Multi-agent system oriented to establishing relationships on Twitter based on similar interest between users.

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Abstract. The purpose of this research is to create a multi-agent system capable of establishing relationships between Twitter users if they have interest in the same topics.

Keywords Multi-agent system, Twitter, relationships, interests.

1. Introduction

Twitter is a commonly used social network nowadays, where, due to the huge amount of people using it, it can be a difficult task to separate useful information from the rest of it. This includes finding users with similar interests. With this system, it is intended to reduce the complexity of this process and help users find people to connect with.

In this article we will make a quick summary of the antecedents for social media and personality prediction as well as the article that has inspired this one. Also we will make a description of the implementation we have thought about and it's experimental results with a short conclusion about the topic chosen.

2. State of the art

Social networks are relatively modern. Nowadays this concept is associated with webs like Twitter, Facebook or the outdated Tuenti, but, the first recognizable social media site dates from 1997. It was called Six Degrees and allowed people to create a profile and make friends with other users. Going even further in 1890 and 1891 the invention of the telephone and radio could also lay the groundwork to this concept of social media.

As times goes, social media keeps gaining more and more importance in people's daily life. People can share their feelings and opinions with the rest of the world, know all the things happening immediately and interact with other users. There have been some experiments done with the aim of predict behaviors in social media or even detect terrorism or dangerous activities.

As an example here is a summary of the idea proposed by some members of the polytechnic university of Valencia about prediction of personality based on Twitter, which inspired the creation of this article. They suggest the creation of a multi-agent system where the interaction between a user and their followers can be classified based on the Big Five personality test. This test establish four big groups of personality characteristics: Opening to new experiences (art, adventure, emotions,...), responsibility (auto-discipline), extraversion (tendency to positive emotions and looking for the company of others), kindness (tendency to being compassionate and cooperative with other people) and lastly, neuroticism (tendency to developing bad emotions as anger o depression).

Finally it is remarkable the platform Watson IBM BlueMix which offers many services to develop cognitive applications.

