

# Identification of Astrological belief using Sentimental Analysis by Capturing Opinions from Cross-Domain Individuals



C. N. V. B. R. Sri Gowrinath, B. Srinivasa S. P. Kumar, Chilukuri Megh Phani Dutt

**Abstract:** Astrology usage is substantially composed of the belief and opinions by individuals in recent times. Astrology describes a huge set of predictions by using a wide range of horoscope charts along with scientific/mathematical computations. Planets movement around twelve houses is the vital thing for Astrological specifications. Astrology is having mutual sides of belief in proportionate and the belief is identified by using concepts like Sentiment analysis, Naïve Bayes classifiers and others. Sentiment Analysis specifies the odds in-favor and against the concept. The current study describes a model to identify the belief in and against cases on Astrological belief; also identifies the deviated opinions with the help of various features using confusion matrix. Training, Tuning and other analytical activities are used to build and verify a model for accuracy. The present study is mainly emphasized on identifying the belief, which is very useful to derive an unambiguous thesis on Astrology in nearby future.

**Keywords:** Astrology, Confusion Matrix, Tuning, Training, Accuracy, Semantia, Precision, Sentiment analysis.

## I. INTRODUCTION

### A. Astrology:

Astrology is an ambidextrous concept, uses domains Mathematics, Artificial Intelligence, Astronomy, Probability, Statistics and others to figure predictions. Astrology is basically a cosmic energy relevant notion and articulates the required predictions via the positional movements of planets [11]. Astrology consists of scientific computations that depend on various phases of the orbital computations in form of degrees [5]. Astrology is composed of rules that predict different aspects of the human life based on planetary positions of stars based on the birth time [12].

The Astrological calculations were also proved using scientific/mathematical calculations and at present the astrological predictions are represented using distinct automated softwares. The major part of these softwares presenting information that is likely to be static and ambiguous content.

Although some systems are generating dynamic recommendations without user thought, recommender systems should not only be intelligent but also have to identify tendencies of users [19]. In recent times media is also influencing people in vast set of scopes and Astrology is one such kind. People are also willing to know about their future to make their life run in a smooth passion. Feature similarity and divergence plays a vital role in identification of source domain for a specific domain [3].

### B. Sentiment Analysis:

The main reason behind the lack of belief on Astrology is that astrologers' provide quality services to persons rather than universal rules and standards [6] and so the belief on Astrology is also being disproved day-by-day. The current study uses Sentiment analysis to detect the basic belief on Astrology from cross-domain Natural Language opinions. The outcome from sentiment analysis on Astrological data is useful to identify the root causes for polarity on astrology and to develop understandable standards/inferences in the domain followed by improvising the belief. Models like intuition and polarity based Sentiment, ensure that sentences are correctly labeled and hence wrong information should not be entered into the system [10], consequently the sentiment analysis approach should be as keen as possible. Use of Sentiment analysis in conjunction with Machine learning algorithms and other disciplines will produce dynamic and better accurate results. The improvement of accuracy on astrological predictions leads to the incremental belief on Astrology. There is a requirement of researchers and astrologers come to define uniform rules and scientific validity for predictions [6]. Sentiment analysis is a text analytical tool in which the opinions regarding a context will be concluded. In general it extracts the number of odds in-favor as well as against-favor. Although Sentiment analysis is a frequent mining tool, it has some challenges with respect to cross domains [3]. The concept is used to extract pros and cons regarding hotels, movies, products, student performance and so on. Sentiment Analysis procedure is continuously finding out the sentiment, if our text is having Subjectivity [1]. Hence sentiment analysis is the suitable method to analyze the astrological belief opinions.

Manuscript published on January 30, 2020.

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# Identification of Astrological belief using Sentimental Analysis by Capturing Opinions from Cross-Domain Individuals

In sentiment classification a variety set of algorithms are being used to achieve effectiveness in classification [1]. To achieve accuracy and precision, in some cases more than one distinct algorithm is used [14].

The analyzed information should be of the form:

- Yes / No responses
- Ratings using stars (\*)
- Progress bars (%)
- Scaling (Real values)
- Natural text using any spoken language (sentences) and so on.

Sentiment analysis uses one or more Lexicons (bag-of-words), act as databases to decide the positive or negative polarity using weights. In general the entire dataset can be partitioned into two parts – one is Training set and the other is Test set. Training set develops a model using the major portion of dataset and is approximately 70 -80 %. In Training of the dataset, Lexicon uses weights of words to identify Subjective and sentiment classifications. Then the Test dataset is applied on the developed model to verify the model accuracy from the generated results. The categorization of the results based on class labels provide accuracy of information likewise the labeling of classes in health related research [8]. Aspect based Sentiment analysis is a two-step method which can be used for aspect term extraction and sentiment classification [21], but it is a complex one for novice analysts.

