

The purpose of this work is to research, analyze and create a paraconsistent model of communication in intelligent systems. The traditional approaches to modeling Agent Communication Languages settled for the two-valued logics despite their natural modeling limitations: inability to properly deal with lacking and inconsistent information. The two pillars of the proposed research are: the Walton and Krabbe's semi-formal theory of dialogue and the Austin and Serale's speech acts theory.

In multi-agent settings, the most exploited dialogues are: information seeking, inquiry and persuasion. In the proposed work the further development of paraconsistent model of agent communication is intended, more specifically, persuasion dialogue, which aims to resolve conflicts. It is characterized as follows by Walton and Krabbe: „The initial situation of a persuasion dialogue (or critical discussion), is a clash or conflict of points of view. The main goal is a resolution of the initial conflict by verbal means. This means that if the dialectical process is to be successful at least one of the parties involved in the conflict will have to change its point of view at some stage in the dialogue. The internal aim of each party is to persuade the others to take over its point of view (...) Persuasion dialogue generally takes the form of a sequence of questions and replies, or attacks and defenses where each side takes a turn to make a move. A move is a sequence of locutions advanced by participant at a particular point in the sequence of dialogue. (...) The locution rules of a dialogue define the permissible locutions, like statements, questions, inferences, and so on. The structural rules define the order in which moves can be made by each participant.”

As one might expect, persuasion is an especially important dialogue in the process of creating the team, which is the core of cooperation in multi-agent systems. However, the task of appropriate modeling of persuasion dialogue is demanding. Based on the results of the previous tasks, we will be able to analyze and propose paraconsistent model of (multi-party) persuasion, taking into account different strategies of conflict resolution in the case of missing or inconsistent information. We will also need to examine the properties of the proposed strategies and, as a result, the properties of persuasion dialogues. The fulfillment of this task will allow individual agents to reach agreements that are essential in teamworking (groups of) heterogeneous agents.

As explained above, the basic character of the proposed research is purely theoretical. The goal of this research is to widen perspective of the communication mechanisms in the intelligent systems, which need to act in the presence of uncertain and incomplete information. The proposed research is not geared towards practical applications, however some of the results could hopefully become be a starting point for a different applied research in the future.