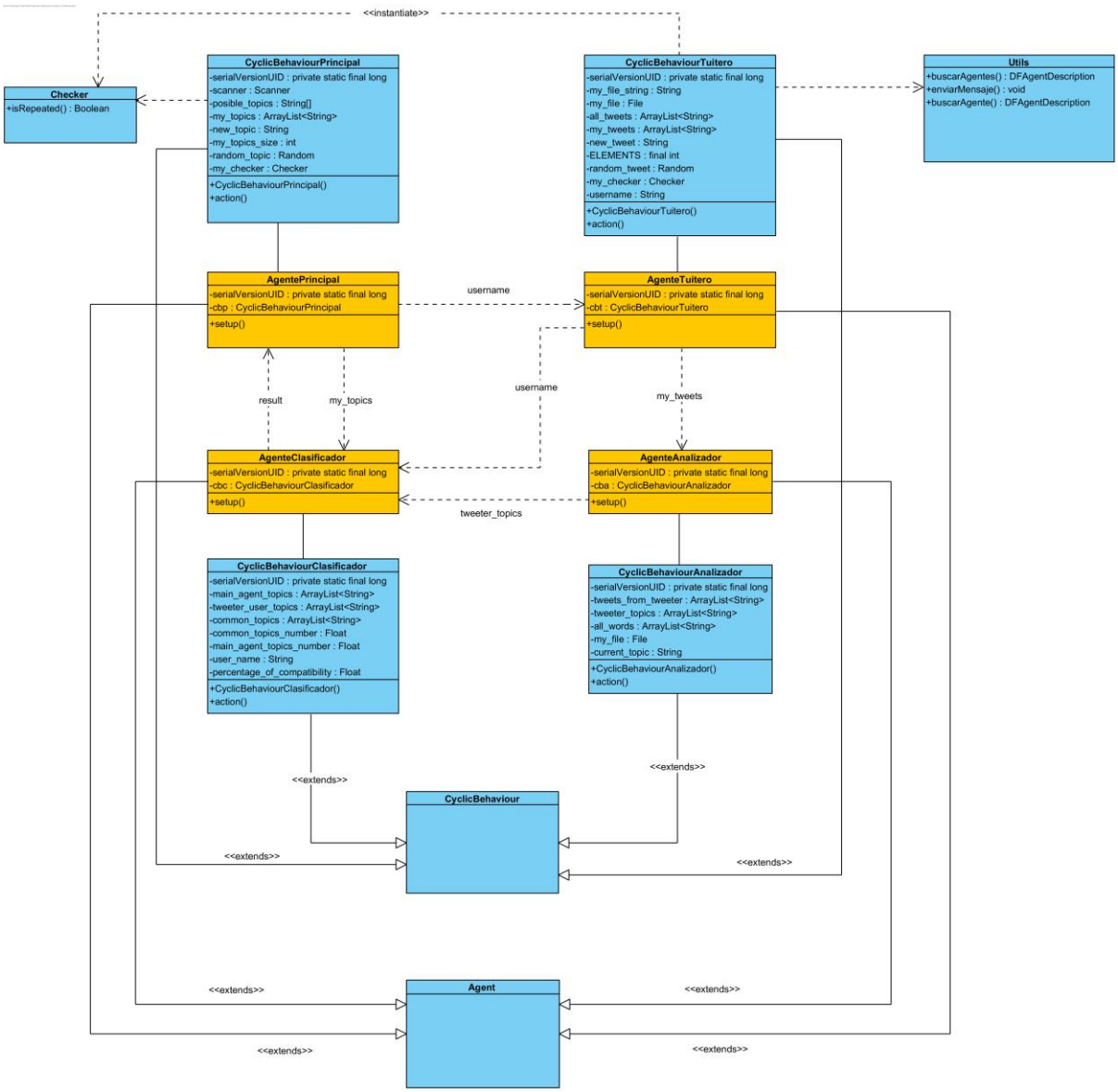
3. Proposed architecture

The system proposed is applied for every user in Twitter. For each of them, a certain range of other users is selected. After this process, each of these latest users is analyzed by their latest tweets in order to find which topics interest them the most. Once this is done, the topics are compared with the ones from the original user and the relationship between the two users is established following this standard:

- More than 75% of the topics are shared: Both users can follow each other and establish a conversation.

- Between 25% and 75% of the topics are shared: The users can follow each other but without establishing personal contact.

- Less than 25% of the topics are shared: The users should not establish any kind of contact. They should neither talk nor follow each other.



[Figure 1]. Proposed architecture designed in Visual Paradigm for UML

3.1 Agents description

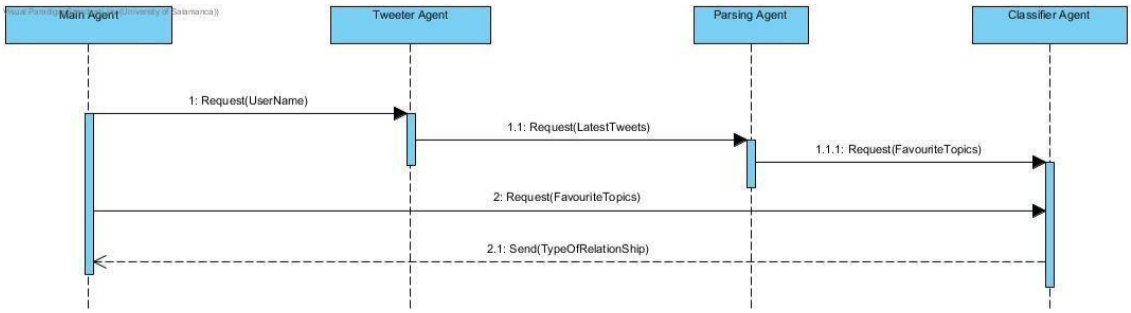
This system uses four different agents:

- **Main agent:** This is the agent that starts the whole system and simulates a normal user. It uses a register - that we can store in a file associated to the agent - of their particular interest based on different topics. It is possible to randomly generate those topics in each new program launch. As an example, a main agent whose interests are politics and sports.

- **Tweeter agent:** The objective of this agent is to read the latest tweets from a particular user, whose name is received from the main agent. Abstractly, it represents a user from the network who is represented by their latest tweets.

- **Parsing agent:** The agent receives the latest tweets that have been read in the last step. Once they are received, the will be processed one by one with the intention of finding a general topic of each of them. One way of doing it is to select the key words from the tweet and after that searching the meaning of those words in the dictionary. This process is repeated on the definition to find they key words that will led to finding a particular topic which will be associated with the user. After analyzing all the tweets the system has a list of the user's interests.

- **Classifier agent:** It receives the user's topics from the parsing agent as well as the topics in which the main agent is interested. With those two registers it is ready to do the comparison between the topics and the possible evaluation of the paring between the profiles based on their particular interests. It is possible to take the standard for the pairing that was mentioned above.



4. Experimental results and conclusion.

The system allows the users know their compatibility by comparing their favorite topics to see if they have any of them in common. This is a very simple algorithm to show how the system would work for some pre-established categories.

It was developed in Java programming language using Jade to create the simulation with agents.

In the future with the technological advances and the development of new forms of Artificial Intelligence these types of systems will be much easier to do and also they will be significantly more accurate than the ones that exist at the moment, being also important the increasing capacity of computer and machinery in general.