

"Robots+Avatars dreaming with Virtual Illusions"

Producers: **F.A.B.R.I.CATORS** in collaboration with: K-TEAM SA, SWITZERLAND

I-55

Overview:

"Robots+Avatars dreaming with Virtual Illusions" integrates virtual reality, robotics and telepresence with a high aesthetical content as well as an suggestive and enigmatic interaction.

The **Real ambience** is represented of a scenography under the form of an Arena with labyrinthic pathways, made of mirrors, metal, wood, in a shiny colorful sand and stone-landscape. A screen 4X4 mts projects the VR world and the results of the interaction between the user and the (robot) and avatars..

The **Virtual Ambiences** is articulated by 10 different worlds or cities contained in the "Mother City" Ying&Yang. The personages in this installation exist both in real space (Koala=robot) and in virtual space Ying and Yang: avatars. Each can control the other and yet both are controlled by the user in a local space and also through the net (from a non local space).

The public can interact with each single robot in it's environment, by moving a joystick. This interaction generates a real time reaction in the behaviour of the robot as well in the avatars in the Vr-world, visible on the projection screen at the top of the scenography of the arena " the real world".

There exist the possibility of attracting Koala clicking on the button of the joystick and causing Koala to move towards Yang, trying to find him either in the physical or virtual world. In synthesis either Koala or the avatars Ying and Yang can interact with the visitors by means of the network or telepresence. Network which becomes a sort of prolongation.

The personages:

1) **Koala (Robot)**. Koala is a robot in the form of a cyber turtle. Its body is covered by a smart skin which is at the same time a catalyzer and mirror of his experience and emotions which he lives by means of the interactivity, since this skin is a porous and expressive entity... Koala lives in his real ambience which is strongly related to the virtual world through Ying (avatar).

2) **Ying (avatar)** and alter ego of Koala. Ying is the alter ego of Koala in the Virtual World. Its an antropomorphic human like creature Ying the avatar represents the feminine principle. She is closely related to the physical world through Koala. Each of them quite individual and unique yet integral in this robotic universe.

3) **Yang (avatar)** lives alone by itself in the limbo of the cyber space, with no alter ego in the physical world. However , Yang becomes connected to the real world by means of the manipulation of a joystick provided for the purpose. Yang, a virtual creature has no alter ego with the real world. He exists by himself in the limbo of the cyberspace and represents the masculine principle.

a) **A real ambience** represented by an physical structure under the form of an Arena. This is the physic habitat of Koala.

b) **Virtual Ambiences** is articulated by the mother city Ying Yang and 10 different worlds or cities contained in the mother city. The worlds or cities and 10 in number and are known as: Avalon, Amazonia, Root of Knowledge, Black Hole, Lautriv's City, Bosh Hell, Ynte Colony, skin city, Boundry City, Amazonas City .

Interactive experience:

The public can interact with each single robot in it's environment, by moving a joystick. This interaction generates a real time reaction in the behaviour of the robot as well in the avatars in the Vr-world, visible on the projection screen at the top of the scenography of the arena " the real world".

There are two joysticks

One is to interact with **Koala**. It is possible to navigate and conduct koala in the virtual world. and the other joystick with **Ying** and **Yang** (avatars).

The public can command the actions of koala and in consequence the actions of Ying in the Virtual Worlds. ying the avatar will operate in the virtual worlds and koala will follow-up step by step what his alter ego does..and generate the same actions.

Koala is cloned with it's Avatar Ying. Koala is present in the virtual world through his avatar ... Ying.

On some occasions it could be observed that Koala moves in a very particular way, in his habitat as if trying to avoid some obstacles, as if he is entering into a cave, trying to escape an object of obstruction.

The curious thing is that in the real world there is no apparent obstacles ...but in-fact there are obstacles. It is only that you do not see them but koala has the capacity to see them...since he has the virtual vision in his perception and he avoids the obstacles his avatar finds in the Virtual World. Koala the robot is seeing the obstacles since they become visible in his imagination these objects which exist in the virtual world.

Koala sees that which his avatar sees in the virtual world, it means that he sees through his avatar. Only that while this occurs, the public sees in the real world smooth sands, without obstacles, while in fact koala is navigating and acting as if it were in the virtual, it is only that his physical body is placed on the sands but his vision is focused in the virtual world.

Koala will replicate, in real space, the travels of Ying, drawing out the path traversed on the environment of sand. It will seem that he is a sort of somnambulist ... going up and down in a senseless manner. He however, knows where he goes it is only that the human eyes are not able to percieve it until Koala relives the same with traces in the sand.

This mean that the physical world is an illusion and that what we see in virtual and dreams are projections without consistency. That the avatar, the alter ego sees objects in the virtual world and reproduces it in the real world and the objects you do not see even are also there because Koala sees it through his avatar Ying.

The Net experience

In the web page that accompanies the installation ... Robot avatar dealing with virtual illusions there is a menu with diverse possibilities of action, view point, interaction...and of navigation.

Koala can be commanded from different points of view and inputs. His actions exercise immediate responses in real time in his avatars and viceversa.

