

# BUSINESS CONTINUITY INFORMATION NETWORK AT THE CENTER FOR INNOVATIVE INFORMATION SYSTEMS ENGINEERING

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Studies have shown that businesses risk failure if they are unable to reopen quickly after a disaster. To reduce these risks and improve communications within the business community, the Florida International University CREST Team developed the Business Continuity Information Network (BCIN, pronounced “bee-kin”), a web-based service ([www.bizrecovery.org](http://www.bizrecovery.org)) where local businesses, emergency management, and organizations that assist businesses can gather to share critical information and support continuity efforts before, during and after a disaster.

Available year-round as a public service, this business-to-business community network currently maps and shares critical information about infrastructure conditions and recovery efforts by working with County Emergency Management Offices and major private infrastructure providers. BCIN localizes and tailors relevant information to business managers who use this information to better assess an event’s impact to their facilities, employees, suppliers and customers.

The BCIN South Florida Release supports business recovery programs initiated by county participants including Broward, Miami-Dade, Palm Beach and Monroe counties through their respective Emergency Management offices. Private sector participants include Wal-Mart, Verizon Wireless, IBM, the Greater Miami Chamber of Commerce and a variety of local and national businesses across industry sectors.

Further research is needed to achieve the scale and provide the needed capabilities to collect, integrate, filter and deliver up-to-the-minute information about infrastructure conditions, situation reports, assistances and recovery efforts, both before and after disaster:

- Tools for companies and government agencies to

gather, integrate and report disaster damages to and situation assessments about their organization infrastructure and operations, as well as needs for assistance, both within the organization structure.

- Intelligent analytical and data mining tools that help decision makers to achieve comprehensive disaster recovery situation awareness, risk assessment, and decision making.

We present below several research activities that are driving further collaborative research, in areas such as disaster information management, data mining, social networks, and mobile computing.

**Disaster Management Dataspace.** This research focuses on ways to better organize, ingest, aggregate, and represent streaming and multimedia data relevant to the BCIN ecosystem. The disaster-related data can be disaster damage analysis reports and images, open/closure status about roadways/highways/bridges and other infrastructure such as Fuel, Power, Transportation, Emergency Services (Fire Stations, Police Stations etc.), Schools and Hospitals; it may be stored in various formats and can be structured, semi-

**Situation Dashboard**

All Counties	Airport	County Buses	County Trains	Curfews	Drawbridges	PODS	Power Availability	Roadways	Schools	Shelters	Water ways	Seaport
Miami-Dade	⬆️⬆️	⬆️⬆️	⬆️	⬆️	⬆️	⬆️⬆️	⬆️	⬆️	⬆️	⬆️	⬆️	⬆️
Broward	⬆️	⬆️				⬆️⬆️	⬆️	⬆️	⬆️	⬆️	⬆️	⬆️
Palm Beach	⬆️	⬆️		⬆️	⬆️	⬆️	⬆️	⬆️	⬆️	⬆️	⬆️	⬆️
Monroe						⬆️	⬆️	⬆️	⬆️	⬆️	⬆️	⬆️

**Track/Timeline** | Situation | Messaging | Reporting | Resources | Assistance | ESF-18 | Help

**Items**

Search:  GO

County: Miami-Dade Municipality:

**Items Requested**

- Tarps** Available
  - Pace Hardware**
    - Category: Hurricane Preparation/Recovery
    - Description:
    - Address: 1380 Weston Rd Weston FL 33326
    - Phone#: 954-464-2322
    - Web Page: www.pacehardware.com
    - E-Mail: help@pacehardware.com
  - Debris Removal Services** Available
    - Category: Debris Removal/Salvage Services
  - Portable Sanitation Systems** Available
    - Category: Sanitation Systems
  - Shutters** Available
    - Category: Hurricane Preparation/Recovery
- Most Requested**
- Recently Posted**
- Browse By Category**
  - Hurricane Preparation/Recovery
- Special Request**

**Summary**

Pace Hardware has Tarps and Shutters  
1380 Weston Rd Weston FL 33326

**Tarps Category: Hurricane Preparation/Recovery**

Available: Yes As of: Tue 25 7:49 a.m.