### C. Semantria Excel:

In recent times we use different automated analytical tools to conduct Sentiment Analysis. For example, MS-Excel Semantria, Text2Data , Monkeylearn online analytics, Tableau and so on, has sentiment analysis supportability. SentiSW is another analytical tool that performs Sentiment analysis using entity recognition at the time of sentiment classification [20]. For better analytical results, we can prefer domain ontology with usage knowledge as well as collaborative filtering recommendations [18]. Ms-Excel tools are optimal for our current astrological dataset and the tool is easily downloadable for 32 as well as 64 bit excel and also having compatibility with other operating systems.

In Semantria excel tool we can assign weights to any word. Also we can stop analyzing some words as they are using in positive, neutral as well as negative senses. Sentiment Analysis can be of various levels such as Document, Sentence and Phrase. We can use parts-of-speech to identify the belonging of words [16]. In general stop words are prepositions such as:

- in
- are
- from
- and
- or
- they
- the
- can
- were
- make
- an
- and so on

The following table shows a sample set of Negative, Neutral and Positive words:

Table 1: Sample words under different polarities

Negative	Neutral	Positive
<ul style="list-style-type: none"> <li>• Wrong</li> <li>• Reject</li> <li>• Not</li> <li>• Negate</li> <li>• Hardly</li> <li>• False</li> </ul>	<ul style="list-style-type: none"> <li>• Identify</li> <li>• Apply</li> <li>• Opinion</li> <li>• Trust</li> <li>• Normal</li> </ul>	<ul style="list-style-type: none"> <li>• Right</li> <li>• Accurate</li> <li>• Accept</li> <li>• Creatively</li> <li>• True</li> </ul>

The relation between Astrology and Sentiment analysis is being initiated by collecting the opinions from cross-domain individuals. After analyzing the collected data, expected belief of each individual can be identified. Then apply the sentiment analysis technique to identify the actual beliefs. Formulate the expected versus observed using confusion matrix model as per the below table:

Table 2: Confusion matrix template

<b>Observed</b>  <b>Expected</b> 	<b>Positive</b>	<b>Negative</b>
	True Positive	False Positive
<b>Positive</b>	True Positive	False Positive
<b>Negative</b>	False Negative	True Negative

The range of Polarities can be specified as per the application or context dynamically. The categorization of polarities can be generally as follows:

- Positive: +0.26 or greater
- Neutral: -0.25 to +0.25
- Negative: -0.26 or lesser

## II. LITERATURE SURVEY

In the current competitive world, Opinion mining plays a vital role to identify strengths and weaknesses of any product/service/object. Sentiment Analysis is the commonly used text mining method for opinion collection, as it has a great impact in vast set of domains and the required information can be extracted in multiple perspectives [1]. Sentiment analysis conducted using variety of tools and methods one such useful method is Grey number sentiment analysis that uses bag of words without heuristics for sentiment classification [2]. Being multidisciplinary, Sentiment analysis requires an annotation of data to obtain certain performance accuracy in mining [3].

A classifier addresses poor performance with other domains, if it was already trained on a specific domain and hence sentiment analysis should be used on unknown target domain (annotation) to achieve proper and better accuracy [3]. Also various challenges were existed in emotion/sentiment classification [2].

We need a vast set of corpus generation to analyze opinions in broad perspective and so the current study captures opinions on Astrological belief from cross-domain individuals. Astrology is a likelihood credence identification concept, which requires in-depth analysis using natural language text. Sentiment analysis is the best suitable technique to analyze the text data that uses NLP and other classification techniques to attain better accuracy [4].

Astrology is not only a spiritual concept, but also the precise one, that consists of orbital timing of planets along with scientific calculations [5]. But the different Astrological systems interpret predictions in varying manner [12] and so we need better Knowledge Management System (KMS) that interprets astrology in a uniform manner and also accepted by majority of assessors. Astrological belief is increasing now-a-days due to the availability of media as media is influencing more and more in our daily life. Although people is having ability to believe Astrology, they are unable to identify the behind facts [11]. This study basically addresses the belief on Astrology using Sentiment analysis to identify the odds in-favor and against, which is very useful in uncovering the related facts to the outside world.

