DEVELOPMENT OF WEB-APPLICATION FOR DIGITAL IMAGE PROTECTION

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Research goal and objectives

Goal:
Create a simple and convenient tool to protect digital images using a digital watermark

Objectives:
- to analyze the subject area and technologies for creating applications with a web interface
- to study and select the most suitable for the current task algorithms for embedding digital watermarks into images
- develop a web application to protect images using a digital watermark
- perform functional testing of the implemented application
Comparative analysis of analogous sites

+ Simple and convenient interface
+ Grant full access without payment.
+ Implement the ability to choose the size of the logo and determine the position when placing the logo
+ Add the ability to contact the creator of the service
Functional requirements

- upload image to protect
- upload logo
- to embed a digital watermark to protect the digital image
- to generate a watermark from user entered text
- realize the ability to place a visible or invisible digital watermark on the image
- to check the image for the presence of a digital watermark (extract the text embedded in this application)
Use case diagram

Web-application of protection watermark image

- Check image
  - Include
  - Specify parameters
  - Include
  - Save image
  - Include

- Add Text
  - Include
  - Specify parameters
  - Include
  - Save image
  - Include

- Add logo
  - Include
  - Specify parameters
  - Include
  - Save image
  - Include

- Image list
  - Include
  - Specify parameters
  - Include
  - Download image
  - Include

User

Choose a method
- Include
- Upload image
- Include
- Enter text
- Include

Choose a method
- Include
- Upload image
- Include
- Upload logo
- Include
**Database schema**

- **Type_of_image:**
  - the digital image that you want to protect
  - the digital image with visible watermark (logo/copyright)
  - the digital image with invisible watermark (logo/copyright)
Implementation

- ASP.NET Web form Framework
- Language: C#
- SQL Server database
Algorithms

- The Hash function algorithm
- LSB algorithm
- extract copyright
Home page application

Digital Watermark

Logo Options
Logo position: Middle
Logo size: Medium
Choose logo: Choose File

Copyright Options
Copyright Position: Left
Copyright text:
Visible Watermark: Yes

Create Watermark

Digital Watermark

Logo Options
Logo position: Middle
Logo size: Large
Choose logo: Choose File

Copyright Options
Copyright Position: Left
Copyright text:
Visible Watermark: Yes

Create Watermark
### Invisible Watermark images

<table>
<thead>
<tr>
<th>Deleting</th>
<th>Invisible Image ID</th>
<th>User ID</th>
<th>Original Image ID</th>
<th>Invisible Image Name</th>
<th>Invisible Images</th>
<th>View Original Image</th>
<th>Invisible Image URL</th>
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### Visible Watermark images

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<th>User ID</th>
<th>Original Image ID</th>
<th>Visible Image Name</th>
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<td></td>
<td>Image URL</td>
<td>Original Image</td>
</tr>
</tbody>
</table>
Check Copyright
Results

- Similar web applications were searched and analyzed
- Functional and non-functional requirements to the system were formulated
- The technology of embedding a digital watermark in digital images using the LSB and hush function methods has been studied.
- Designed and implemented a database to store information about the application users and their images
- Designed and implemented a web application to protect digital images using a digital watermark
- Functional testing of the developed web application is carried out. Test passed successfully.
Thank You