Decision Support with Text
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Ubiquiti Software Products

This brief write up describes the current Ubiquiti software product suite at a high level. Ubiquiti software products are modular, and designed to work with each other, and also where appropriate, our products can be tied into existing third-party software tools.

Ubiquiti Coder/Indexer generates "descriptors" automatically for each item in a dataset, and these descriptors serve as surrogates to represent content in records & documents. The descriptors can be used for further processing in analytics, diagnostics, or search. Obviously, the descriptors should represent concisely the contents of the original data. The Coder/Indexer expects the format of the original data to be configured in advance.

The descriptors for each record come from a reference "ontology" (a set of words, phrases, terms and concepts that are interlinked to represent their semantic associations) that is configured and set up in advance by Ubiquiti. The Coder/Indexer aims to "understand" the content of each item in datasets to assign the descriptors, and this activity is controlled by certain "logic" that is set up in advance and contained within the Coder/Indexer. The ontology and logic vary as per the domain of discourse, and contain (as a subset) any associated set of standardized "codes" or indices together with the appropriate logic to assign them. By using an ontology and coder configured for a customer, the system gets configured for the particular customer.

An ontology embodies the information of a particular domain of discourse (which may be described loosely as a set of similar elements interconnected in the logical organization of a real-world system). The ontology and the logic are stored as information internal to the Ubiquiti system. End users do not interact with Coder/Indexer directly; instead, and at appropriate times, Ubiquiti products invoke it – and so, there is no user interface for the Coder/Indexer. The Coder/Indexer is necessary to enable the functioning of the other Ubiquiti products.

Ubiquiti RADAR (**R**ecords **A**nd **D**ata **A**nalysis **R**epository) is a software application to allow users to encode, analyze and utilize information that would otherwise require tedious manual effort and time. RADAR is able to handle, in addition to numeric and categorical data, plain verbatim text narratives that are often present and of considerable value. This product essentially enables users to organize their data, perform charting, generate formatted reports, drill-down into the data, and search the datasets.

Ubiquiti RADAR may be enhanced with other auxiliary panes that incorporate several related analytical activities on the data records. These may include mechanisms to indicate trends, or for root-cause analysis, when unexpected patterns arise in the data. The different panes appropriately allow users to select the Coder/Indexer descriptors over which to conduct analytics, and then also display the results.

Ubiquiti Mining is an auxiliary pane (added into) Ubiquiti RADAR to enable "mining" the co-occurrences of descriptors and significant deviation among subsets with breakdowns as defined in the ontology. These mining results may prove important to indicate trends, or for root-cause analysis, wherein unexpected patterns in the data may be located. The interface allows a user to select the types of descriptors, or the subsets, over which to conduct such mining, and then also displays the results. The system automatically identifies "top issues" based on statistical metrics of "interestingness" and "significance". The results, displayed in a manner that leverages the ontology, can be delved into by zoom-in and zoom-out features. Also, the issues found that pertain to specific elements in the ontology in use may be examined using the mining interface.

Ubiquiti FAST (**F**orecasting & **A**lerts **S**ystem **T**echnologies) provides means to forecast and get automated alerts on issues from diverse information sources. Sources include Repair Records, Warranty Claims, Surveys (e.g., J.D. Power), Safety Studies (e.g., NHTSA), Internal Manufacturing Floor Tests, External Supplier Tests etc. Each source has its own data format and meaning associated with its values. Alerts and Forecasts (and often this may be with use of 3rd-party software), as applied to diverse sources examined in a unified manner, help to create an "Early Warning System". Ubiquiti FAST helps set, evaluate and view Alerts; enable Forecasts based on an ontology-based information organization; and use diverse information sources. Ubiquiti FAST interacts seamlessly with Ubiquiti RADAR.

Ubiquiti Search leverages our core text technologies to provide a powerful means to locate information quickly from diverse data and information sources. In particular, by means of customized Ubiquiti-provided ontologies, common issues of spelling errors, acronyms, jargon, and multiple terminologies are overcome. Navigation aid is provided by way of customized facets based on the ontology, and specific pages can be located and previewed in large documents. The results can be viewed with highlighted terms, and there are multiple ways to rank the results to address issues concerning too many or too few relevant results. This same technology has also been provided for tabular data within the Ubiquiti RADAR software modules.

Ubiquiti Diagnostics use stored repairs & maintenance data as a knowledge base, and with input symptoms and vehicle information for new repair instances, the system rapidly identifies the most likely causes and their fixes. These results are shown as differential diagnoses and fixes – with sub-second response times. The software finds similar cases (i.e., symptoms and vehicles) in the "knowledge" available in the historical repairs data (with each record suitably pre-processed by the Coder/Indexer), and uses sophisticated instance-based learning algorithms applied to the stored data. Also, after any vehicle is repaired, that repair case becomes part of the stored knowledge base to help with future repair diagnostics. In fact, our approach adapts to emerging new issues as they get reflected in stored data, and thereby, it becomes part of the "collective knowledge" – and this requires few changes, if any, to an implemented system.

External Tools which may be third-party commercial, or software built in-house at our customers, can use the data initially processed by the Ubiquiti Coder/Indexer. Such tools may include other Search, Analytics/BI, Charting/Reporting, Diagnostics utilities etc.