- 1) You could become the view point of Koala. This way you assume, by means of your interaction the position of the other to see the worlds around you.
- 2) You could also see the movements of Koala, Ying or Yang as if they were placed in a virtual chamber in frot of your eyes, and as a consequence you assume the view point of koala or that of Ying or Yang ... this is to say see the worlds, the cities from their view point... nevertheless, you are physically behind the joystick, this implies that a sort of telepresence is experienced, your body is there behind the joystick but your eyes see what could be seen by one of the three personages and from their own point of view.
- 3) You could also have an "external view point", that is to say see from the outside, the inside scenes...change radically from the perspective of that of the personages and assume the position of the view of a bird, for example: fly over the landscape, the visions, the lanscape of the virtual world.
- 4) By means of the web pages, from robot avatar dreaming with virtual illusion, you could enter and leave different cities, and enter again into the mother city which inturn contains the rest of the cities. This process of entering in contact and navingating and interacting with the city is being done through the net.
- 5) Let us speak about another avatar....of Yang. Yang could be activated and commanded by means of a second joystick. In reality, Yang represents in ludic terms the "view point" a "moving view point"...

There exist the possibility of attracting Koala clicking on the button of the joystick and causing Koala to move towards Yang, trying to find him either in the physical or virtual world.

In synthesis either Koala or the avatars Ying and Yang can interact with the visitors by means of the network or telepresence. Network which becomes a sort of prolongation.

More about the net from a non local space in the installation

The Avatar Yang reacts and acts in the virtual world with movements of coordinates X and Z. Between the coordinates X and Z of the virtual world there are invisible barriers, invisible zones that define a net of interactive knots.

Each knot is a point of interaction which in turn is connected to sites, webs, http.... This represents the world of the net, of telepresence. In the real human world these tangible realities are invisible, this is because the real world is not represented physically, in a concrete way since in our world they are, in effect, invisible realities, intangible nevertheless they exist. And they are of vital importance for humanity and man in the aspect of communication.

On the other hand these interactive knots in the virtual world are represented by objects, cubes, geometric forms, symbols.

The interesting thing is that koala, through his alter ego, recognizes where these interactive knots are located and which contain a latent cyber reality which is activated only when touched or someone passes on top or very close to them. The presence of koala and his avatar creates a stimulus for their connection.

In technical terms when the robot or his avatar passes close to these knots whether in the physical world (invisible knots) or the virtual world (visible knots) a collision is brought about and the net of the world becomes connected, activating the knot and connecting at some place in the net.

If the connection obtains a positive result there emerges a tree in the virtual world and this signifies and/or symbolizes that the connection was activated. If the tree does not grow it means that the connection was not made.

Technical specification

The installation is carried out in the C language with Microsoft Visual C++ - Windows NT 4.0.

The part dealing with the graphic has been developed with the VC Division library. For the execution of the application it is necessary that the DVS Division runtime component is installed with the required characteristics.

Other components necessary for the adequate functioning of the application are: (two) analogous joysticks and the corresponding drives.

A joystick permits the entry into interactive contact with Koala and its avatar Ying...whether in the real world or in the virtual world. The second joystick permits the entering in contact with the two worlds: the real world of Koala and the virtual world of Ying and Yang.

Interacting with these two joysticks and these worlds... interactions, collisions and encounters are generated which permit the entry, exit the discovery of new worlds all in function with the laws that govern actions and reactions of the three personages of this installation.

The visitor has the capacity to intervene, interact, penetrate within new worlds, change the actions and movements of Koala and the avatars... command koala to move towards its avatar or Yang, enter into one of the cities, wander around the "Mother City".

During this walk, there is set in the form of an invisible grid a sort of "world-map" of sites, which will be called up with a ping to the corresponding positioned website existing in the database.

The database of the weblinks: about (suggested) 100 http addresses will be defined and stored in a database and then localized in the invisible grid of the VR-world. For the very moment the avatar crosses over this link, he will create a connection to the site and if the connection happened to be successful a flag or something else will be visualized on the screen.

The environment is a landscape which is generated as a 3D surface mapped with a corresponding texture.

Depending upon the different areas/zones the outlook changes. WE WOULD LIKE to offer the opportunity to the vast public via Internet to participate and send inputs to the simulation.

Level of innovation:

In the field of mobile robotics, researchers are working on several hard subjects: - Human-robot interaction - Mobile robot navigation - Robotic telemanipulation - Relationship between simulated (models) and real robots. This work access several of those subjects from a very original viewpoint, with an artistic backgroud and very sophisticated techniques, including: - REAL mobile robots: a real mobile robot (type Koala, from K-Team) is used as physical representation.

This robot has been programmed for navigation in the performance environment and has a connection to the virtual world and its model in this virtual environment.

- Mobile robot models: a model of the robot is associated to the real robot in the virtual world and acts in relationship with the robot actions.

- Virtual reality: complex environments and virtual worlds are linked to the robot activity, internet activity and visitor interactions.
- Internet. The project is pushing particularly the limits of technology in the field or human-robot interaction and robotic manipulation, integrating a large number of complementary tools (mobile robot, virtual worls, robot models, internet, visitor reactions) giving an important role to complex subjective \par aspects. Both the integration aspect and the subjective approach make this project a very innovative and leading research project.

Future applications include all mobile robotic implementation where innovative human-robot interaction is requested (robotics pets, robotic services for private people, telerobotics on Internet for surveillance or telepresence, etc. The innovative approach allows new applications wich can be implemented in all-days life. The social implications are a much better integration of robots in the humans life, including at the cultural level (robot as a new expexpression vector).