Computers show how bats classify plants according to their echoes

March 21 2008

Researchers have developed a computer algorithm that can imitate the bat's ability to classify plants using echolocation. The study, published March 21st in the open-access journal *PLoS Computational Biology*, represents a collaboration between machine learning scientists and biologists studying bat orientation.

To detect plants, bats emit ultrasonic pulses and decipher the various echoes that return. Bats use plants daily as food sources and landmarks for navigation between foraging sites.

Plant echoes are highly complex signals due to numerous reflections from leaves and branches. Classifying plants or other intricate objects, therefore, has been considered a troublesome task for bats and the scientific community was far from understanding how they do it.

Now, a research group in Tübingen, Germany, including University of Tübingen researchers Yossi Yovel, Peter Stilz and Hans Ulrich-Schnitzler, and Matthias Franz from the Max Planck Institute of Biological Cybernetics, has demonstrated that this process of plant classification is not as difficult as previously thought.

The group used a sonar system to emit bat-like, frequency-modulated ultrasonic pulses. The researchers recorded thousands of echoes from live plants of five species. An algorithm that uses the time-frequency information of these echoes was able to classify plants with high accuracy. This new algorithm also provides hints toward which echo

characteristics might be best understood by the bats.

According to the group, these results enable us to improve our understanding of this fascinating ability of how bats classify plants, but do so without entering the bat's brain.

Citation: Yovel Y, Franz MO, Stilz P, Schnitzler H-U (2008) Plant Classification from Bat-Like Echolocation Signals. PLoS Comput Biol 4(3): e1000032. doi:10.1371/journal.pcbi.1000032 (www.ploscompbiol.org/doi/pcbi.1000032)

Source: Public Library of Science

Citation: Computers show how bats classify plants according to their echoes (2008, March 21) retrieved 26 April 2024 from https://phys.org/news/2008-03-echoes.html