

Exploring Challenges in Embedding Metadata of Licence Information in Digital Work

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1.1 Research Questions

2. Theoretical Background

3. Methodology

4. Results

5. Discussion

6. Recommendations

Introduction

Key words:

Digital work,
Attribution of copyright,
Licence,
Metadata

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Introduction

Research Questions:

- RQ1 - What are the technological and social challenges of building an end-user tool, which can embed metadata of licence information in digital work?
- RQ2 - What are the suggestions to address these challenges?

Introduction

Identifying and tracking the metadata:

1. “Which author is it?”
2. “How to attribute this author?”
3. “Under which licence was this work released?”

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Theoretical Background

- Licences
- Rights Expression Language (REL)
 - E.g.
 - Creative Commons Right Expression Language (ccREL)
 - Open Digital Rights Language (ODRL)
- Digital Rights Management (DRM)
 - Digital Rights Enforcement (DRE)

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Methodology

- Qualitative case study
- Five semi-structured interviews

Methodology

- Sound recording
- Transcription
- Thematic analysis
- Prototype

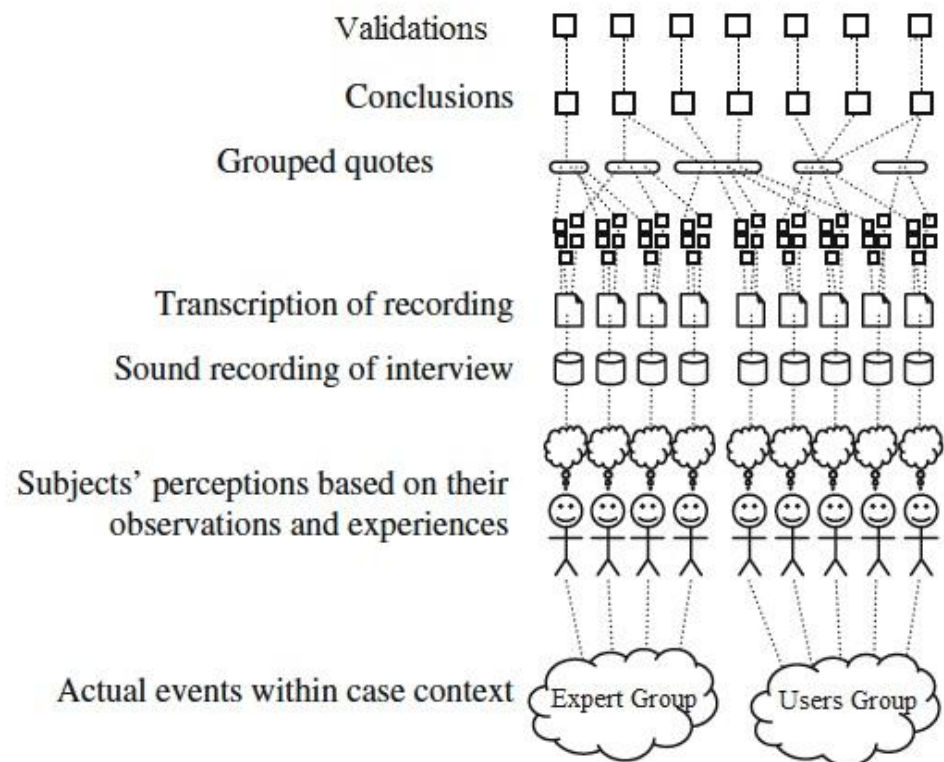


Fig. 1 Modified version of data collection and analysis process (Runeson and Höst, 2009)

Methodology

- Expert group (3 ppl.)
 - ODRL Community Group
 - Creative Commons
 - Europeana
- End user group (2 ppl.)
 - Independent photographers

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Results

- 7 Challenges

- The potential challenges in embedding metadata of licence information in digital work from the **experts' perspectives.**

- 7 Problems

- The practical problems encountered in the current way in which attribution is handled from the **potential end users' perspectives.**

