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6. