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Algorithmically Generated Visual Knowledge Panels

Atreyee Dey

Tanvi Shah

Aditi Singla

Zoltan Ray

Rich King

See next page for additional authors

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Inventor(s)

Atreyee Dey, Tanvi Shah, Aditi Singla, Zoltan Ray, Rich King, and Payal Patel

Algorithmically Generated Visual Knowledge Panels

ABSTRACT

Information about a particular topic, e.g., in response to a search query, is sometimes presented in a concise user interface (UI) such as a knowledge card or panel. Such panels are typically text intensive and can be unsuitable for certain users, e.g., users that have limited reading capability, or those who prefer visual content. This disclosure describes techniques to render a visual knowledge panel, e.g., one that primarily includes images, videos, and other visual content. Per the techniques, the visual knowledge panel is algorithmically created by mapping a text knowledge panel to existing video or image content such as video Q&A, a short video, a story illustrated by slideshow, etc.

KEYWORDS

- Knowledge panel
- Search result
- Visual UI
- Visual Knowledge Panel
- Video summarization
- Scene recognition
- Video matching
- Entity graph
- Knowledge graph

BACKGROUND

Information about a particular topic, e.g., in response to a search query, is sometimes presented in a concise user interface (UI) such as a knowledge card or panels. Such UI includes sections of condensed information about entities (people, places, organizations, things) associated with the particular topic. The UI helps users get a quick snapshot of information on a topic without having to browse multiple separate websites or other knowledge sources. Knowledge panels are constructed out of entity graphs, which are networks of entities and their relationships. Entity graphs and knowledge panels can be algorithmically constructed from web sources or selected knowledge sources that provide authoritative data.

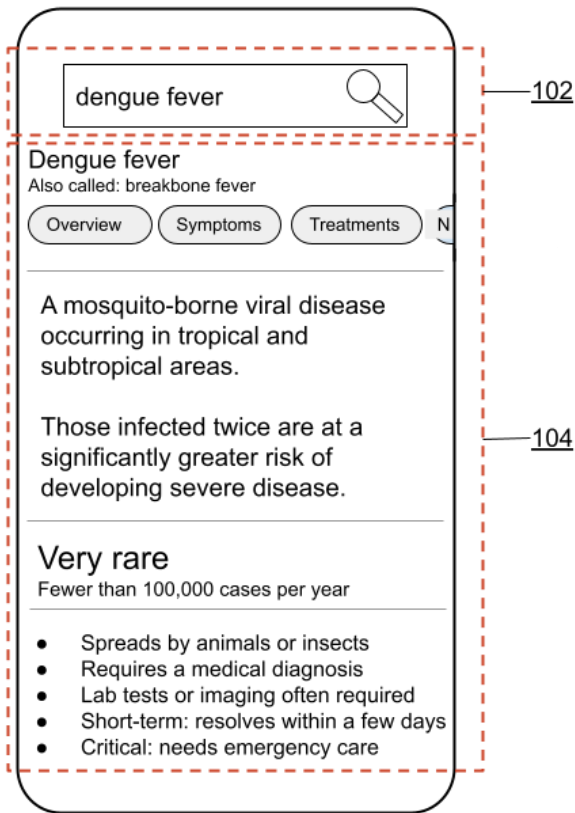


Fig. 1: An example knowledge panel in smartphone form-factor

Fig. 1 illustrates an example knowledge panel (in the form-factor of a smartphone), generated in response to the search query ‘dengue fever’ (102). As illustrated in Fig. 1, knowledge panels (104) are typically text intensive. However, some internet users might be more comfortable interacting with content with non-textual modalities such as images, videos, etc. rather than textually, with knowledge panels and search results in general. For example, users may have limited or no knowledge of popular search engine languages. Other users, particularly those who are relatively new to the internet, tend to engage more with non-textual content, e.g., short-form or long-form videos, images, etc., and find the textual content of knowledge panels unappealing. This disclosure uses the term “visual” to refer to content with non-textual modalities.