- 11 Suggestions

- The suggestions to address such potential challenges and practical problems, given by **both experts and end users.**

Potential Challenges (C) and Practical Problems (P)	Suggestions (S)										
	S1. Embedding metadata	S2. Reusing existing tools	S3. Integrating with CMS	S4. Improving user experience using logos	S5. Using GUI pop-ups	S6. Embedding during content creation	S7. Verifying the authenticity of the source metadata	S8. Resolving conflicts in composite work	S9. Storing metadata separately	S10. DRM issues	S11. Use simple constraints
C1. Increasing end-users' awareness		X	X	X	X						
C2. Increasing the adoption of the end-user tool		X	X								
C3. Integrating the end-user tool with existing software		X									
C4. Embedding licences with too many constraints						X					X
C5. Attributing multiple right holders in composite work								X			
C6. Rework effort									X		
C7. Verifying the authenticity of the source metadata							X			X	
P1. Informal attribution standard	X		X		X	X					
P2. Users not providing attribution	X			X	X						
P3. Low awareness of licensing			X	X	X						
P4. Lack of attribution support in CMS	X		X								
P5. Issues using a watermark	X										
P6. Issues keeping track the attribution	X										
P7. Verifying the authenticity of the source metadata							X			X	

Fig. 2 Mapping of Suggestions to Challenges/Problems

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 - 4.2 Problems
 - 4.3 Suggestions
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Results

Challenges
Problems
Suggestions

C1 C4
C2 C5
C3 C6
C7

Challenges

- C1. Increasing end-users' awareness
- C2. Increasing the adoption of the end-user tool
- C3. Integrating the end-user tool with existing software

Results

Challenges
Problems
Suggestions

C1 C4
C2 C5
C3 C6
C7

Challenges

- C4. Embedding licences with too many constraints
- C5. Attributing multiple right holders in composite work
- C6. Rework effort
- C7. Verifying the authenticity of the source metadata

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Results

Challenges
Problems
Suggestions

P1 P5
P2 P6
P3 P7
P4

Problems

- P1. Informal attribution standard
- P2. Users not giving attribution
- P3. Low awareness of licensing
- P4. Lack of attribution support in CMS

Results

Challenges
Problems
Suggestions

P1 P5
P2 P6
P3 P7
P4

Problems

- P5. Issues using a watermark
- P6. Issues keeping track the attribution
- P7. Verifying the authenticity of the source metadata

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Results

Challenges
Problems
Suggestions

S1	S4	S7	S10
S2	S5	S8	S11
S3	S6	S9	

Suggestions

- S1. Embedding metadata
- S2. Reusing existing tools
- S3. Integrating with CMS

Results

Challenges
Problems
Suggestions

S1	S4	S7	S10
S2	S5	S8	S11
S3	S6	S9	

Suggestions

- S4. Improving the user experience using icons
- S5. Using GUI pop-ups
- S6. Embedding during content creation

Results

Challenges
Problems
Suggestions

S1	S4	S7	S10
S2	S5	S8	S11
S3	S6	S9	

Suggestions

- S7. Verifying the authenticity of the source metadata
- S8. Resolving conflicts in composite work
- S9. Storing metadata separately

Results

Challenges
Problems
Suggestions

S1	S4	S7	S10
S2	S5	S8	S11
S3	S6	S9	

Suggestions

- S10. DRM issues
- S11. Use simple constraints

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C3. Integrating the end-user tool with existing software		X									
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C5. Attributing multiple right holders in composite work							X				
C6. Rework effort								X			
C7. Verifying the authenticity of the source metadata							X		X		
P1. Informal attribution standard	X		X		X	X					
P2. Users not providing attribution	X			X	X						
P3. Low awareness of licensing			X	X	X						
P4. Lack of attribution support in CMS	X		X								
P5. Issues using a watermark	X										
P6. Issues keeping track the attribution	X										
P7. Verifying the authenticity of the source metadata							X		X		

