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Finding the unconformity among the objects using inconsistency

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Abstract*—. Continually arise facts or events that are related by the witnesses that providing different points of view. These generate inconsistent data even though they are part of the event observed, considering that they are described by viewers with different cultural levels and geographical positions with respect to the event. Each witness gives atomic statements describing the object through affirmative expressions. For example, In England, a gentleman could be considered as a man that likes visit the club, uses elegant clothes, having a mustache, assists to cinema and theater one or two times a week, and takes the coffee at 6 pm. But an elegant man in Guatemala or Tanzania has a different connotation. Now, considering that a man is in Istanbul and is observed by three different viewers with origins in different parts of the world, your descriptions around to him, generate inconsistencies in spite of your comments, generating the profile specifically the object to be described.

Keywords. **Confusion, Inconsistency objects, observers, sentences, theory revision.**

I. INTRODUCTION

In the logic sense, the principles of reasoning eliminate ambiguities [1], [2]. The first order logic works with propositional predicates considering the composition through the connectors (and, or), and conditionals (if, then, and if and only if). Each premise takes on a single value, knowing as a true or false (or in Boolean as (1) or (0), respectively) [3]. The proposition is true (T) or false (F) depending on the connector and premises relationship. Moreover, the traditional results observe the logical paraconsistency in which the quasi-classical logic, which manages the inconsistency with statements using the logical foundations deciding whether the statement is true or false but gives no inconsistency degrees. [3]. The multivalued statements require premises applied into proposition through the special connectors. And in consequence, has special answer expressed as possible, necessary or maybe. The multivalued statements require premises applied into proposition through the special connectors. And in consequence, has a special answer rather than a single value. This type of logical relations is a new system considering the logic paraconsistent model [4]. The DEEPFLOW proposes system implementation; extracts claims from unstructured text apply reasoning aiding users in a making decision in large-scale projects in diverse domains [5]. In this approach evaluates the quantitative uncertain proposition based on argumentative inference. In this approach evaluates the quantitative uncertain proposition based on argumentative inference and was selected as the unstructured text containing data which is unreliable, incomplete, or even contradictory.

In this approach, evaluates the quantitative uncertain proposition based on argumentative inference selecting into the Knowledge Base the unstructured text containing incomplete information [6]. The implementation software called MINC identify the inconsistencies automatically [7].

The Dempster-Shafer inconsistency theory considers that the observer answers have a range of probabilities [8].

Combining the inconsistency measurements with semantic and syntax based approaches, generate a Minimal Unsatisfied Subset (MUS) and Minimal Correction Subsets (MCSs), giving two equivalent inconsistency degrees. Guohui and Yue presented the theoretical and experimental comparisons and the two purely semantic-based on inconsistency degrees: 4-values and the Quasi-Classical semantics based on inconsistency degrees [9].

The purpose of this paper is to present a model where that includes the inconsistency degrees formed with qualitative values obtaining through hierarchies.

II. INCONSISTENCY ANALYSIS IN OBJECTS BAG

Each object has a set of characteristics belonging to a qualitative hierarchy, applying in the present the five characteristics forming the hierarchy.

The following definition describes the Objects Bag properties.

Definition 1. *Let* $OB=\{O_1,O_2,\cdots O_n\}$, $n\in Z_+$ *be an Objects Bag* OB, *where each element (object) is formed with m pairs (property, value) symbolically described as* $\left(p_j^i,vc_j^i\right)$, *with* $i,j\in Z_+$ where i corresponds to the object position and j *represents the qualitative value having the cardinality* $\#i=n,\ \#j=m;\ m,n\in Z_+$, *with* $P=\left\{p_j^i\right\}\ i,j\in Z_+$, *the set of objects with domain in Linguistic Variables set, representing the object characteristics,* $VC=\left\{vc_j^i\right\},\ i,j\in Z_+$ *the qualitative values set, where the domain is a linguistic hierarchical variable set* $H=\{h_1,h_2,\cdots,h_s\},s\in Z_+$, *where each hierarchy contains the qualitative values related to a linguistic variable set VC*.

Then, in (1) every object is built with a set of couples.

$$O_1=\left\{\left(p_1^1,vc_1^1\right),\left(p_2^1,vc_1^2\right),\cdots,\left(p_m^1,vc_1^m\right)\right\} \quad (1)$$
$$O_2=\left\{\left(p_1^2,vc_2^1\right),\left(p_2^2,vc_2^2\right),\cdots,\left(p_m^2,vc_2^m\right)\right\},$$
$$\cdots,$$
$$O_n=\left\{\left(p_1^n,vc_n^1\right),\left(p_2^n,vc_n^2\right),\cdots,\left(p_m^n,vc_n^m\right)\right\}.$$

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After to be defined the inputs, are calculated the unconformity of every object as follows:

Let Knowledge Base described as *OB* built with the product set $\beta := O_\bullet \times O^\bullet$, in (2), where $O_\bullet, O^\bullet$ are the lower a upper Object Couples Bag, conforming:

$$\beta = \begin{Bmatrix} (O_1,O^1) & (O_1,O^2) & \cdots & (O_1,O^n) \\ (O_2,O^1) & (O_2,O^2) & \cdots & (O_2,O^n) \\ \vdots & \vdots & \ddots & \vdots \\ (O_n,O^1) & (O_n,O^2) & \cdots & (O_n,O^n) \end{Bmatrix} \quad (2)$$

R, is the diagonal pairs matrix defined as $R = diag(\beta)$ and has the elements pair $\{(O_1,O^1),(O_2,O^2),\cdots,(O_n,O^n)\}$. Then, the domain of confusion is $Conf_O : \mu[\beta - IR] \to [0,1]$, in (3), where I is the identity matrix with dimension equal to β and μ is the metric in the Lebesgue sense, then confusion function [1], [2] among objects, for any object that belongs to $\beta - IR$ is defined as: $VC = \{vc_j^i\},\ i, j \in Z_+$

$$Conf_O(O_k,O^t) = \sum_{s=1}^{k}\left(\sum_{r=1}^{t}\frac{Conf(O_s,O^r)}{\mu(h_s)}\right) \quad (3)$$

Where h_s represents the hierarchy properties of O_k. That´s if $p_{j=1}^{i=1} = Animal$, represents to the hierarchy Animal $h_1 = Animal.$

Then, the $prof_{h_1} = \mu(h_1)$ represents the levels number in the hierarchy implicated.

After, $[\beta - IR]$is calculate as the inconsistency between the objects, the inconsistency described as $Incon_O : \beta \to [0,1]$ between the objects considered the Monte Carlo Method, for any object that belongs to $[\beta - IR]$ in average, and the total confusion is known as the centroid (4), requiring to describe the difference between both techniques.

$$\sigma_O = \frac{\sum_{k=1}^{n} Conf_O(O_k,O^t)}{\#TO} \quad (4)$$

Where $\#TO$, represents the number of Objects in the Bag.

The object with the lowest unconformity is always named a total confusion in the Objects Bag, it has the centroid.

Therefore, the total confusion value is near to zero and will be considered as the inconsistency, and it is the most representative result in this analysis events in the Monte Carlo form.

III. EXPERIMENT

In some cases, it will be necessary to an inquiry about a person. But only, knows the information that some observers were given. An observer saw a person with an animal; he is Christian and has a boat.

Other observer saw a person with a cat, he believes is catholic and traveled in an airplane. The last observer saw a human being arriving at a meter with a bird and he supposed was catholic. Here, there are the atomic sentences as He believes is catholic, he traveled in an airplane, among other atomic sentences. Above is the representation of (p_m, vc_m) tuples.

John= {(Animal, animal), (Religion, Christianity), (Transport, boat)}
Peter= {(Animal, domestic cat), (Religion, Catholicism), (Transport, airplane)}
Luis= {(Animal, bird), (Religion, Catholicism), (Transport, meter)}.

The objects bag is compound by *OB= {John, Peter, Luis}*.

To determine the inconsistency of the bag was realized an application in Java® code. The hierarchies: Animal, Religion, and transport are shown in figure 1, in part a, b, and c, respectively. The hierarchies displayed were obtained through the XML file. See figure 1.

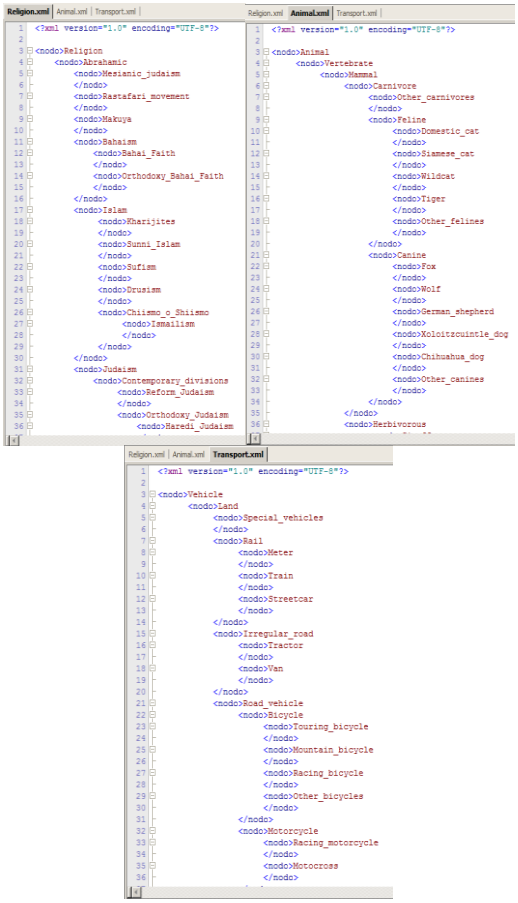

Fig 1. Hierarchy representation for Pet, Religion, and transport [1], [2].

