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Bayesian keys: biological identification on mobile devices

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Key words: *mobile, biological identification, keys, informal learning, citizen science*

Abstract:

A Bayesian key is a computer-aided method for biological identification. A traditional biological key is a series of branching questions which must be answered in order to arrive at a correct identification. But these keys can be cumbersome, error-prone, and do not match users' approach to the task. Multi-access keys based on Bayesian statistics promise quicker and more robust identification that matches the users' task. We are developing these for the web and for mobile devices.

iSpot¹ is a public-access website, part of the large-scale citizen science² OPAL project³, whose aim is to encourage a new generation of naturalists. iSpot is a social networking site where people can post 'spots' – interesting observations of wildlife, ideally based around a photograph and geographically located. Correct identification is crucial for the observation to be interesting and iSpot is designed to support individuals as they develop skills of identification. The social aspects of iSpot allow others to offer help and support in checking tentative identifications, but iSpot will also offer novel Bayesian keys.

The *Bayesian keys* project⁴ seeks to supplement traditional paper-based keys with computer-aided methods. A traditional biological key is a series of branching questions that must be answered in order to arrive at a correct identification. But these keys can be cumbersome, error-prone, and do not match the way people actually approach the task of identification: people are more likely to note distinctive characters, to relate an unknown species to a known one, or to make a tentative identification and then check it. Our multi-access keys based on Bayesian statistics can support these methods of working and promise quicker and more robust identification. These keys can also take account of the commonness or rarity of species found at the user's location, using live data from the 40 million UK distribution records of the NBN⁵. We can deliver these keys both on the web and on mobile devices that can be as easily taken into the field or lab as a book.

References:

- [1] iSpot, <http://www.ispot.org.uk/>
- [2] Silvertown, J. (2009) A new dawn for citizen science, *TREE*, **24**, 467-471
- [3] OPAL, <http://www.opalexplornature.org/>
- [4] We are grateful for funding from the Big Lottery Fund for England and The Open University
- [5] National Biodiversity Network Gateway, <http://data.nbn.org.uk/>

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