Fig. 2 Mapping of Suggestions to Challenges/Problems

Results Prototype

Software Requirements

- RQ1. The application should be able to read *.xmp file into XMP Meta objects.
- RQ2. The application should be able to embed XMP Meta objects into images (preliminarily *.jpg and *.png).
- RQ3. The application should be able to read previously embedded XMP metadata in the image file.
- RQ4. The application should support ccREL syntax.
- RQ5. The application should be based on Adobe XMP Toolkit SDK.
- RQ6. The application should be able to run locally (offline).
- RQ7. The application should integrate with WordPress as a plug-in.
- RQ8. The application should use icons.
- RQ9. The application should use GUI pop-ups.
- RQ10. The application should support embedding licence at content creation.
- RQ11. The application should have a trust mechanism that verifies the authenticity of the source metadata.
- RQ12. The application should resolve licence conflicts in composite work.
- RQ13. The application should be implemented in a DRM-free environment.
- RQ14. The application should avoid complex constraints on rights statements.

Results Prototype

Software Requirements

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RQ12. The application should resolve licence conflicts in composite work.

RQ13. The application should be implemented in a DRM-free environment.

RQ14. The application should avoid complex constraints on rights statements.

Results Prototype

Licence: **CC BY-SA 2.5 SE** (<http://creativecommons.org/licenses/by-sa/2.5/se/>)

Title of work: **TheTitle**

Attribute work to name: **TheAuthor**

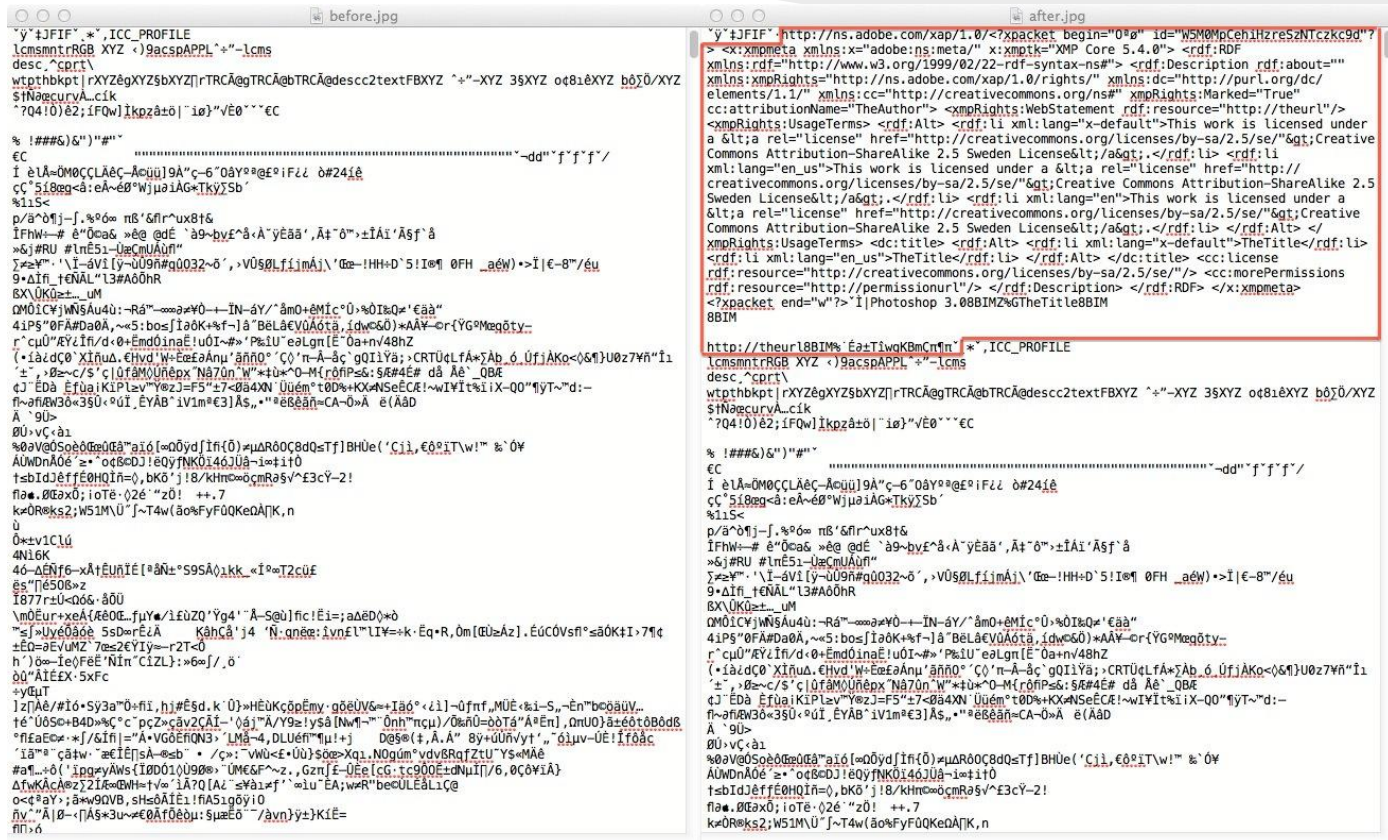
Attribute work to URL: **<http://theurl>**

