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Technology: Context-Aware Computing

At Last — Total Recall ...

The Challenge

The first challenge for any information research is to find relevant information. The success of the mission, however, may depend on re-finding that same, now critical bit of data weeks or months after it was first discovered.

Intelligence analysts must review hundreds of references from multiple sources and types of media. They face numerous challenges: information management, increasingly compressed timetables for delivering mission critical intelligence products, increasing need for interagency sharing, and a decreasing supply of veteran analysts. Another challenge for the intelligence analyst is to keep track of already found information, so that previously found-relevant resources can be quickly accessed to develop new intelligence reports. And, finally, this intelligence must be available for collaboration and to train new analysts.

Keeping Information

An analyst collects information resources such as webpage bookmarks, e-mail messages, files, etc. They save data using diverse, disconnected "keeping methods," including "Do Nothing," e-mail folders, bookmarked lists, etc., with varying degrees of organization. Because these collections can be highly idiosyncratic in content and organization, they can be hard to share with other analysts.

Each method of "keeping" references has its own advantages. For example, a "Do Nothing" method requires little effort when something is found but can tax a user's memory to re-find it. Bookmarks make data easier to re-find but take more effort to create, maintain, and organize. These methods also vary in their ability to capture the context of an item—for example, why the item was originally considered important. Bookmarks in lists and folders provide little context because the user sees only the web-page title.

The value of information is having it available when you need it.

Finding relevant data is only the first step. The challenge is to find it the next time you need it.

Tagged for Re-Finding

Lockheed Martin Advanced Technology Laboratories (ATL) has developed a Context-Aware Computing (CAC) framework. CAC is based on an explicit, machine-understandable representation of context that automatically captures, tags, and stores data items to help re-find them in future, similar searches.

Context tags are items like specific people, places, events, things, or concepts that are the most active in the current context when the item is stored.

As an analyst works, the CAC framework builds a model of the context of the task and attaches a (data) tag to each found item. These data items can be retrieved and viewed in a number of ways, including their metadata, content, and context at the time stored. The latter will help the user remember or determine why an item was saved.

Finally, stored knowledge bases can be shared, with their contexts, among analysts. CAC can also automatically suggest relevant stored items by using the terms in the current context and matching those to the context tags on stored items.

CAC will provide the intelligence community with much needed support for contextually relevant information capture, retrieval and sharing, while significantly reducing the time and cost to complete security-critical analyses.

ATL is also investigating ways that "kept" items may be shared among multiple analysts. Key benefits include savings in time and cost to re-find items, improved ability to exploit previous research, and an improved analytic product.

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