Smart bear phone: Information on brown bears available on mobile phones in the future

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Bears have captured our imagination throughout centuries. Ancient Finnish and Lappish myths and legends are probably one reason why these powerful animals are still held in great respect today and referred to as the King of the Forests. It is often believed that bears behave in an unpredictable way. However, as with all mammals, bears' behavior is governed by a combination of genetic programming and social and environmental factors. Once we understand bears' behavior and communication, it will not look haphazard for us anymore.

Brown bears are not only wandering by themselves around forests but they are also communicating with each other and – when needed – humans as well. The behavioral and communication scheme of the bear seems to be very goal-oriented and situation-specific. If we can recognise context-dependent communication schemes, we will be able to create an ABC of a bear communication. The ABC can be used, for example, by scientists, authorities, teachers, students, hikers and especially citizens living in bear-rich areas.

We can create a mobile bear communication ABC for hikers. Hikers can browse a set of icons by their phone and get bear communication information with voice samples and guidelines about how the hiker should behave. The hiker can also send a picture of a bear taken with mobile phone to the service. The picture, the situation and the voice sample is then compared to image groups in the database. The most

similar image will be selected and the image and a voice sample will be sent to the hiker with instructions on how the hiker should behave.

In the Department of Mathematical Information Technology at the University of Jyväskylä we study the context-sensitive communication of brown bears by means of three-phase SPA-architecture (Sensing, Processing, Actuating). In the sensing phase we collect voice samples of bears in different situations. In the processing phase we analyse the voice data. The aim is to combine numerical features to certain bear voices. Finally, in the actuating phase we develop applications such as Bear ABC for Hikers and Citizens and bear knowledge for schools and universities.

Bear behavior and communication research is very different from bear population research. Information and communication technology (ICT) provides us new research tools and methods in addition to radio signal tracking and Global Positioning System (GPS). Close monitoring and the collecting of data give more precise information on bears' behavior. On the basis of that information we can create new knowledge on the biology and environmental state of bears. In addition to biological research, bears are constantly contributing to our environmental research as well – if only we could understand their signals. It is important to increase the competence of modern humans – especially that of environmental researchers and decisions makers – to interpret weak signals from the nature early enough for environmental protection initiatives and programs to avoid, for example, the current predicament of polar bears and pandas.

Ancient and aboriginal populations like Mayas and Indians, as well as nomads in many continents, have good skills for living in harmony with and as a part of the nature. It is important to understand how bears communicate in general because that will better enable us to interpret their weak signals when the living conditions in bears' natural

environments change.

The bear research paper has just been presented in the 23th European-Japanese Conference on Information Modelling and Knowlegde Bases in Nara, Japan.

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