More permissions URL: **<http://permissionurl>**

Results Prototype

```
<?xpacket begin='' id=''?>
<x:xmpmeta xmlns:x='adobe:ns:meta/'>
  <rdf:RDF xmlns:rdf='http://www.w3.org/1999/02/22-rdf-syntax-ns#'>
    <rdf:Description rdf:about=' ' xmlns:xmpRights='http://ns.adobe.com/xap/1.0/rights/'>
      ...
      <xmpRights:WebStatement rdf:resource='http://theurl'/>
      <xmpRights:UsageTerms>
        <rdf:Alt>
          <rdf:li xml:lang='x-default' >This work is licensed under a &lt;a
            rel='license' href='http://creativecommons.org/licenses/by-sa/2.5/se/'>Creative Commons Attribution-ShareAlike 2.5 Sweden
            License.</a>.</rdf:li>
          ...
        </rdf:Alt>
      </xmpRights:UsageTerms>
    </rdf:Description>
    <rdf:Description rdf:about=' ' xmlns:dc='http://purl.org/dc/elements/1.1/'>
      <dc:title>
        <rdf:Alt>
          <rdf:li xml:lang='x-default'>TheTitle</rdf:li>
          <rdf:li xml:lang='en_US'>TheTitle</rdf:li>
        </rdf:Alt>
      </dc:title>
    </rdf:Description>
    <rdf:Description rdf:about=' ' xmlns:cc='http://creativecommons.org/ns#'>
      <cc:license rdf:resource='http://creativecommons.org/licenses/by-sa/2.5/se/'>
      <cc:attributionName>TheAuthor</cc:attributionName>
      <cc:morePermissions rdf:resource='http://permissionurl'/>
    </rdf:Description>
```

Results Prototype



Before Embedding

After Embedding

Fig. 3 Mapping of Suggestions to Challenges/Problems

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Discussion

- Embedding metadata improves user's experience of identifying and attributing the original author.
- The lack of awareness of licence and attribution is a fundamental challenge. Increasing user's awareness of licence and attribution is a long-term process.

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Recommendations

To consider in future research:

- Explore more challenges and investigate further from wider perspectives.
- Build and evaluate a complete end-user tool.

Recommendations

Future prototype development is suggested to consider:

- Support authentication
- Support multi-licences in composite work
- Compare interpreting licence information with different REL standards
- Develop strategies to increase awareness for attribution
- Transform image-watermarking solutions to embedding metadata
- Promote usage by integration with mainstream social network CMS.

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References

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- Creative Commons <http://creativecommons.org>
- CcREL http://wiki.creativecommons.org/CC_REL
- Adobe Extensible Metadata Platform (XMP) <http://www.adobe.com/products/xmp>

Thank you!

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