Astrology uses basic mathematical calculations of planets, when they move in their orbits about the Sun [5]. Astrology has wide range of applications including prediction of the profession [6], diseases and so on. Astrology addresses predictions on various aspects and composed of number of horoscope charts [11]. Astrological predictions for profession identification using Case Based Reasoning (CBR) is one of the techniques, which uses four R's (Retrieve, Reuse, Revise and Retain) for effective accuracy [12]. Astrological predictions of different incidences in human life are identified based on similarity of positions of planets, zodiac signs and aspect between them [6].

Sentiment analysis is an NLP mining method that mines opinions on various facets like place recommendations [7], health related research [8], home interview survey [9], hotel reviews [10][13], opinion mining from student feedback data [14], parents feedback on children [15], Aspect-level sentiment analysis on E-commerce data[16], Probabilistic word selection via topic modeling [26] and so on. A recommendation system is also required to evaluate facts from captured cross-domain opinions that are in an unstructured input format. In general the evaluation depends on collaboration from distinct recommender systems like personalized web recommendations using ontology [17], collaborative filtering using domain knowledge [18], Intent-aware contextual recommendation system [19] and others.

In sentiment analysis, concepts like aspect based comments on entity-level [20], feature selection and ensemble construction [21] play vital role in improvising the accuracy. Data mining techniques strengthen the data classification, especially Naïve Bayesian algorithm is a powerful method for comparing and classification of data [22] [23] [24] [25] as per the current trending of data. It classifies distinct data sets in an effective manner.

Opinion mining outcome is of different forms and one of the important techniques to evaluate the outcomes is supervised learning algorithms [14] and the sentiment analysis belongs to this category of algorithms. In this regard, opinions are being extracted using automation tools like Orange, IBM SPSS, Rapid Miner, Google docs, Monkey survey, SentiSW – an entity level sentiment analysis tool for sentiment classification[20], Red Opal[4] and others. Sentiment analysis uses either a dictionary based or corpus based approach for sentiment classification [1] ; subsequently the concept is useful in applications including decision making, business related, trend analysis and so on.

The unstructured data collected from cross-domain individuals undergone sentiment analysis from years ago [11]. NLP tasks such as Opinion mining mainly focuses on semantic inferences and doesn't require deep understanding of text. Sentiment analysis method like Entity level sentiment analysis generates an accuracy of about 77% [20], if we evaluate sentiment classification using <sentiment, entity> tuples.

### III. METHODOLOGY

In the prediction process, an attribute without any significance will be removed / ignored and hence in our context Name shouldn't be considered for analysis as it is the attribute with no significance. From our dataset, we use conclusion as a primary attribute for prediction analysis and the attributes including age, occupation and others are kept for future analysis. The following methodology used to identify the belief on Astrology:

- Collect the relevant information regarding Astrological belief using the tool like Google Documents or any other information retrieval tool.

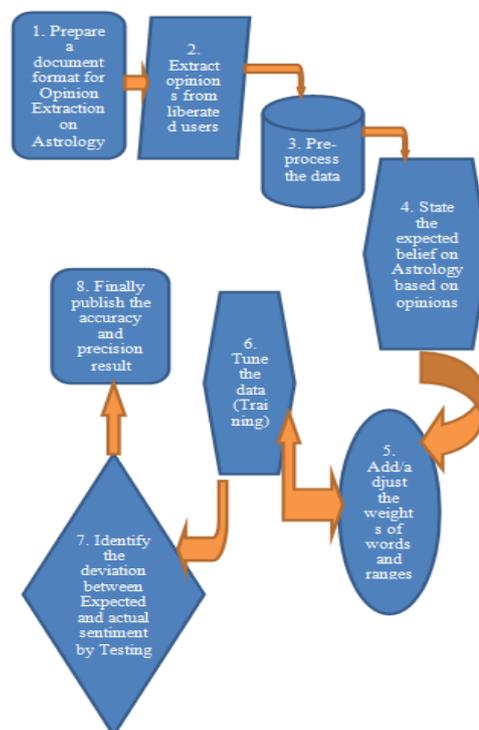


Fig.1. Architecture to conduct sentiment analysis for Astrological data set

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- The collected data using enquired questions from a Google like documents will be transferred to table format so that it consists of individual opinions with respect to various attributes.
- Now perform pre-processing of the table data to eliminate missing values, inconsistencies and outliers in the collected data.
- Draw the expected Sentiment belief in terms of Positive, Negative or Neutral classifications.
- Use an analytical tool to perform Sentiment Analysis. In the current situation Sematria Excel was used for analysis.
- Perform Tuning (a Training method) that assigns a positive or negative weight for useful words except propositions based on the nature of the words.
- Apply the sentiment analysis on the document (Testing) and extract results.
- Tabulate and identify the actual Sentiment classification.
- Compute the degree of accuracy in the applied Sentiment Analysis using Accuracy and Precision formula. Also identify the deviation on sentiment classification.

