capo	1399334400	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
511	Amazon	Organ pipes	B0002CZV...	SJ Holley	[0, 0]	You can nev...	5	Kyser Is Th...	1334534400	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
512	Amazon	Organ pipes	B0002CZV...	Uriah Rose ...	[0, 0]	I've been us...	5	One of the b...	1340150400	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
513	Amazon	Organ pipes	B0002CZV...	Victoria	[0, 0]	This is suc...	5	Couldn't As...	1399248000	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
514	Amazon	Organ pipes	B0002CZVXM	aceofbase	[0, 0]	These are t...	5	Best Strapl...	1398038400	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
515	Amazon	Organ pipes	B0002CZVXM	Alexander V...	[2, 2]	In particular...	4	Probably th...	1325289600	2016-11-18...	2017-05-21...	http://review...	Positive	null	null	null
516	Amazon	Organ pipes	B0002CZVXM	Anon	[0, 0]	So I bought ...	4	They work fi...	1375660800	2016-11-18...	2017-05-21...	http://review...	Positive	null	null	null
517	Amazon	Organ pipes	B0002CZVXM	aspiring sai...	[1, 1]	The screws...	4	Does NOT f...	1290038400	2016-11-18...	2017-05-21...	http://review...	Positive	null	null	null
518	Amazon	Organ pipes	B0002CZVXM	bayou bob	[0, 0]	yes, if your ...	4	work fine ki...	1402444800	2016-11-18...	2017-05-21...	http://review...	Positive	null	null	null
519	Amazon	Organ pipes	B0002CZVXM	B. Hood "al...	[0, 0]	best strap l...	5	work great	1357948800	2016-11-17...	2017-05-21...	http://review...	Positive	null	null	null
520	Amazon	Organ pipes	B0002CZVXM	BigSteph66	[0, 0]	Almost drop...	5	Life saver	1361923200	2016-11-17...	2017-05-21...	http://review...	Positive	null	null	null
521	Amazon	Organ pipes	B0002CZVXM	Bilbo	[2, 2]	I tried this ...	4	I Prefer Sca...	1289779200	2016-11-17...	2017-05-21...	http://review...	Positive	null	null	null
522	Amazon	Organ pipes	B0002CZVXM	Bill Lewey "...	[0, 0]	I had to actu...	5	Work Great	1398816000	2016-11-17...	2017-05-21...	http://review...	Positive	null	null	null
523	Amazon	Organ pipes	B0002CZVXM	bman	[0, 0]	These strap...	5	Easy to inst...	1393891200	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
524	Amazon	Organ pipes	B0002CZVXM	Brian	[0, 0]	I've tried a f...	5	By far the b...	1390089600	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
525	Amazon	Organ pipes	B0002CZVXM	Chris	[1, 2]	Great produ...	5	Love em	1385942400	2016-11-16...	2017-05-21...	http://review...	Positive	null	null	null
526	Amazon	Organ pipes	B0002CZVXM	Christian F...	[0, 0]	they work w...	5	Nice locks	1304467200	2016-11-15...	2017-05-21...	http://review...	Positive	null	null	null
527	Amazon	Organ pipes	B0002CZVXM	Delta Echo	[0, 0]	No complai...	5	Simple, eas...	1323734400	2016-11-15...	2017-05-21...	http://review...	Positive	null	null	null
528	Amazon	Organ pipes	B0002CZVXM	DMGenest |...	[4, 4]	After receivi...	4	Gibson Goo...	1301443200	2016-11-15...	2017-05-21...	http://review...	Positive	null	null	null
529	Amazon	Organ pipes	B0002CZVXM	Don B	[0, 0]	Very easy to...	5	Easy to inst...	1323216000	2016-11-14...	2017-05-21...	http://review...	Positive	null	null	null
530	Amazon	Organ pipes	B0002CZVXM	Don "On Th...	[0, 0]	This produc...	5	Want securi...	1364083200	2016-11-14...	2017-05-21...	http://review...	Positive	null	null	null
531	Amazon	Organ pipes	B0002CZVXM	D.T.	[0, 0]	I have two s...	5	Great Locki...	1395273600	2016-11-13...	2017-05-21...	http://review...	Positive	null	null	null
532	Amazon	Organ pipes	B0002CZVXM	Eric A. Rog...	[0, 0]	It's worth a f...	5	An essentia...	1360886400	2016-11-13...	2017-05-21...	http://review...	Positive	null	null	null
533	Amazon	Organ pipes	B0002CZVXM	GaryG	[0, 0]	Oh Yeah, L...	5	Great Buy	1351468800	2016-11-12...	2017-05-21...	http://review...	Positive	null	null	null
534	Amazon	Organ pipes	B0002CZVXM	GeekParrot	[0, 0]	I have had t...	5	Sturdy and ...	1357862400	2016-11-12...	2017-05-21...	http://review...	Positive	null	null	null
535	Amazon	Organ pipes	B0002CZVXM	Gordy Styles	[0, 0]	these dunlo...	5	save your a...	1358208000	2016-11-12...	2017-05-21...	http://review...	Positive	null	null	null
536	Amazon	Organ pipes	B0002CZVXM	GreatAPG	[0, 0]	Very high q...	5	Going to get...	1388880000	2016-11-12...	2017-05-21...	http://review...	Positive	null	null	null
537	Amazon	Organ pipes	B0002CZVXM	Hannah Ba...	[0, 0]	i've had the...	5	you should ...	1383436800	2016-11-12...	2017-05-21...	http://review...	Positive	null	null	null
538	Amazon	Organ pipes	B0002CZVXM	Hitthespot	[0, 0]	This is the fi...	5	Working Pe...	1376092800	2016-11-11...	2017-05-21...	http://review...	Positive	null	null	null
539	Amazon	Organ pipes	B0002CZVXM	HLB "HLB"	[0, 0]	What's grea...	4	Vastly Supe...	1351123200	2016-11-11...	2017-05-21...	http://review...	Positive	null	null	null
540	Amazon	Organ pipes	B0002CZVXM	IBZANE	[0, 0]	Straplocks ...	4	Dont know ...	1346284800	2016-11-11...	2017-05-21...	http://review...	Positive	null	null	null
541	Amazon	Organ pipes	B0002CZVXM	Jake	[0, 0]	I have never...	5	What a fant...	1392854400	2016-11-11...	2017-05-21...	http://review...	Positive	null	null	null

