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DISCOVERY:
A Photo-Identification Data Management System

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Leszek Karczmarski¹
Glenn Gailey²

¹ The Swire Institute of Marine Science
The University of Hong Kong

² Cascadia Research Collective

14th Savanna Science Network Meeting
Photo-Identification

- Time consuming
- Visually fatiguing
- Cross comparisons between databases
Approach

• **Integrative** system
  ◦ Store, visualize, manage and analyze photo-ID/associated data

• **Dynamic** setting
  ◦ Meet various needs of research projects and user preferences

• **Inclusive** of other tools (*e.g.* program R)

• **Compatible** with other software (*e.g.* MARK, SocProg, ArcGIS)

• Efficient to maintain **long-term, multi-team** datasets
Approach

Field Data Collection

Pre-matching Processing
- Filenaming
- Filtering
- Pre-Matching

Matching to Catalog

Sighting Info & Survey Effort
- Start/End time
- Geographic location
- Group info
  ... etc.

Data Management

Data Visualization, Summary & Analysis

Import & Export Data

Miscellaneous Data
(e.g. biopsy, behavior, telemetry, etc.)
Pre-Matching Procedures

- Image processing
- Image filtering

User-defined folders from dynamic setup
Photo-ID Matching

- **Horizontal View Mode**
  - Enhanced searching of IDs by **categorizing database**
  - User-defined settings to optimize efficiency

- **Vertical View Mode**
Survey Associated Info.

Sighting Information

- **Study**: WGW
- **Date**: 02-Feb-2013
- **Start Time**: 13:33
- **End Time**: 13:55
- **Survey**: PhotoID
- **Species**: Gray Whale
- **Group ID**: 2
- **Behavior**: Foraging
- **Grp Size**: 5

**Comments**

- Date: 02-Feb-2013, Time: 13:33:00, Comment: This is my comment
- Date: 02-Feb-2013, Time: 13:55:00, Comment: This is my second comment
Data Management - Individual Catalog

Catalog of Individuals

Individual Images
Data Management - Sighting Records

- Study Site
- Species

Study Area	Date	Group	Start	Stop	Species	Survey	Behavior	Group Size	Ind	Comments
HongKong	25-Jan-2014	01	11:02:00	11:22:00	Sousa chinensis	PhotoID	Foraging	8	Ind	Env Data
HongKong	25-Jan-2014	02	11:35:00	11:45:00	Sousa chinensis	PhotoID	Travelling	2	Ind	Env Data
HongKong	25-Jan-2014	03	11:47:00	12:00:00	Sousa chinensis	PhotoID	Travelling	3	Ind	Env Data
HongKong	25-Jan-2014	04	12:48:00	13:10:00	Sousa chinensis	PhotoID	Foraging	2	Ind	Env Data

Environment

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<tr>
<th>#</th>
<th>Time</th>
<th>Depth</th>
<th>SST</th>
<th>Offshore</th>
<th>Tide</th>
<th>Seastate</th>
<th>Habitat</th>
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<td>3000</td>
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<tr>
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<td>5.9</td>
<td>19</td>
<td>5000</td>
<td>Ebb</td>
<td>1</td>
<td>open sea</td>
</tr>
<tr>
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<td>5.9</td>
<td>19</td>
<td>6000</td>
<td>Ebb</td>
<td>1</td>
<td>open sea</td>
</tr>
</tbody>
</table>

Geographic

<table>
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<th>Longitude</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>2</td>
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<td>22.365470</td>
<td>113.875700</td>
</tr>
</tbody>
</table>
Data Visualization, Summary & Analysis

Individual Records
Sighting Locations
Survey Tracks
Discovery R

- Wide range of analytical and display functions (open source)
- Built-in interface for users not familiar with R
Discovery R

Plot on Google Map

Behavior Activity Budget
Data Management - Import & Export

Import
- Images with EXIF
- Excel / Access Databases
- DISCOVERY Databases

Database management

Export
- MARK
- SocProg
- Map / Shapefile
Website (program download and manual):
http://www.biosch.hku.hk/ecology/staffhp/lk/Discovery/

(New version out soon! Stay tuned!)

OR

Skukuza Unit 225 (14th – 17th March)

DISCOVERY: Photo-Identification Data-Management System for Individually Recognizable Animals

About the Software

Individual photographic identification (photo-ID) represents a powerful technique to study behavioural and population ecology of free-ranging animals. This approach has been applied across species and habitats, both aquatic and terrestrial, gathering a large variety of data.

All photo-ID studies require many hours of intensive field surveys and even longer hours of subsequent, labour-intensive processing of photographic material. Thanks to the recent advances in digital photography, high quality digital images can be obtained in a short space of time and the photo-ID data can be processed immediately upon the completion of a field day, even in remote locations where processing of traditional photographic material would not have been possible. However, such fast accumulation of data can pose an obvious and often considerable obstacle to data management. This is where DISCOVERY comes handy; it provides a dynamic, user-friendly platform to assist researchers not only with the matching of individual photo-ID data, but also at the multitude of steps of field data collection and the complex data management and analyses that follow after individual matching is completed.

The DISCOVERY system assists with filtering of raw data and all levels of individual-ID matching; it assists with processing, storing and managing digital images; it provides file naming routines and links sighting information with environmental, geographic, and numerous user-defined parameters; it provides graphic displays of data and basic analytical tools. DISCOVERY can be used to centralize a database for multiple species and multiple study areas; it is particularly useful for maintaining a single database for research projects collecting data at large geographical scales and between multiple research teams working on different databases. DISCOVERY also provides a means of linking the new system with traditional datasets based on film photography, to form continuous complete datasets. The DISCOVERY system has been designed so that it can easily facilitate integration of all collected and stored data to and from other tools; with a multitude of dynamic functions it was designed to meet project-specific requirements and user-specific needs.

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  - Glenn Gailey
  - Leszek Karczmarski

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