In the last few years we have witnessed an explosion in the publication of data in the form of Linked Data. Recording the provenance information of Linked Data is an essential task in order to effectively support trustworthiness, accountability and repeatability. In this context, our work:

- Introduces a new provenance model for SPARQL INSERT Updates
- Allows the reconstructability of SPARQL INSERT Updates from their provenance
- Provides algorithmic support via the Provenance Construction and the Update Reconstruction algorithms

### Provenance Model

<table>
<thead>
<tr>
<th>Quadruple (q)</th>
<th>Provenance (P)</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>s p o n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$c_1$ (a b d n)</td>
<td>$P_{c_1}$ = ${ \langle i, i, i \rangle }$</td>
<td>Attributes derived from const values</td>
</tr>
<tr>
<td>$c_2$ (d b a n$</td>
<td>$)</td>
<td>$P_{c_2}$ = ${ \langle qp^{p_1}_o \circ (c_i), qp^{p_2}_o \circ (c_i), qp^{p_3}_o \circ (c_i) \rangle }$</td>
</tr>
<tr>
<td>$c_3$ (a d b n$</td>
<td>$)</td>
<td>$P_{c_3}$ = ${ \langle qp^{p_1}_o \circ (c_i), qp^{p_2}_o \circ (c_i), qp^{p_3}_o \circ (c_i) \rangle }$</td>
</tr>
<tr>
<td>$c_4$ (a d b n$</td>
<td>$)</td>
<td>$P_{c_4}$ = ${ \langle qp^{p_1}_o \circ (c_i), qp^{p_2}_o \circ (c_i), qp^{p_3}_o \circ (c_i) \rangle }$</td>
</tr>
</tbody>
</table>

### Provenance Construction

- Quadruple $q_2$: (a, b, d, n$|$)

  - Position $s p o$  
    - INSERT: $\{ (s_1, s_2, s_3, s_4) \}$
    - WHERE: $\{ (s_1, s_2, s_3, s_4) \}$

  - $P_{q_2}$:  
    - Attributes derived from const values

### Update Reconstruction

- Quadruple $q_2$: (a, b, d, n$|$)

  - Position $s p o$  
    - INSERT: $\{ (s_1, s_2, s_3, s_4) \}$
    - WHERE: $\{ (s_1, s_2, s_3, s_4) \}$

### References


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