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We present in this volume the col
tion of the IWANN conference ("
Networks"). This biennial meetin
applications of systems inspired b
tionary systems).

Since the first edition of IWAN
intelligence community and the d
computational intelligent banner w
interest and objective: to better un
elaboration of theories, models a
professionals working in the area,
petitive applications.

More and more, these new com
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In this IWANN edition we have
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The above concepts were the m
2007 edition: *"Computational a*
addressed the following topics:

1. **Mathematical and theo**
   Complex and social syst
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2. **Neurocomputational for**
   modelling. System-level n
   logical learning.
3. **Learning and adaptatio**
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   algorithms.
4. **Emulation of cognitive f**
   Sensor mesh. Natural lan
   function (visual, auditory,
   motor control.
5. **Bio-inspired systems an**
   tems. Evolvable computing

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Generating Random Deviates Consistent with the Long Term Behavior of Stochastic Search Processes in Global Optimization

Arturo Berrones

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Abstract. A new stochastic search algorithm is proposed, which in first instance is capable to give a probability density from which populations of points that are consistent with the global properties of the associated optimization problem can be drawn. The procedure is based on the Fokker – Planck equation, which is a linear differential equation for the density. The algorithm is constructed in such a way that only involves linear operations and a relatively small number of evaluations of the given cost function.

Keywords: global optimization, stochastic search, statistical physics.

1 Introduction

The optimization of a cost function which has a number of local minima is a relevant subject in many important fields. For instance, the determination of the weights of learning machines depends in general on the solution of global optimization tasks [1]. A feature shared by almost all of the most common deterministic and stochastic algorithms for continuous nonlinear optimization is that their performance is strongly affected by their starting conditions. Depending on the algorithm, the correct selection of an initial point or set of points have direct consequences on the efficiency, or even on the possibility to find the global minima. In this contribution a novel way to define starting points for search in global optimization is proposed. The procedure is itself a stochastic search algorithm. Stochastic strategies for optimization are essential to most of the heuristic techniques used to deal with complex, unstructured global optimization problems [2]. The roots of such methods can be traced back to the Metropolis algorithm [3], introduced in the early days of scientific computing to simulate the evolution of a physical system to thermal equilibrium. This process is the base of the simulated annealing technique [4], which makes use of the convergence to a global minimum in configurational energy observed in physical systems at thermal equilibrium as the temperature goes to zero.

The method presented in this contribution is rooted in similar physical principles as those on which simulated annealing type algorithms [5,6,7] are based.

Nature-Inspired Planner Agent for Health Care

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Abstract. This paper presents an autonomous intelligent agent with a human thinking reasoning model, based on past experiences. The agent is developed to assist medical staff in geriatric residences. The health care process is a vital function, requiring nature-inspired solutions imitating the residence staff behaviours. An autonomous deliberative Case-Based Planner agent, AGALZ (Autonomous aGent for monitoring ALZheimer patients), is developed and integrated into an environment-aware multi-agent system, named ALZ-MAS (ALZheimer Multi-Agent System), to optimize health care in geriatric residences: ALZ-MAS is capable of obtaining information about the environment through RFID technology.

1 Introduction

Agents and multi-agent systems (MAS) have become increasingly relevant for developing distributed and dynamic intelligent environments. The ability of software agents to act somewhat autonomously links them with living animals and humans, so they seem appropriate for discussion under nature-inspired computing [7]. This paper presents AGALZ (Autonomous aGent for monitoring ALZheimer patients), and explains how this deliberative planning agent has been designed and implemented. A case study is then presented, with AGALZ working with complementary agents into a prototype environment-aware multi-agent system (ALZ-MAS: ALZheimer Multi-Agent System). The elderly health care problem is studied, and the possibilities of Radio Frequency Identification (RFID) [10] as a technology for constructing an intelligent environment and ascertaining patient location to generate plans and maximize safety are examined.

This paper focuses in the development of nature-inspired deliberative agents using a Case-Based Reasoning (CBR) [1] architecture, as a way to implement sensitive and adaptive systems to improve assistance and health care support for elderly and people with disabilities, in particular with Alzheimer. Agents in this context must be able to respond to events, take the initiative according to their goals, communicate with other agents, interact with users, and make use of past experiences to find the best plans to achieve goals, so we propose the development of an autonomous deliberative agent that incorporates a Case-Based Planning (CBP) mechanism, derivative from Case-Based Reasoning (CBR) [2], specially designed for planning construction. CBP-BDI

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facilitates learning and adaptation, and t
that found in pure BDI (Believe, Desire,
implemented by using different tools, suc
beliefs, goals and plans, as java objects
agent at execution time.

During the last three decades the numb
by about 50%. Today they represent n
estimated that in 20 years this percenta
meaning 100 millions of citizens [4]. Th
studies in other parts of the world show
developing new and more reliable ways
underlined by this trend [4], and the cre
environments for monitoring and optim
authors [8] consider that tomorrow's hea
intelligent systems capable of interactin
architectures based on intelligent devices
systems for medical care for the elderly o
in all aspects of daily life, predicting po
physical and cognitive support.

RFID technology is a wireless technolog
the move. An RFID system contains basica
and software [10]. The configuration used
of 125KHZ transponders mounted on bra
several readers installed over protected zon
central computer where all the ID numbers

In the next section the autonomous
AGALZ, is presented. Then, a case s
characteristics of ALZ-MAS architecture a
with initial results and conclusions obtain
into a real scenario.

2 Autonomous Nature-Inspired

We have developed AGALZ, an autonomo
BDI) agent that integrates with other agen
MAS, as a proposal to improve the efficienc
in geriatric residences. AGALZ presents a
(Belief, Desire, Intention) model [3]. In
capabilities of the agents are based on hum
and intentions. Our method facilitates the
deliberative mechanism within BDI agents
providing a greater degree of autonomy th
CBP-BDI agent is specialized in generati
Planning (CBP) mechanism. The purpose of
adapting solutions that have been used to sol
CBP agents are a variation of the CBR agen
case. A CBP planner is used for AGALZ to

Table 2. Time (minutes) spent on indirect tasks

	Monitoring	Reports	Visits	Other	TOTAL
Before	167	48	73	82	370
After	105	40	45	60	250

In the future, health care will require the use of new technologies that allow medical personnel to carry out their tasks more efficiently [4]. We have shown some potential of deliberative CBP-BDI agents in a distributed multi-agent system focused on health care. In addition, the use of RFID technology [10] on people provided a high level of interaction among users and patients through the system.

Acknowledgements. This work has been partially supported by the MCYT TIC2003-07369-C02-02 and the JCYL-2002-05 project SA104A05. Special thanks to Sokymat for the RFID technology provided and to Telefónica Móviles (Movistar) for the wireless devices donated.

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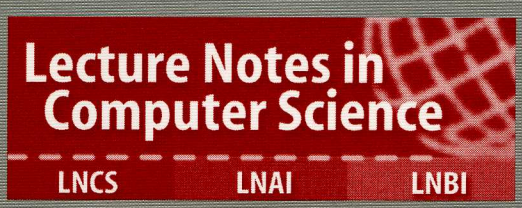

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