Test SQL Qu... (100 rows)

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Figure 9. Output of Organ pipes

4.6 Sicks

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The figure 10 shows the output of Sicks.

Mapping ID: MAPID-9867cbe8cb8842ca9ff7a3b324b1d432

ID	Manufacturer	Types	asin	reviewerNa...	helpful	reviewText	Rating	summary	unixReview...	reviewsdate	reviewdates...	reviewssour...	Opinion	FIELD15	FIELD16	FIELD17
775	Amazon	Sicks	B0002D0C...	Bob "Bob in...	[0, 0]	I've used ev...	5	Tortex Picks...	1218672000	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
776	Amazon	Sicks	B0002D0C...	bobby 12333	[0, 0]	I bought the...	5	Great Picks	1371254400	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
777	Amazon	Sicks	B0002D0C...	Brian	[0, 0]	Love these ...	5	Tortex Picks	1390089600	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
778	Amazon	Sicks	B0002D0C...	Cesar Augu...	[0, 0]	I've always ...	5	Great price ...	1354147200	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
779	Amazon	Sicks	B0002D0C...	Chava Perez	[0, 0]	I know that ...	5	Cool	1391040000	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
780	Amazon	Sicks	B0002D0C...	Chris30542	[0, 0]	I use Dunlo...	5	Just right fo...	1388534400	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
781	Amazon	Sicks	B0002D0C...	Chris	[0, 0]	i've been us...	5	pick of the li...	1355097600	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
782	Amazon	Sicks	B0002D0C...	David Y.	[0, 0]	Great picks ...	5	Good all ro...	1388016000	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
783	Amazon	Sicks	B0002D0C...	D. Jones "T...	[1, 1]	I think Torte...	5	Great picks ...	1269907200	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
784	Amazon	Sicks	B0002D0C...	D. Villella "g...	[0, 0]	I've been a ...	5	My favorite p...	1354838400	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
785	Amazon	Sicks	B0002D0C...	Everanor	[0, 0]	I like the pic...	5	Great!	1362700800	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
786	Amazon	Sicks	B0002D0C...	From Detroit	[1, 1]	Yes. The 1...	5	Blue Tortex ...	1255737600	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
787	Amazon	Sicks	B0002D0C...	GamerBoy	[1, 1]	Whatever si...	5	My Favorite ...	1347753600	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
788	Amazon	Sicks	B0002D0C...	Gordy Styles	[0, 0]	I've always ...	5	great picks!	1358208000	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
789	Amazon	Sicks	B0002D0C...	Hagen LeBr...	[0, 0]	I've been pl...	2	Not the Wor...	1402358400	2017-03-17...	2017-04-03...	http://review...	Negative	null	null	null
790	Amazon	Sicks	B0002D0C...	Hannah Ba...	[0, 0]	thankfully i ...	5	great picks	1383436800	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
791	Amazon	Sicks	B0002D0C...	Hurley "I tho...	[0, 0]	I was lookin...	5	Very sturdy ...	1291075200	2017-03-17...	2017-04-03...	http://review...	Positive	null	null	null
792	Amazon	Sicks	B0002D0C...	J.C.	[1, 1]	I've been us...	5	Picks	1395187200	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
793	Amazon	Sicks	B0002D0C...	Jean Hann...	[0, 0]	I love these ...	5	Favorite pick	1361232000	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
794	Amazon	Sicks	B0002D0C...	Jeffrey A. H...	[0, 0]	If you don't k...	5	Good Picks	1388448000	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
795	Amazon	Sicks	B0002D0C...	Joehorse	[0, 0]	Good picks,...	4	Good picks ...	1314316800	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
796	Amazon	Sicks	B0002D0C...	Jon S	[0, 0]	I used to us...	5	Just about ...	1379376000	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