DESCRIPTION

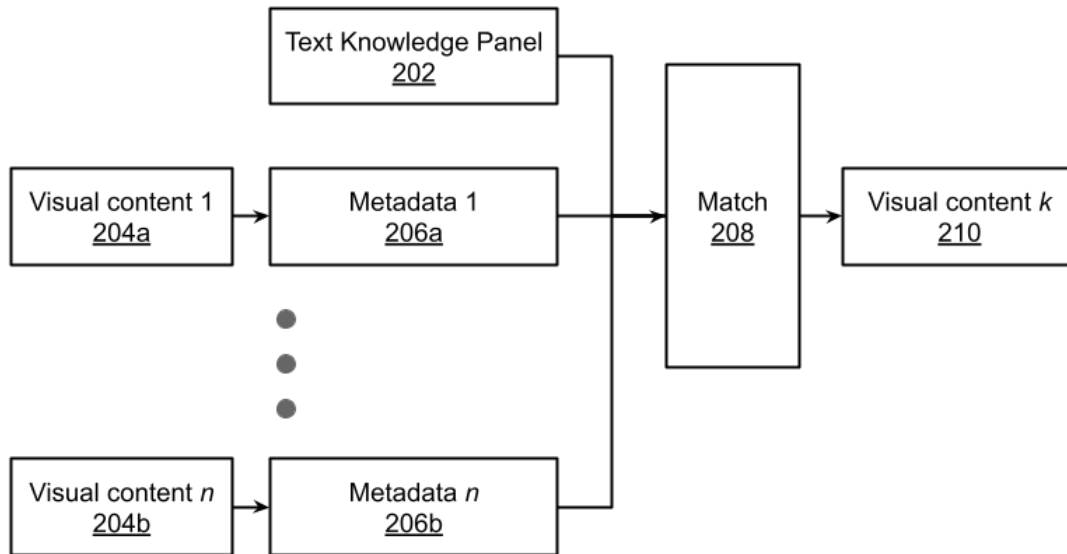


Fig. 2: Creating visual knowledge panels from text knowledge panels

This disclosure describes techniques to render a visual knowledge panel, e.g., that primarily includes images, videos, and other visual content. The visual knowledge panel is

created by mapping a text knowledge panel to existing video or image content in various forms such as a video Q&A (popular questions answered by experts over video); a short video (typically created directly from a smartphone); a story illustrated by slideshow, images, videos, etc.

As illustrated in Fig. 2, the mapping is created by matching or correlating (208) the text of the knowledge panel (202) to the metadata (206a-b) of the visual content, e.g., the transcript, title, summary, description, etc. of the video or image. In the example of Fig. 2, of the n pieces of visual content (204a-b), the text knowledge panel optimally matched with visual content k (210). The creation of metadata describing visual content can be done using various techniques such as video summarization, image understanding, object recognition, scene recognition, etc. which can be achieved using several machine learning techniques. Further, the textual knowledge-panel content can also be mapped with visual metadata using machine learning or other suitable techniques.

For example, as illustrated in Fig. 3, a text-heavy knowledge panel (Fig. 3(a)) describing dengue fever can be mapped to a video Q&A by a doctor (Fig. 3(b)); a text-light story describing the disease, its symptoms, its treatments, etc. (Fig. 3(c)); or a short video illustrating the progression and treatment of the disease (Fig. 3(d))

In this manner, compact and structured bites of information are provided in a visual format, structured as a knowledge panel. This type of a user interface is especially suitable for new internet users and users who prefer to engage with non-textual online content.

