SAISBECO –
Detection and Identification of Great Apes
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The developed software detects in single images or videos which images show the faces of great apes. Whether gorilla or chimpanzee – the algorithms allow the identification and classification of the ape species. After that, according to typical facial characteristics, structures and outlines, the individuals of a group are identified. Even several apes of a group can be detected and identified at the same time. The software works almost independently from the environmental conditions like the background structures, coverage by trees and leaves as well as by different lighting conditions according to the time of day. Images from zoos recorded under near optimal conditions are suitable to develop such a system and to apply it to wildlife recordings later on.

As the system is quite robust against background noises, which always occur under real-life conditions, relevant sequences in audio recordings can be identified by recognizing typical acoustic characteristics, such as screams and drums produced by the apes. On the basis of these sequences a classification can be made with regard to the respective species and individual animals. The system is also able to determine different sound types, such as warning cries, for example. Furthermore, the system allows users to verify the results and quickly choose from several proposed hypotheses the one deemed most suitable.

Research Project “SAISBECO”

Protecting endangered species is of great importance for the conservation of biological diversity. Therefore, the stock of populations is monitored and documented continuously to immediately react to threats endangering a population’s survival. Based on the results of these observations, measurements on preserving endangered species can be developed. For this, the use of audio- and video-traps is essential. By now, the audio and video material recorded hereby is manually evaluated. This is not only very time-consuming, but a process prone to errors. The same is true for recordings from zoos, where comprehensive material is being collected for research purposes.

Now, this extensive work is over: In the research project “SAISBECO” (Semi-Automated Audiovisual Species and Individual Identification System for Behavioral Ecological Research and Conservation), a collaboration between the Fraunhofer Institute for Digital Media Technology IDMT, the Fraunhofer Institute for Integrated Circuits IIS, and the Max Planck Institute for Evolutionary Anthropology (MPI-EVA) developed a software solution for species and individual identification in audio and video material with great apes as an example.
Applications

Using the software systems developed in the SAISBECO project, comprehensive data bases of audio and video recordings of great apes are enhanced. Intelligent query mechanisms allow a targeted query on individuals of a group which permit conclusions on typical behaviors like social behavior and mating or even the development of the population.

Based on this information, measures for species conservation can be taken, as for example setting up protection zones or creating species-appropriate environments in zoos. In addition, interactive teaching material in wild life parks or zoos helps visitors to learn things worth knowing about endangered species; park rangers are supporting to monitor the animals.

Application field
- Wildlife monitoring for scientific purposes
- Automatic monitoring of animal populations
- Monitoring stations in zoos, wildlife parks, and reservations
- Reprocessing of documentations
- Analysis of archived material

Current and Future Features

Video
- Detection of facial characteristics, structures and outlines
- Identification and differentiation of different species
- Real-time detection of species and individuals
- Detection largely independent of
  - Background
  - Size of the individual
  - Number of individuals
  - Changes in light
  - Occlusion
- Identification of individual animals by means of biometric features
- Extension of databases by adding previously unknown individuals

Audio
- Time segmentation by relevant events
- Classification of audio signals by species, individuals, and sound types
- Process for iterative semi-automatic system optimization
Project Partners and Funding

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