## IV. RELATED WORK

Although Astrology is a forecasting concept, it requires the structuring of standard and accurate inference rules to make Astrology believable and generate accurate forecasting results. In-prior to improve the accuracy of any concept, identifying the root causes for inaccuracy and ways to compute the accuracy are essential. As Astrology is a domain saying that supposed to be around 40% - 60% accurate, the main cause for less accuracy is lack of standardized rules and ambiguous interpretations. As per the recent Statistical analysis [1] the familiarity of the Sentiment Analysis is increasing with diverging datasets and hence, in Astrological belief identification it is a powerful tool.

### Data Collection:

A set of personnel opinions from a questionnaire using Google document is extracted as per the figure 2. This questionnaire consists of personnel as well as astrological belief related queries decomposed into two sections. First section captures personal information such as name, mail id, gender, occupation and age. Out of which name is an optional entry. The data collected from Google form is converted into Excel data and shown in figure 3.

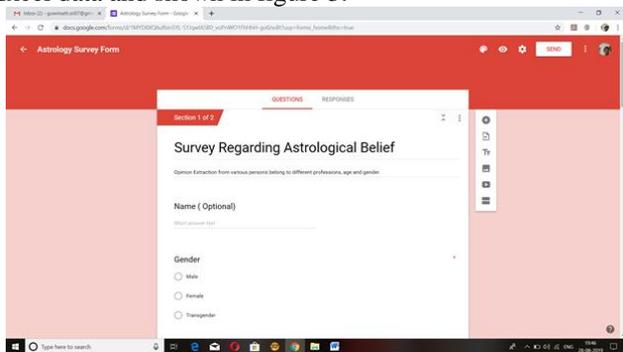


Fig.2. Astrological Survey form section-1

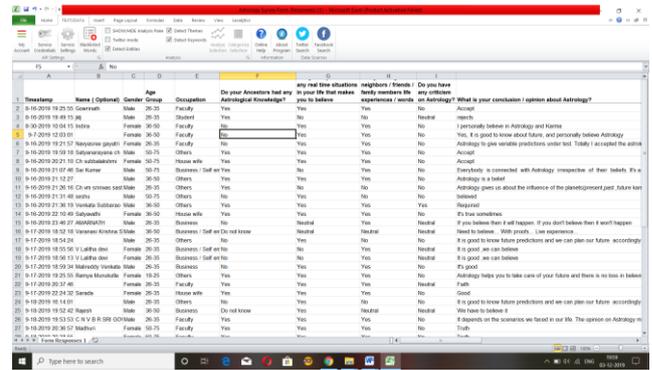


Fig.3. XLS collection of data from Google document

The second section captures opinions on astrological belief through a set of questions which are facing by people in real life. This section contains Yes/No/Neutral answer oriented questions as well as opinions entry.

### Data capturing:

From the above document, it is observed that opinions stored in response sheets are captured into excel format file.

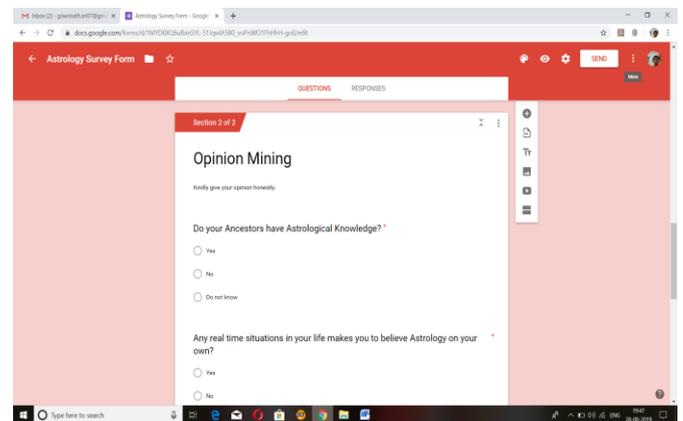


Fig.4. Astrological Survey form section-2

Summary of the captured information specifies answers relate with the below:

- Any Astrologers as ancestors
- Belief on Astrology by his/her own
- Got belief by observing others real time scenarios
- Accepting or rejecting the astrology
- Overview of the concept

Providing dynamic recommendations for any system, product or service is an apparent technique in current e-commerce arena [16] and hence for conclusion / information retrieving, significance allocated for recommendations on Astrological belief.