Then, will run the application named "Inconsistency". Firstly, introduce the names of the properties as shown in figure 2. After press "Add Properties" to accept all properties that every object will have.

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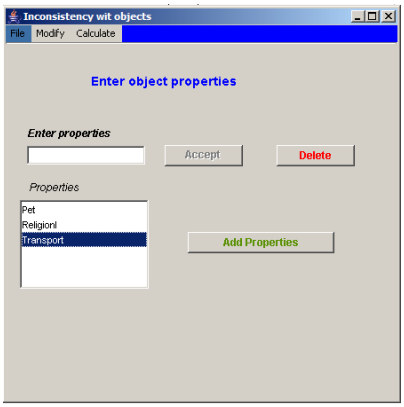

Fig 2. Object properties in the screen.

The following, create the objects with the values for each property as shown in figure 3 [1], [2].

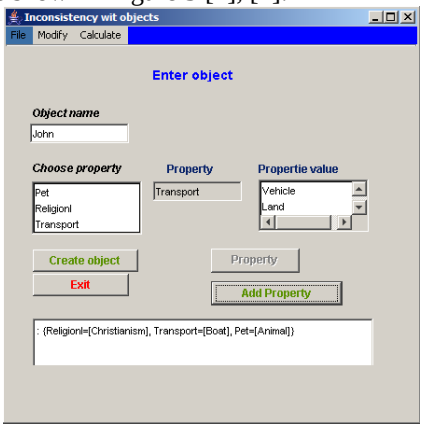

Fig 3. Objects created with their property values are shown on the screen [1], [2].

In application, choose the menu "Calculate", where appear a screen shown in figure 4.

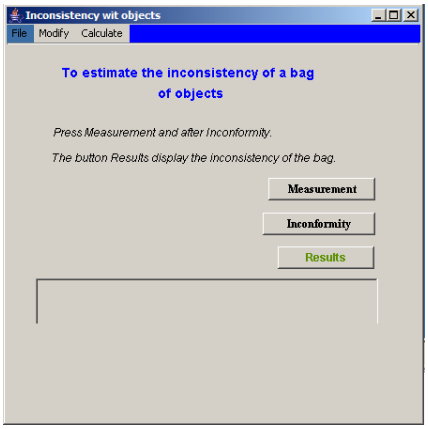

Fig 4. Calculating the inconsistency of objects bag are shown on the screen [1], [2].

To determine the disagreement also called total confusion of all objects press the button "Measurement", enter to the button "Unconformity" to display the objects with their confusion total (see figure 5).

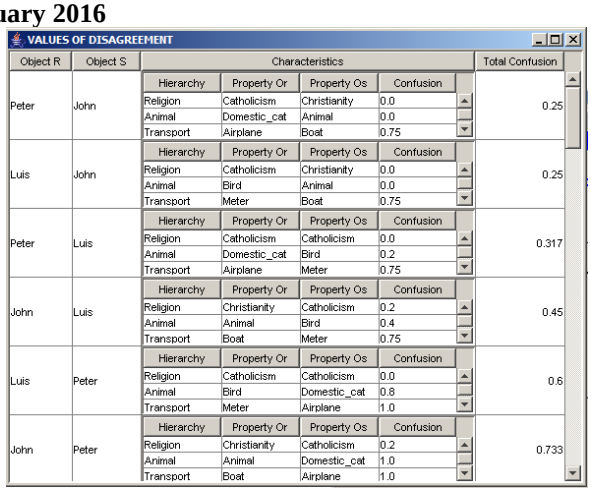

Fig 5. Results represent all objects with their properties and total confusion [1], [2].

The above figures present the objects total confusion. Then click on button "Results" to output the inconsistency of the bag and the object that generates it (see figure 6).

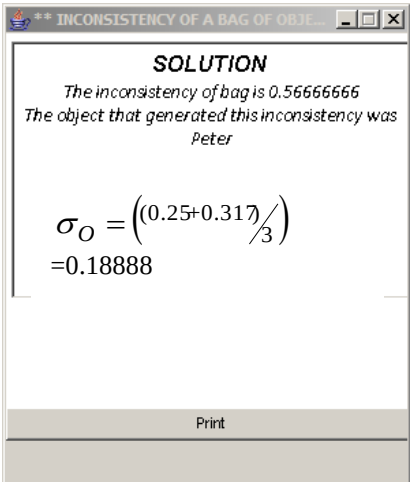

Fig 6. The Screen corresponds to the inconsistency of the bag and the object or objects that generate it [1], [2].

From all objects, Peter is more closely to be the object that gives off the lowest inconsistency in the bag.

IV. Conclusion

Currently, they are creating different methodologies to treat inconsistent information in different areas such as requirements specification, databases, news reports, among others; results obtained using probability and different types of semantic and logic syntaxes description.

In this paper was presented a methodology to find matches and to compare these with the characteristics that describe objects without confusions. The introduction and the inconsistency analysis in objects bag allowed developing the methodology that solved this problem through the computational results.

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