METHOD FOR DIALOGUE BETWEEN A MACHINE, SUCH AS A HUMANOID ROBOT, AND A HUMAN INTERLOCUTOR; COMPUTER PROGRAM PRODUCT; AND HUMANOID ROBOT FOR IMPLEMENTING SUCH A METHOD

The present invention relates to a method for dialog between a machine and a human being. The machine can be any data processing device such as a computer, the processor of a "smartphone" or a robot, notably humanoid, comprising at least one embedded processor, and the dialog can be conducted orally. The invention relates also to a computer program product and to a robot, preferably humanoid, for the implementation of such a method.

A "humanoid robot" can be defined as a robot exhibiting certain attributes of the appearance and of the functionalities of a human being such as a torso, a head, arms, legs, the capacity to communicate orally with a human being using voice recognition and synthesis means, etc. The aim of this type of robot is to reduce the cognitive distances between man and machine. One of the most important features of a humanoid robot is its capacity to sustain a dialog that is as natural as possible with a human speaker. This capacity is essential for the development of "companion robots", intended to assist the elderly, sick or simply people who are alone in the necessities of daily life, and to provide these people with an acceptable substitute to the presence of a human personal assistant.

The dialog methods for humanoid robots known from the prior art are not satisfactory because they lead to dialogs that are repetitive and stereotyped, and at the very least unnatural.

The paper by S. Rosenthal and M. Veloso "*Mixed-Initiative Long-Term Interactions with an All-Day-Companion Robot*", in *Dialogs with Robots: Papers from the AAAI Fall Symposium (FS-10-05), pages 97 – 102*, describes a robot capable of guiding a human being in a visit, for example to the robotics department of a university. The robot is programmed to avoid the repetitions during the dialog; however, two different human speakers will be offered substantially identical dialogs.

CLAIMS

1. A method for performing a dialog between a machine (RT) and at least one human speaker (INT), comprising the following steps, implemented by said machine:

a) identifying said human speaker;

b) extracting from a database (BDD) a speaker profile (INT_PR) comprising a plurality of dialog variables (VD), at least one value being assigned to at least one of said dialog variables;

c) receiving at least one sentence originating from said speaker, analyzing said or each said sentence originating from said speaker to extract therefrom at least one value to be assigned to at least one dialog variable of said speaker profile and store said or each said value in said speaker profile; and

d) formulating and emitting at least one response sentence as a function at least of said sentence received and interpreted in step c) and of one said dialog variable of said speaker profile;

characterized in that said or at least one said sentence received and analyzed in step c) is a sentence spoken by said speaker spontaneously or following a non-interrogative sentence emitted by said machine~~.~~

~~2. The method for performing a dialog as claimed in the preceding claim, in which~~; and in that the analysis of said or at least one sentence originating from said speaker and the formulation of said or at least one response sentence are performed by means of a plurality of sentence patterns (MDP) represented by respective syntax trees (AS1, AS2).

~~3~~2. The method for performing a dialog as claimed in claim ~~2~~1, in which at least some of said sentence patterns contain at least one pointer to a dialog variable of said speaker profile.

~~4~~3. The method for performing a dialog as claimed in one of the preceding claims ~~2 or 3~~, in which at least some of said sentence patterns

contain at least one pointer to at least one set of terms that are interchangeable in a sentence, called concept (CPT).

~~5~~4. The method for performing a dialog as claimed in one of the preceding claims ~~2 to 4~~, in which said step d) is implemented by means of a plurality of rules (R) associating at least one sentence pattern originating from said speaker and at least one response sentence pattern.

~~6~~5. The method for performing a dialog as claimed in claim ~~5~~4, in which, in said step d), at least one said rule associates, with a same sentence pattern originating from said speaker, a plurality of sentence patterns that can serve as response sentences; and in which, out of said response sentence patterns, those which contain a pointer to a dialog variable to which no value is assigned in said speaker profile are discarded.

~~7~~6. The method for performing a dialog as claimed in one of claims ~~5~~ 4 or ~~6~~5, in which:

- at least one said rule is marked by a tag (TG) identifying a conversation topic;
- in said step d), the rule or rules marked by at least one tag identifying a determined conversation topic are activated or deactivated as a function of at least one dialog parameter.

~~8~~7. The method for performing a dialog as claimed in one of the preceding claims, in which said speaker profile also comprises a dialog history and, in said step d), said or at least one said response is also formulated as a function of said dialog history.

~~9~~8. The method for performing a dialog as claimed in one of the preceding claims, in which, in said step d), said or at least one said response is also formulated as a function of at least one contextual parameter acquired or determined by said machine.

~~10~~9. The method for performing a dialog as claimed in one of the preceding claims, in which, in said step a), said human speaker is identified by means of an image acquisition device (DAI), by facial recognition or by reading a graphic code presented to said device.

~~11~~10. The method for performing a dialog as claimed in one of the preceding claims, in which, in said step b), the machine accesses a remote server (SVD) via a communication network (RC) and downloads said speaker profile from said database which is stored on said remote server.

~~12~~11. The method for performing a dialog as claimed in claim ~~11~~10, in which said machine, having accessed said remote server via said communication network, loads into said database a speaker profile updated by the storage of at least one value assigned to at least one dialog variable extracted, in said step c), from at least one sentence originating from said speaker.

~~13~~12. The method for performing a dialog as claimed in one of the preceding claims, in which said machine comprises a processor (OE) embedded in a humanoid robot (RT).

~~14~~13. A computer program product for implementing a method as claimed in one of the preceding claims when said program is run on a processor.

~~15~~14. A humanoid robot (RT) comprising an embedded processor (OE) programmed to implement a method as claimed in claim ~~13~~12.

~~16~~15. The humanoid robot as claimed in claim ~~15~~14, also comprising:

- an image acquisition device cooperating with said embedded processor to identify a human speaker;
- a sound acquisition device cooperating with said embedded processor to receive at least one sentence spoken by said human speaker; and
- a sound emission device cooperating with said embedded processor to emit one said response sentence.