

ABATEUS

Conversational 3D Avatar in Basque Language for Multimedia and TV Applications

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Introduction

The influence of computers has grown recently to the point where they have become essential tools for many people, not only in their jobs but also in their leisure time. The technology, however, is becoming more advanced and more difficult to understand for the average user. For that reason, an important change in the interaction between humans and computers is necessary.

Today the most common way of entering and displaying or printing data on the computer is based on the old WIMP paradigm (Windows, Icons, Menus and Pointers), which does not allow the user to interact naturally with the machine. The most natural way for humans to communicate is by speech. Innovative user interfaces are being developed with the ability to synthesize speech and recognize it also, with a representation of a 3-D synthetic character as a »partner« in the dialogue. These new interfaces are called Conversational User Interfaces, in which Avatars (for our purposes, 3-D speaking characters) play an important role.

Emotions and Minority Languages

An important advantage of having a conversational 3-D Avatar in a system is the facility that it gives the user in interacting with the system as if he would be communicating with a real person.

The synchronisation of speech and gestures and the simulation and generation of emotions are relevant research areas in this field.

Avatars are computer characters that can simulate aspects of human conversation, but they are currently subject to technological restrictions. Some of the characteristics that should be taken into account for their use on multimedia applications are: emotional capabilities, little polygonal weight, platform flexibility (PC's, PDA's, Digital TV, etc.) and real time response, since pre-recorded animations do not always serve if interactive communication is required.

Majority language users have the luxury of developed computer systems with voice recognition and synthesis capabilities. The risk exists that minority language users will be left without this cutting edge technology.

German Abstract

Für die Entwicklung von Avataren, d.h. kleinen computergenerierten Figuren, die Aspekte menschlicher Konversation für die Interaktion mit dem Nutzer simulieren, ist es zweifellos von größter Bedeutung, welche Sprache sie sprechen werden. Es besteht immer die Gefahr, dass Minderheiten, die eine andere als die Landessprache sprechen, ohne ausreichende Sprachgenerierungs- und Sprachwiedererkennungssysteme die Avatare nicht nutzen können, weil die sprachlichen Botschaften nur in mehrheitlich gebrauchten Sprachen wie etwa Englisch oder Deutsch aufbereitet werden.

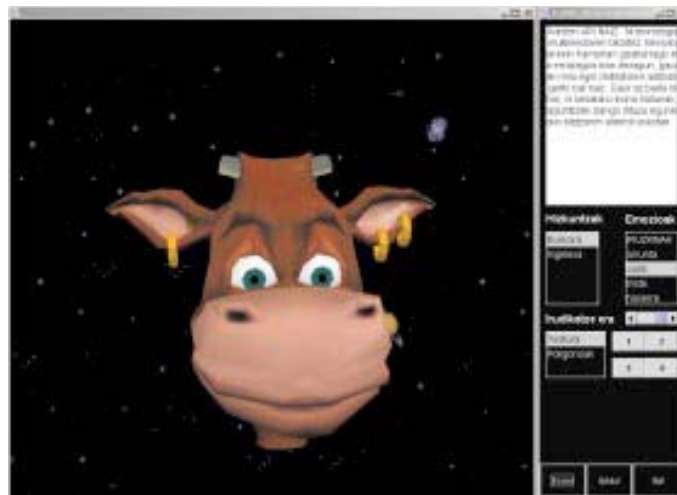


Figure:
Conversational
Interface.

The ABATEUS Project

The goal of ABATEUS is to have a platform for the development of Basque-speaking avatars, based on the characters of the television and film producers, Baleuko and Talape, and to explore their use in innovative ways in the Internet, on CDs and Digital TV, as well as in the traditional television production environment. The project is based on the Avatar platform prototype, which already exists in VICOMTech for other languages.

Baleuko and Talape have much experience in 3-D animation. Baleuko produced one of the first 3-D movies in Europe among several others and produces about 8 minutes per week of *BetiZu*, a full 3-D cartoon series for the *EiTB-Basque TV* channel, which is the most seen TV children program.

Baleuko and Talape are interested in the area of computer graphics for television application, in particular, for the *BetiZu* character, a Basque-speaking space cow. The ABATEUS project will help in the automating of the production process and will allow the use of their «cartoon star» in other innovative, non-conventional areas. This technology can improve the current scenario of modelling and producing TV content and extend the company's (or companies') activities to other communication channels such as the Internet and multimedia CDs.

VICOMTech is responsible for the avatar platform as such, especially for 3-D graphics algorithms and the synchronization of modules. The group AhoLab from the University of the Basque Country is developing an emotional voice synthesizer for the Basque language to be integrated into ABATEUS. This activity is very important given the lack of commercial Basque synthesizers and the need for cartoon-like voices for *BetiZu*.