### Data Analysis:

Data Analysis is a critical task to elevate the patterns as the data might be having sensitive information. The captured information should be tabulated, for analysis as well as to get conclusion on belief. To express the collected information inform of expected belief, one or more attributes are undergone for analysis. In this context, the attribute conclusion is mainly considered to achieve the expected belief.

Lazy classification is an excellent tool that solves multiple problems concurrently and deals the changes in various problem arenas successfully, but it requires large space to store the entire training data [23]. Semantria tool in Excel takes less storage space and flexible to analyze the captured data; also suitable enough for our current data set. Generally the nature of the data used for analysis specifies the best classification algorithm for a problem that gives better accuracy and transparency [24]. To do analysis, initially tune the words based on the phrase context. Here tuning concept acts as training of the dataset and then perform analysis. Finally retrieve the Positive/Negative/Neutral polarity based on the tuning conducted.

**V. RESULT ANALYSIS**

The main objective in the current study is to identify the belief on Astrology and the result will be used in the development of a Knowledge Management System that provides standard inference rules on Astrological predictions. The methodology used opinions from cross-domain individuals, to identify the deviation between expected and observed belief especially the conclusion attribute to classify them as Positive, Negative or Neutral opinions. In general a confusion matrix composes of Positive and Negative classifications, but here classification conducted as Positive, Negative or Neutral as some people do not have any awareness on Astrology. Precision is the measure of quality exactness, whereas Recall is for quantity or completeness [25]. The dataset used for analysis is opinions captured in two ways – using Google form and Oral collection. Google form captures information as written evidence whereas oral collection is non-writable. As an experiment approach, data collected in both the modes and the evidence based only used for analysis. The result using confusion matrix is as per the below table:

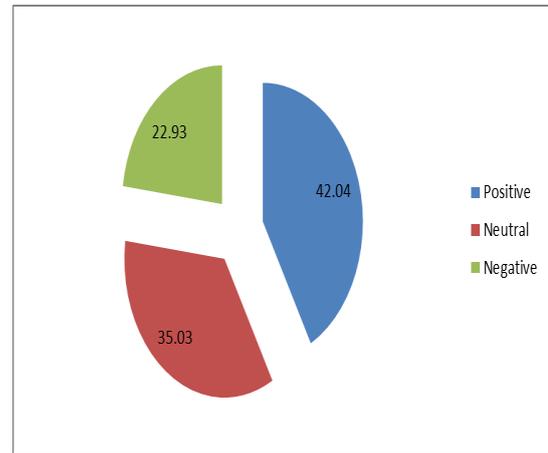
**Table 3: Polarity wise result display after Sentiment Analysis**

Observed \ Expected	Positive	Neutral	Negative
Positive	66	20	11
Neutral	5	55	18
Negative	3	7	36

**True Positive** is the number of records that are having positive belief on Astrology in both the expected and observed.

**True Neutral** is the number of records that are having neutral belief on Astrology in both the expected and observed.

**True Negative** is the number of records that are having negative belief on Astrology in both the expected and observed.



**Fig.5. Percentage of identified belief**

The above Pie chart represents the percentage of True Positive, True Negative and True Neutral of all the similar expected versus observed.

**Accuracy Computation:**

The expected and observed results compared using confusion matrix row by row and identifies the deviations between them by formulation as below:

$$Accuracy = \frac{TP + TN + TNe}{TP + TN + TNe + FP + FN + FNe}$$

- Where TP -> True Positive
- TN -> True Negative
- TNe -> True Neutral
- FP -> False Positive
- FN -> False Negative
- FNe-> False Neutral

$$Accuracy = \frac{66 + 55 + 36}{218} = 72.02\%$$

$$Precision = \frac{TruePositive}{TruePositive + FalsePositive} = \frac{66}{97} = 68.04\%$$

**VI. CONCLUSION AND FUTURE ENHANCEMENT**

The current paper primarily focuses on identifying the astrological belief and hence it identifies the deviation between the expected versus observed astrological belief. The paper also provides the scope to design a strong inference engine that improves the accuracy of Astrology to attract more and more people towards astrology. In future an envisioned feedback is used to update weights of words in Lexicon(s) that uses an approach like combination of content-based and frequency-based recommender system [19]. Another perspective with the current study is to develop an application that provides ranking on recommended interests in Astrology such as place recommendation system [7].

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