# Free creatures :
# The role of uselessness in the design of artificial pets

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In less than five years, artificial pets have achieved a real commercial success. These apparently useless toys have been massively adopted, in Japan first, and progressively in the rest of the world. Children, and also adults to a large extent (see [Kus00]) have started to spend a significant part of their leisure time engaging in relationship with these artificial creatures. It is remarkable to note that this is not due to the realism of the artificial pets. The Tamagotchi and its successor were merely crude animated figures presented on low-tech displays. More recently, the AIBO, being designed as a robot with no fur, does not mimick a real dog . We will argue in this paper that the success of the existing artificial pets relies on some clever design principles. Among these principles is the fact that they are useless in the sense that they do not perform any service task. We will then discuss why we should follow this 'uselessness principle' when we design artificial pets that are able to learn and adapt themselves.

## 1 Design principles of commercially available artificial pets

The primary purpose of an artificial pet is to establish and maintain a relationship with its owner. Commercially available virtual and robotic pets have been designed to do so. We are arguing that their success relies on the two following design principles:

### 1.1 Free creatures

What make artificial pets different from other robots or software agents is that they are not designed 'to be slaves'. It means that their first function is not to provide any kind of services such delivering mail or bringing coffee. In that sense, they are different from a lot of robots described in popular Science-Fiction. More generally, they are not doing what you tell them to do. If AIBO is 'tired' of playing it won't play anymore irrespective of its owner's efforts to raise its interest. Paradoxically, these creatures are not designed to respect Asimov's second law of robotics : 'A robot must obey a human beings' orders'. They are designed to have autonomous goals, to simulate autonomous feelings.

It is in fact one of the first times in the history of machine building, that engineers have to design apparently 'useless' creatures. It changes completely the way we can evaluate them. If you send an autonomous robot on Mars or on a serious mission in a nuclear plant, if the robot ever falls down, the engineer who designed it will feel he has not done his job well. It is not so serious when AIBO is falling. Usually people laugh. They are not excepting the robot to accomplish a very specific task, they just want it to be entertaining, to act as a companion.

One way of showing that the pet is a free creature is to allow it to refuse the order of its owner. In our daily use of language, we tend to attribute intentions to devices that are not doing their job well. For instance, we do not develop any kind of relationship with our computer, washing machine or TV set when they work properly. It is only when they start disfunctionning, when they show that they can act differently that what we ordered, that we are ready to give them a kind of 'intentionality': "This computer refuses to work, the washing machine has decided to go on strike, etc.".

The freedom of the pet, its apparent autonomy in the choice of its goals, seems a *necessary* feature for the development of an interesting relationship. Of course, it is not a *sufficient* feature. All the art of the creature designers rely on the way the pet will actually convince the user to interact with it.

### 1.2 . . . that make you feel responsible

The paradox with an artificial pet is that although the creature is designed to be free, the owner has to have a reason for interacting with it. In most commercially available pets, repeated interactions are achieved because the owner feels responsible for his pet. The Tamagotchi for instance is a fragile being. If its owner does not give it the proper feeding,

cleaning, nursing and playing, the pet will quickly die. A PostPet[1] might run away from its house, if its owner does not take care of it well. All these pets have been created to perform a kind of 'affective blackmail'. The owner must feel guilty if he doesn't take care of his pet.

One very effective way of performing such a pressure on the user is to link the maturation of the creatures in some manner with the way the user is taking care of his pet. Most of the existing virtual or physical pets have a predefined maturation program which can be slowed down by a lack of interactions from the user. If you don't play enough with AIBO, it will not mature properly in the long run.

The trick is to create a positive feedback loop on the user investment in taking care of the pet. The more the user has spent time interacting with the pet the more it is crucial for him that the pet does not die or run away and matures properly. The initial investment may simply rely on the money spent to buy the pet. Then, the relationship emerges from this self-reinforcing dynamic.

## 2 Uselessness as a design principle

It is surprising how far this first generation of artificial pets has been able to give convincing results without using almost any of the techniques developped in the fields of artificial intelligence and researchs on adaptive behavior. However, it is probable that in the long run, people might to get bored with this kind of artificial pets. Users will want their pet to learn more about their life so that they get the impression that they really share something with them. Object recognition and interaction with natural language will be some key issues in the development of an interesting relationship.

Several research projects are currently conducted in various labs to explore more interesting interactions with artificial pets. Robota is able to learn and imitate gestures [BDH98]. Kismet engages in proto-conversation without semantic contents but in which a lot of non verbal features are present [Bre00]. In Sony CSL Paris, we are currently working on a system enabling the AIBO to learn how to interact with humans using real words. This research relies on previous works showing how agents could build categories and words from scratch to name simple objects [SK99]. First experiments have been done showing how an enhanced AIBO could perform this task on top of its current autonomous behavior [Kap00].

It is important for the design of learning artificial pets not to loose the features that have made the success of the more simple ones. That's why we argue for *uselessness as a design principle*. The creature should always act as if driven by its own goals. However, an additionnal dynamics should ensure that the behavior of the pet is interesting for its owner. In commercially available artificial pets this is achieved through the induction of a responsability feeling. Other ways are possible.

It is not because an artificial creature does not perform a useful task that it can not be evaluated. Evaluation should be done on the basis of the subjective interest of the users with the pet. This can be measured in a very precise way using the time that the user is actually spending with the pet.

We believe that in addition of being a necessary feature for relationship emergence, taking uselessness as design principle should also encourage engineering progress.

- Autonomy and functionality are often contradictory. Part of the research on autonomous behavior has been slowed down by the fact that autonomy was not so interesting from an engineering point of view. On the contrary, autonomy becomes a key issue for the building of free creatures.
- In artificial intelligence, artificial vision and natural language processing, a large number of techniques, despite the fact that they give satisfactory results, do not meet a performance level suitable for industrial use. As the evaluation of entertainment pets should not be based on functional criteria, some of these techniques can be applied. Their performance level should improve in the process and open for other uses in the future.

For all these reasons, we believe that second generation artifical pets should still be built on the principles that have made the success of the first ones : be designed as free 'not functional' creatures.

## References

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[1] Postpet is a mail software developed by Sony, in which a Pet is delivering your mail. It has been a important success in Japan. More information on: http://www.sony.com.sg/postpet/postpet/index.html

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