797	Amazon	Sicks	B0002D0C...	Jorge Barb...	[0, 0]	If you thoug...	5	Quality	1351900800	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
798	Amazon	Sicks	B0002D0C...	JuanKiDaz	[0, 0]	Finally deci...	5	Great picks	1291075200	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
799	Amazon	Sicks	B0002D0C...	Kazmir	[0, 0]	I think these...	5	Always usin...	1403308800	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
800	Amazon	Sicks	B0002D0C...	Mark Burge...	[0, 0]	I've used th...	5	If you need ...	1386288000	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
801	Amazon	Sicks	B0002D0C...	Mark R. Seg...	[0, 0]	In a fit of bor...	5	Still the best	1357689600	2017-03-16...	2017-04-03...	http://review...	Positive	null	null	null
802	Amazon	Sicks	B0002D0C...	M. M. Jacks...	[0, 0]	These will p...	5	Nice, servic...	1334620800	2017-03-16...	2017-03-27...	http://review...	Positive	null	null	null
803	Amazon	Sicks	B0002D0C...	Moe	[0, 0]	I like it. Grip...	5	Simply good	1358121600	2017-03-16...	2017-03-27...	http://review...	Positive	null	null	null
804	Amazon	Sicks	B0002D0C...	MojoMMjojo	[0, 0]	Tortex is gr...	5	excellent	1402099200	2017-03-15...	2017-03-27...	http://review...	Positive	null	null	null
805	Amazon	Sicks	B0002D0C...	Mr. GrvThang	[0, 0]	The thickne...	5	My favorite f...	1372204800	2017-03-15...	2017-03-27...	http://review...	Positive	null	null	null

Test SQL Qu... (100 rows)

Update   Cancel

Reasoner active ✓ Show Inferences

Figure 10. Output of Sicks

4.7 Singing Tube

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The figure 11 illustrate the output of Singing Tube.

Figure 11. Output of Singing Tube

4.8 Siren Disk

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Siren Disk is shown below figure 12.

Figure 12. Output of Siren Disk

4.9 Trombone

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The figure 13 illustrate the output of Trombone.

Figure13. Output of Trombone

4.10 Ultrasonic Receiver

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Ultrasonic Receiver is shown in figure 14.

Figure 14. Output of Ultrasonic Receiver

4.11 Ultrasonic Xylophone

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The Output of Ultrasonic Xylophone is shown figure 15.

Figure 15. Ultrasonic Xylophone

4.12 Xylophone

After developing Ontology in Protégé, we created mapping, applied inference based semantic rules and got the results from Reasoner to distinguish between positive and negative reviews. The figure 16 shows the Output of Xylophone.

Figure 16. Output of Xylophone

5. CONCLUSION AND FUTURE WORK

As time passes, product reviews given by different people change. These variations might be due to different reasons like change in user requirements, improvement in product quality, market trend and evolution of technology. This research is focused to make automatic product reputation model to compute dynamic rating. Our Proposed model has different layers such as sentiment layer and semantic layer. Reviews are collected from internet such as amazon, then features are extracted from those reviews. Sentiment analysis is applied in the base of these features. In second layer, we use semantic knowledge to infer new knowledge for scaling past ratings. We have developed an ontology by using protégé tool. An inference based semantic rules for Dynamic product reputation are defined and query generation has been done using SPARQL query to validate results. We have developed automatic product reputation model to compute dynamic

(changing) rating of product. We performed sentiment analysis manually. In future, work can be done to fully automate the sentiment analysis by coding in java.

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