Targeting both assembly and service industry, the DARWIN project aims to develop an "acting, learning and reasoning" assembler robot that will ultimately be capable of assembling complex objects from its constituent parts. First steps will also be taken to explore the general reparation problem. Functionally the robotic artefact will operate in three modes: slave, semi-autonomous, fully autonomous mode. Categorization, object affordances, accurate manipulation and discovery of naive physics will be acquired gradually by the robot. The reasoning system will exploit all these experiences in order to...
allow the robot to go beyond experience when confronted with novel situations.

Targeting both assembly and service industry the DARWIN project aims to develop an 'acting, learning and reasoning' assembler robot that will ultimately be capable of assembling complex objects from its constituent parts. First steps will also be taken to explore the general reparation problem (seen as a sequence of assembly-disassembly actions). Functionally the robotic artefact will operate in three modes: a) slave, where the necessary sequence of operations will be provided by a CAD-CAM system; b) semi-autonomous, where the sequence will be provided either through demonstration by a teacher performing the same task or by describing it in a higher level 'language', suitable for a human operator. In this mode the system's perception will provide closure of the perception-action loop, so eliminating the need for detailed spatial information as in (a); c) fully autonomous mode, where an executive process will generate the necessary sequence by reasoning and mental simulation of consequences of actions on objects. Effort will be put to keep the resulting cognitive architecture domain agnostic. This directly implies that the robot should be able to effectively generalize and transfer previously gained knowledge to new tasks (or performing the same task in a slightly modified world). The objects in its world will not be known apriori. Rather, their knowledge will be built by interacting with them. Thus categorization, object affordances, accurate manipulation and discovery of the naive physics will be acquired gradually by the robot. In addition, it will also learn the solution steps for an assembly problem by observing snapshots of the assembled object during various construction phases. The reasoning system will exploit all these experiences in order to allow the robot to go beyond experience when confronted with novel situations. A series of demonstrators of increasing complexity will be developed in correlation with the maturation of the cognitive architecture.

Programme(s)

Topic(s)

Call for proposal

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