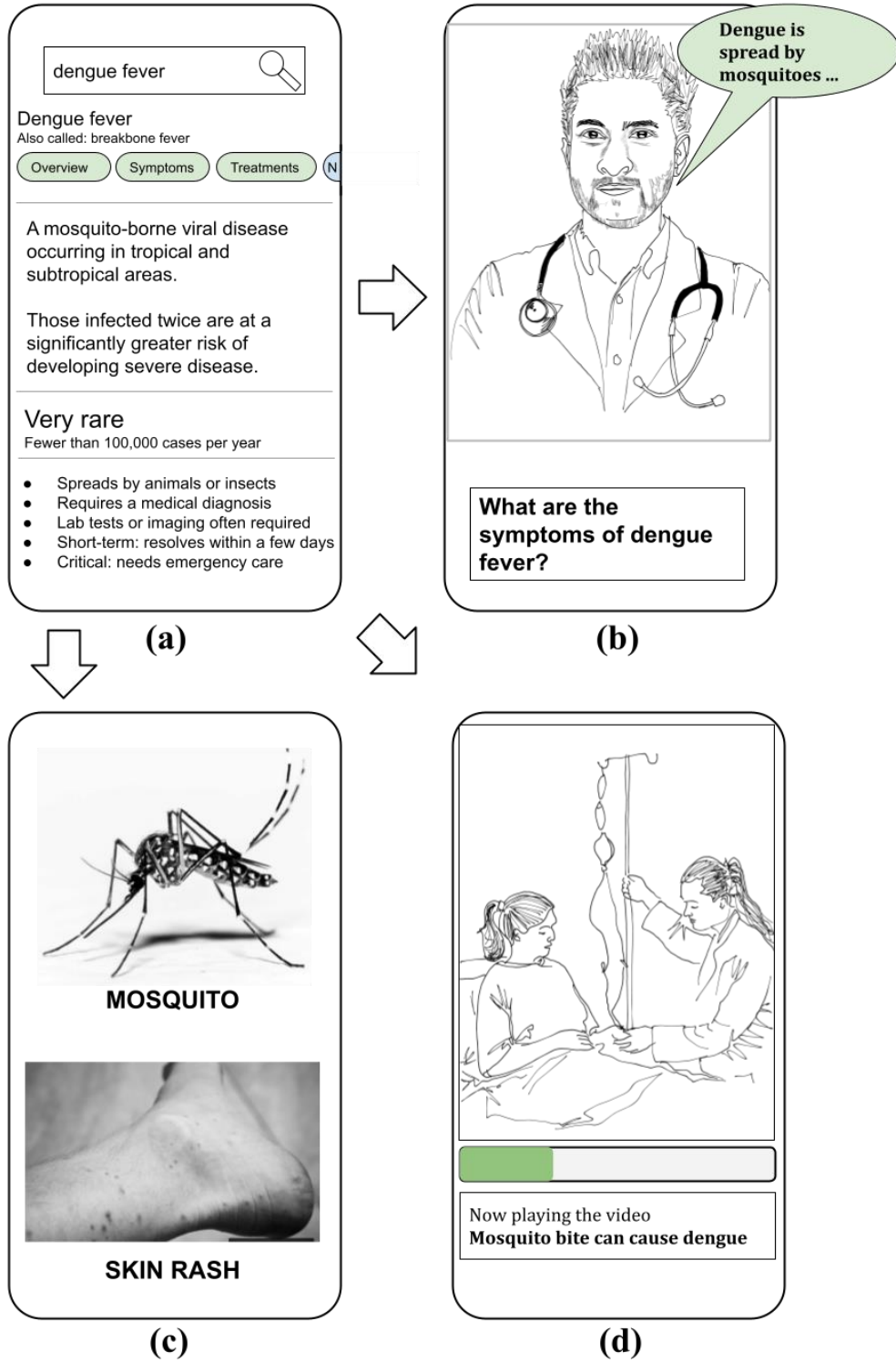


Fig. 3: Mapping a text knowledge panel to visual knowledge panels

Further to the descriptions above, a user is provided with controls allowing the user to make an election as to both if and when systems, programs, or features described herein may enable the collection of user information (e.g., information about a user's search queries, content viewing history, a user's preferences, or a user's current location), and if the user is sent content or communications from a server. In addition, certain data are treated in one or more ways before it is stored or used so that personally identifiable information is removed. For example, a user's identity may be treated so that no personally identifiable information can be determined for the user, or a user's geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level) so that a particular location of a user cannot be determined. Thus, the user has control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes techniques to algorithmically render a visual knowledge panel, e.g., one that primarily includes images, videos, and other non-text heavy content. The visual knowledge panel is algorithmically created by mapping a text knowledge panel to existing video or image content such as video Q&A, a short video, a story illustrated by slideshow, etc.