Automated Visual Surveillance of a Population of Nesting Seabirds

Chunmei Qing *, Patrick Dickinson*, Shaun Lawson*, Robin Freeman†
*School of Computer Science, University of Lincoln, UK
†Microsoft Research, Cambridge, UK. Email: a-roblr@microsoft.com

Introduction:
Seabird populations are a valuable and accessible indicator of marine health: population changes have been linked with fish stock levels, climate change, and pollution. Understanding the development of particular colonies requires detailed data, but manual collection methods are labour intensive and error prone. Our work is concerned with development of computer vision algorithms to support autonomous visual monitoring of cliff-nesting nesting seabirds, and collection of behavioural data on a scale not feasible using manual methods. This work has been conducted at the University of Lincoln (UK), in collaboration with the Centre for Computational Ecology and Environmental Science (CEES) at Microsoft Research Cambridge. Our work has been ongoing for around 12 months, and focused on robust image processing techniques capable of detecting and localizing individual birds in image and video data. In our case, we are using data captured from a population of Common Guillemots (Uria aalge) resident on Skomer Island, West Wales (UK) during the summer of 2010. This work represents a unique adaptation of computer vision technology, and we present a discussion of current and future technical challenges, processing techniques which we have developed, and some preliminary evaluation and results. In particular, we consider techniques based on feature based detection of birds and their body parts using gradient image features.

**Acknowledgements:** Thanks to Prof. T. Birkhead, University of Sheffield, B. Dean and H. Kirk, University of Oxford. The work presented is supported by EPSRC grant reference EP/H017143/1 and Microsoft Research.