Currently the first prototype is fully functional and able to synthesize Basque texts with the *BetiZu* character. Work on emotional voice synthesis, representation quality and integration into other

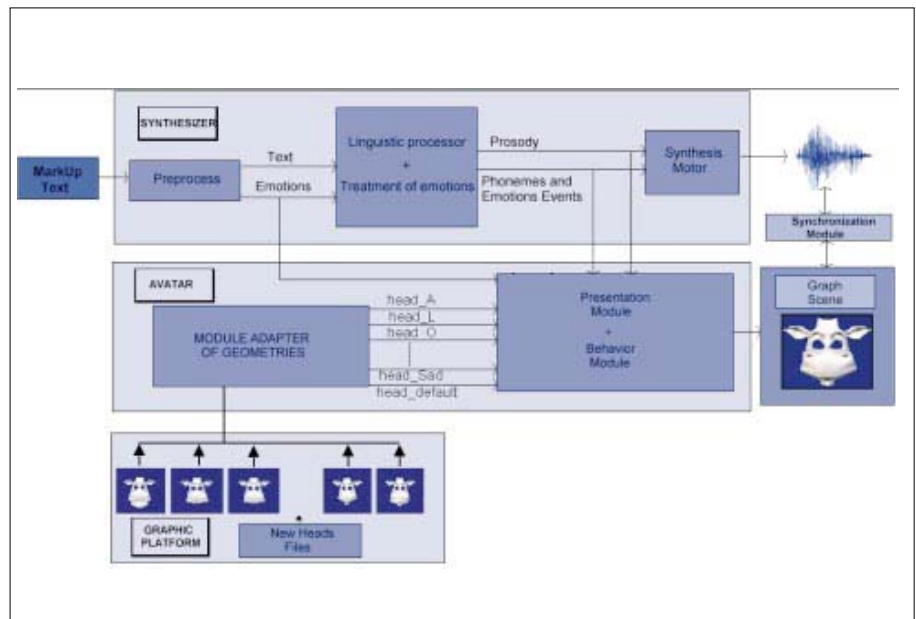


Figure: Architecture of the system.

modules/platforms is ongoing. For this work, the companies subcontracting with VICOMTech have partial funding from the INTEK program from the Basque Government for 2 years from July 2001.

Functionalities of ABATEUS

- MULTILINGUAL. The support of the Basque language, as opposed to majority languages such as English and Spanish, is a key result of the project. The University of the Basque Country (use correct name here and above) is developing an emotional voice synthesizer, where as VICOMTech integrates it into the avatar platform, including coordination with particular gestures appropriate to the Basque language.
- TRANSPARENCY AND USABILITY. In order to facilitate normal production for the companies, the usage of this system must be transparent. Integration with current character generation mechanisms is needed. A special module was developed with this purpose in Maya.
- FACIAL ANIMATION. Currently the facial parts that are animated, are the head, lips, eyes, pupils, eyebrows and

eyelids. Other non-human characteristics, such as cow ears, are being implemented.

- FACIAL EMOTIONS. The emotions implemented in Avatar are a subgroup of the MPEG-4 emotions: happy, sad, upset or neutral, with parametric control of each emotion.
- HIGH RESOLUTION. The goal of the platform is to allow, as much as possible, high resolution models. Ideally the same resolution as that used in the 3-D animation processes by the companies would be reached, and it would be used transparently, utilizing an ordinary PC with graphics card.
- SEVERAL CHARACTERS. The system is flexible; it contains a specific module which allows for changing from one character to another. Characters may look human or cartoon-like.
- TEXTURES AND MATERIALS. Textures and materials are supported by the system, including photographs of persons. With two or three photos it is possible to reproduce an Avatar with a real face, although this process currently requires manual intervention.



Figure: BetiZu integrated in a Web Page.

Conclusions and Future Work
 Avatars and Conversational User Interfaces open new possibilities for human-computer interaction, providing a much more natural user interface. Minority languages have been left behind in the commercial development of speech technology. Therefore, developing Avatars in those languages is important. Integration of Avatars into 3-D television and film production and related areas will provide added value because wellknown characters can be used in other contexts. Good initial results have been obtained so far; these need to be improved in the second phase of development. Audio-visual technology will be enhanced for the Basque user by the development of Avatar technology.



Figure: BetiZu as an assistant or digital story teller

Point of contact

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- **EVENTS.**
 The system is capable of catching events from the user, such as »stop!«, »talk!«, and so forth. The research line is now directed to emotion events, such as laughter, shouts or surprise.

Lines of application

The prototype can be extended to the following scenarios, among others:

- *Internet*
 - As a companion for tales or games
 - As a reader for BetiZu news in the webpage of Baleuko
- *Digital TV*
 - As a guide to TV programming.
 - As a character to interact individually with a spectator
- *CDs*
 - As an interactive storyteller.

- *Normal television production environments*
 - As an automatic generator of gestures.

INI-Graphics Net Cooperation

VICOMTech collaborates in this project with GRIS and ZGDV (Department of Digital Storytelling), who give their advise in Avatar platform development, in which both groups have a great deal of experience, as well as with and a VICOMTech researcher who was trained in 2001 in ZGDV (Darmstadt, Germany) for three months. ZGDV, GRIS and VICOMTech are members of the INI-GraphicsNet.