Description:

Company Contact Info: Pace Hardware

Phone Number: 954-464-2322

Web Page: www.pacehardware.com

Email: help@pacehardware.com

Business Continuity Information Network Web Application

structured, and unstructured. Providing all the required supporting operations like updates, query, search, and optimization, and accommodating the characteristics like different formats and accessibility through different interfaces, and integration across different administrative and semantic formats, are an existing challenge.

We are developing a Disaster Management Dataspace Support Platform that improves on techniques to accommodate communities in a disaster management context. Since a member of each community can participate in multiple communities simultaneously, different relationships can be developed, creating an explosion of interactions that in turn generate a rich set of participant data sets.

**Data Delivery and Semi-automatic Question-Answering on Disaster Dataspace.** FIU is working with the IBM TJ Watson Center on algorithms to generate results in real-time that combine multiple text streams and has developed novel collaborative filtering algorithms utilizing the intrinsic structures of item similarities. FIU is investigating a matching mechanism between profiles and data items for a given context, by employing machine-learning techniques to measure the semantic distance between business profiles and data items related to disaster management. Historical data will be used as the training set. Novel domain-specific machine learning techniques that match profiles to data items will be enhanced by collaborative filtering methods. In addition to the information recommendation mechanism, BCIN will allow stakeholders to submit continuous or ad-hoc information discovery queries on the streaming and stored data. To support ad-hoc or continuous queries of business and government users on the streaming disaster data, effective and efficient information discovery algorithms must be created that take into consideration the context and the stakeholder's profile. In addition to plain keyword queries, predefined questions (e.g., "is it safe to open my business?") will be supported, whose answer is computed by appropriately combined rules specified by a domain expert and knowledge learned from analyzing past disaster data. The answer to the queries will be presented using a combination of ranking and navigation techniques, topics on which the PIs have recent SIGMOD publications, exploiting the profile and context information.

**Dynamic Community Generation:** Geo-location is an important feature associated with different entities, reports and resources. In disaster information management scenario, users can be categorized into sub-groups based on certain

situations taking place, such as curfew. Intuitively, users affected by large-scale events are more likely to share information with each other caring about the current situation in their area; we treat such group of users who are more tending to share or obtain each other's information as a community.

Thus, cluster users based on their location is a natural solution to figuring out the most important issues the users could be interested in. On the other hand, constraints can be divided into two classes: Physical and Non-physical. The former is those constraints which geographically increase/break or decrease/connect two sites, such as a river, broken bridge or highway. The latter are those constraints that can be taken independently to cluster users, such as company status, supply chain. Basically, as those constraints are changing, communities are also changing. So we want to provide users a new angle to retrieve information reflecting on-going situations in their community. Traditionally, most clustering approaches have dealt with non-physical constraints. Just a few methods consider physical constraints. Currently, there are no approaches taking both kinds of constraints at the same time and no scenario has been established to evaluate and verify this kind of applications.

**Summarization for Mobile Navigation:** Our method is based on the multi-document summarization techniques, which is an effective way to aggregate information scattered in several documents. Besides selecting the important related sentences to compose a compact summary, we aim to make available summary extracted information, where users can assess related information by clicking a link in the current summary, rather than input a new query. In this way, users can easily navigate in the system, using the constrained mobile interface. Specifically, when we do summarization according to a query, we want to include some information which the user may want to read about after reading the current summary and provide links leading to details (which are also summaries).

The simplest way to do this is when we generate a summary according to a query; we make the summary contain the most related queries. However, most related does not mean most likely to read next, so we may make use of workflow mining to obtain the query flows from query logs. Our approach is based on the intuitive observation that users often query related information in their several consecutive queries.

