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Low Latency Previews for Links Embedded in Documents

ABSTRACT

This disclosure describes surfacing metadata within link bubbles in documents to enable reduction in user context switching and improve reading efficiency. Per techniques of this disclosure, when a user links to another file or external link from within a document, a link bubble is provided that includes metadata such as the title of the linked document or folder. The link bubble includes a thumbnail image and preview text and provides the user a quick preview of the linked document. Forward caching is utilized to improve response time for retrieval of the linked document. Cached link metadata information can be displayed in the link bubble when a request for the metadata information is made within a threshold time of a previous request for link metadata information. This reduces latency on duplicate requests and faster response and avoids link metadata staleness.

KEYWORDS

- Hyperlink
- Link preview
- Document preview
- Embedded link
- Thumbnail
- Uniform Resource Locator (URL)

BACKGROUND

The negative effect of context switching on efficiency of task completion is well established. For example, when a user is reading/reviewing a document, a common source of distraction is the opening of linked contents (via a new tab or window) that are included in the

document, and then not returning to the original document until much later. Studies (e.g., [1]) have noted that shifting between tasks can create mental blocks that can cost as much as 40 percent of a user's productivity.



Fig. 1: A floating window provides an expanded version of a link within a document

Fig. 1 illustrates the use of a floating window (also referred to as link bubble) that is used to provide additional contextual information regarding links included within documents. When a user points to a link (104) within a document (102), e.g., using a mouseover (mouse hover) action, a floating window (106) is displayed that includes additional contextual information. For example, the floating window typically includes the full Uniform Resource Locator (URL) address and additional options to edit and/or remove the hyperlink from the document. The URL address is a long alphanumeric that refers to a web address or local filesystem location and provides little contextual information to the user.

In order to obtain additional information about the link, the user has to click through and open the link in a new tab to view the contents. If the contents turn out to be not of interest to

the user, some user time is wasted in addition to a loss of context of the content in the original document that the user was reviewing.

DESCRIPTION

User productivity while working on documents can be boosted by providing additional information within a floating window that enables users to quickly determine whether they should click on the included link or continue with the main document without context switching. This disclosure describes the surfacing of metadata beyond the URL within link bubbles in documents to enable reduced user context switching and improve reading efficiency. Per techniques of this disclosure, when a user links to another file or external link from within their document, spreadsheet, slide presentation, forms, surveys, etc. and the user has permissions to view the contents in the link, a link bubble is displayed that includes available metadata such as the name/title of the linked document or folder instead of just the URL. The link bubble also enables users to perform actions (for example, open the link, request access, change link text, etc.) based on the previewed link.

Metadata about links are obtained on a best-effort basis using mechanisms such as a fetch-on-link mechanism that account for latency and avoid stale information. For example, if the user no longer has permission to access a linked document, no metadata about the document is provided. Similarly, if a document has a title change, the updated title is shown, not the title stored in a cache.



Fig. 2: Title of the linked document is displayed in the link bubble

Fig. 2 illustrates an example document (202) with a link bubble (206) that displays a document title of the linked document (204), when the user has permission to view the linked document. Regular expression pattern recognition is utilized to check for known URL patterns. As illustrated in Fig. 2, the preview functionality provided by the link bubble also includes icons or buttons for copying, editing, or deleting the link. An icon that is associated with a type of external link (for example, an icon indicative of spreadsheet, slide presentation, or other type of document etc.) is also included in the link bubble.



Fig. 3: Link bubble includes an option to request document access

Fig. 3 illustrates an example document with a link bubble (302). In this example, the user does not have permission to view the linked document. In this situation, a portion (304) of the link bubble itself is utilized to display a message to the user that they do not have permission to view the document and to provide the user with an option to request access (permission) to the linked document.



Fig. 4: Thumbnails of content in the links, including external are displayed

Fig. 4 illustrates an example document with a link bubble (402), where a preview of contents from the linked document (404) is displayed within the link bubble. In this illustrative example, the link is to a website. In addition to the title of the article, a thumbnail image and preview text is also included to provide the user a quick preview of the linked document. The data source for the displayed information for public websites is a precrawled index. No interaction occurs between the user and the linked website unless the user activates the link. The user can decide based on the preview whether to proceed to the linked document or to continue with the original document itself.

Further, a forward caching scheme is utilized to improve the response time for retrieval of the linked document. For example, cached link metadata information (obtained on user click) can be displayed in the link bubble when a request for the metadata information is made within a threshold time of a previous request for link metadata information. This scheme reduces latency on duplicate requests and faster response and avoids link metadata staleness.

Link preview data can be displayed when viewing a document on any computing device such as a laptop/desktop computer, tablet, smartphone, or other type of device. The size and content of the link preview can be tailored based on the type of device, available screen space, etc.

Different designs of link bubbles can be utilized that include varying levels of metadata and content preview data. For example, link bubbles can have expanded and collapsed states. In the collapsed state, the preview is limited to just the title/URL, the icon, and action buttons. In the expanded state, the preview includes more detail such as , a screenshot of the linked document/web page. User(s) are provided with a choice of link bubble appearances (for example, between expanded and collapsed states). Link bubbles can also be disabled for certain

documents, e.g., documents with confidential data or other content that is not suitable for preview.

CONCLUSION

This disclosure describes surfacing metadata within link bubbles in documents to enable reduction in user context switching and improve reading efficiency. Per techniques of this disclosure, when a user links to another file or external link from within a document, a link bubble is provided that includes metadata such as the title of the linked document or folder. The link bubble includes a thumbnail image and preview text and provides the user a quick preview of the linked document. Forward caching is utilized to improve response time for retrieval of the linked document. Cached link metadata information can be displayed in the link bubble when a request for the metadata information is made within a threshold time of a previous request for link metadata information. This reduces latency on duplicate requests and faster response and avoids link metadata staleness.

REFERENCES

1. American Psychological Association, “Multitasking: Switching costs”
<https://www.apa.org/research/action/multitask> accessed Mar 24, 2020.
2. The Open Graph protocol, <https://ogp.me/> accessed Mar 24, 2020.
3. <https://schema.org/> accessed Mar 24, 2020.