CS4624
SharkPulse
Enhancement

Multimedia, Hypertext, and
Information Access Capstone
Instructor: Dr. Edward A. Fox
Virginia Tech, Blacksburg VA 24061
5/08/2022

By: Omar Kalbouneh and
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Outline

- Client
- Problem
- Deliverables
- Timeline
- Completed Work
- Challenges
- Acknowledgements
- References
Quick Reminder- Client

- Dr. Francesco Ferretti
- Department of Fish and Wildlife conservation
- Interested in building largest database of online shark sightings
Problems

- Improving/Gamifying validation monitor
- Static Website
- Current shark identification guide
Deliverables

- Dynamic Website
- Improving/Gamifying validation monitor
- Refining the point system for the validation monitor

Example of a figure in the webpage that is not dynamic
Timeline

- **February**
  - Familiarized ourselves with the codebase and R
- **March**:
  - Started enhancements on the validation monitor
  - Begin adding dynamic functionality to website
- **April**:
  - Completed enhancements on the validation monitor
  - Continue adding/optimizing features
  - Started enhancements for the identification guide
- **May**
  - Complete website frontend/backend development
  - Final meeting with client to ensure longevity of our work
Work Completed for the validation monitor

- Added functionality in the backend to score points for
  - Users who find rare species. 9 points
  - Users who find threatened species that are:
    - Vulnerable. 9 points
    - Endangered. 10 points
    - Critically endangered. 12 points.
Validation monitor Map
Validation Monitor User Questions

Please validate the following shark image.

Is this a shark? Yes No
In an aquarium? Yes No

Suggested Species:
Carcharhinus spp. 0.88
Carcharhinus Perezi 0.02
Carcharhinus Amblyrhynchus 0.02

Common Name

Species Name
Please fill in species name

Comments

Submit

Post URL
Identification guide
View larger map

Dismiss
How was it done?

- Rare Functionality
  - Front end file sends a query to count number of user input species we have in the validated table in the database
  - Front end file sends the query to count the total number of species in the database
  - Both numbers will be divided
  - Baseline is set at 30%. Anything less than that is rare
How was it done?

- Endangered, critically endangered and vulnerable species
  - Built an in memory web browser data structure to store these lists obtained from IUCN red list of threatened species
  - User input is passed a POST request from a backend R file
  - Input is checked if it fits either category
  - Updates the user points in the database
Leader-Board New Changes

<table>
<thead>
<tr>
<th>User</th>
<th>ValPoints</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>jeremy</td>
<td>1166</td>
<td>5</td>
</tr>
<tr>
<td>Dhruv Dharamshi</td>
<td>761</td>
<td>4</td>
</tr>
<tr>
<td>Francesco Ferretti</td>
<td>470</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User</th>
<th>Coins</th>
<th>Level</th>
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<tbody>
<tr>
<td>jeremy</td>
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<td>Dhruv Dharamshi</td>
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</tr>
<tr>
<td>Francesco Ferretti</td>
<td>$470</td>
<td>3</td>
</tr>
</tbody>
</table>
Identification guide

Mouth in front of eyes?  Yes  No

Mouth in front of eyes

Mouth behind front of eyes
Identification guide

- Implemented in an R script for using an Rshiny app
- Filled a shark characteristics spreadsheet
- Builds an in-memory data structure to process entries
- Present new questions on the website
## Spreadsheet example

<table>
<thead>
<tr>
<th>species</th>
<th>group</th>
<th>anal fin</th>
<th>5 gill slits</th>
<th>6 gill slits</th>
<th>7 gill slits</th>
<th>dorsalspine1</th>
<th>dorsalspine2</th>
<th>flattened body</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aloeias superciliosus shark</td>
<td>shark</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>Aloeias vulpinus shark</td>
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<td>0</td>
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<tr>
<td>Aloeias pelagicus shark</td>
<td>shark</td>
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<tr>
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<tr>
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<td>0</td>
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<tr>
<td>Carcharhinus leucas shark</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>Rhizoprionodon acu shark</td>
<td>shark</td>
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<td>0</td>
<td>0</td>
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<tr>
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<tr>
<td>Glyphis gangeticus shark</td>
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<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
</tbody>
</table>

1 = present  
0 = not present
Small example of how contents were parsed

```javascript
parse.js > ...
const { Console } = require('console');
const ExcelJS = require('exceljs'); // If there is an error, run: npm install exceljs
const wb = new ExcelJS.Workbook();
const fileName = 'elasmotaxonomy.xlsx';

wb.xlsx.readFile(fileName).then(() => {
  var worksheet = wb.getWorksheet('elasmotaxonomy');
  worksheet.eachRow({ includeEmpty: false }, function(row, rowNum) {
```
Challenges

- New languages and frameworks
- Not all team members were available
- Website server often crashes because of too many database requests between PostgreSQL and R.
Acknowledgements

- Dr. Francesco Ferretti
- Jeremy Jenrette
- Aman Kothari
- Dr. Edward Fox
References

- http://hdl.handle.net/10919/103254
- https://www.iucn.org/resources/conservation-tools/iucn-red-list-threatened-species
- http://sharkpulse.cnre.vt.edu/