From engineering dream to robotic pet: the AIBO story

An engineer's vision

The grassroots of AIBO can be traced back to the early 1990's. The technological environment at the time was beginning to experience the creation of innovative and exciting applications spawning from the synergy of existing technologies. In the midst of this, Dr. Doi, the head of Sony's Digital Creatures Lab and AIBO's original progenitor, had a vision that would spark the groundbreaking creation of Sony Entertainment Robots.

With the tremendous advances that were being made in terms of computer processors, artificial intelligence, voice recognition and visual technology, Dr. Doi had the ingenious idea that these technologies could be brought together to conceive an autonomous robot. In particular, artificial intelligence specialists had mastered the process of receiving and expressing emotions. Encouraged by this, Sony envisioned not only a functional robot but also a companion for humans. AIBO would be capable of reacting to the interactions it would have with its owner, and express many feelings including happiness and excitement.

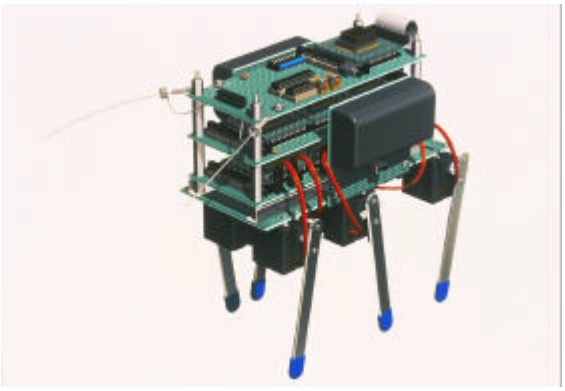
The realization of the immense potential sewn up in creating an autonomous robot, led to the vision that AIBO could one day overtake the popularity of personal computers and find its rightful place in the homes and lives of people worldwide. Owing to the extraordinary progress in Artificial Intelligence (AI), these companion robots would be able to learn and adapt to the people and environments they live with, enabling them to better respond to their owners' functional and emotional needs. After the Personal Computer and the Internet eras, Sony was comfortably predicting that in the next decade Entertainment Robots would steal the show.

Overcoming the challenges of a new field

During the early phases of the development in 1992, the Sony design engineers put in charge of conceiving the robot were faced with several important challenges that nobody had ever attempted to tackle in robotics. At that time, robots with cameras had wheels, and required comprehensive reprogramming for every task or activity they were involved in.

Some of the design challenges faced, included enabling the robot to walk on legs and integrating an AI programme capable of interacting with several sensory organs, such as touch, sight and sound.

By 1997 the first prototypes were beginning to emerge and carried the fruits of extensive research and development. Dr. Doi's team, driven by the ambition of creating a friendly autonomous robot, had succeeded in overcoming the considerable design challenges they had experienced. The very first prototype actually had six legs and was the first step to having a robot on legs.



After this rudimentary model, Dr. Doi's team sculpted an entertaining plaster model that carried the first indication of the shape the entertainment robot would take, or not take!

Several other prototypes were developed, each one getting closer to the shape of the first AIBO that was launched. Each prototype, including current models, was evolving on the "OPEN-R" architecture. This is the standard interface for the entertainment robot system. It's greatest advantage lies in the interactions it allows between hardware and software modules, which significantly expand the capabilities of Sony entertainment robots. It also enables a robot body to be modified by simply swapping a hardware module (head, leg or tail).

AIBO sells out in 20 mi nutes

The original AIBO model presented to the public was ready by May 1999. An initial 5,000 ERS-110 models were put on sale in Japan and the US. The response was so overwhelming that 3,000 robots were sold in under 20 minutes in Japan along with another 2,000 over four days in the US. Owing to this impressive performance, AIBO has been recorded in the Guinness Book of Records 2001 (p. 127) as being the fastest-selling robot pet. Worldwide, AIBO was quickly becoming a media darling, and Sony was greatly encouraged by its success. A trend was born.

The concept of an entertaining companion robot clearly had a huge appeal worldwide. This prompted Sony, who were already developing more advanced models, to bring AIBO onto the European market. The European launch took place on 26 October 1999.

At this glamorous event, Sony announced a new sales offering of a special edition model (ERS-111) for November 1999 targeting Europe, Japan and the US. This time, 10,000 models were to be put on sale for a period of one week. Once again, all expectations were crushed. During that single week, Sony recorded 135,000 orders. The main reason behind offering such limited numbers was to keep a close contact with customers to favour feedback and help further develop the performance of AIBO.

A third sale offering followed in February 2000. For this occasion, Sony promised that there would be no limit on the number of AIBOs available. They confirmed that all orders received during the official order period, that lasted ten days, would be catered for.

AIBO Generation II

The impressive success of the first generation AIBO encouraged Sony to launch the second generation by October of that year. Announced at the state-of-the-art Sony Europe Headquarters in Berlin, the second generation AIBO (ERS-210) was born. With improved mobility, touch sensors and facial LEDs, the ERS-210 model boasted enhanced emotional expression in its interactions with its living environment. Features requested by previous AIBO owners including the Name Recording Function and Voice Recognition, were introduced to the new model bringing AIBO even closer to its owners.

Since this welcomed launch, the ERS-210 model has travelled worldwide to Australia, Europe, Canada, Singapore, Japan and the United States. AIBO has now become available in all these countries, and has attracted the attention of many people seeking an entertainment companion as well as people interested in Information Technology and robotics.

The LATTE and MACARON models joined the family in September of 2001. This new pair affectionately named, are specifically designed to be sweet and adorable. These cuddly shaped companions incorporate the impressive technology found in other AIBO models.

They are capable of emitting friendly sounds and performing movements to express their emotions.

Launched on the 8th of November 2001, the latest AIBO model, the ERS-220, has taken the performance and capabilities of AIBO to new heights. With a sleek and futuristic look, this new model incorporates a multitude of highly advanced actions. Along with numerous lights and sensors, the ERS-220 model has proved to be the most sophisticated entertainment robot on the market.

AIBO not for once, for life

One of the main features appreciated by AIBO owners worldwide, is the availability of an exciting range of software programmed on memory stick for all AIBO models. These packages allow each AIBO to continue developing and diversifying its capabilities throughout its life. For example, the AIBO Navigator 2 software enables the owner to take complete control of AIBO using a remote control programme on a PC. Several other programmes are available including the AIBO Master Studio software that enables the owner to create exciting moves or dances for AIBO, which will then be performed by AIBO.

AIBO to become even more interactive

At a time when the success of the AIBO Entertainment robots continues to flourish, Sony has continued its development work in this new field. In November 2000 they announced the development of a small biped walking robot prototype the “SDR-3X”. In March of this year, Sony announced an evolution of this biped model, the “SDR-4X”,

that has experienced an impressive development. With the successful research and development ongoing at Sony, this model boasts increased mobility and an improved level of interaction with people and its environment. The robot can achieve continuous speech recognition of many words – up to approximately 60,000. In addition, using two colour CCD cameras and visual memory allows it to make its way around objects and people. With 38 joints, the SRD-4X can walk on irregular surfaces maintaining great posture. Using the same Open-R architecture present in AIBO, Sony has used this prototype to continue exploring the new possibilities for entertainment and companion robots.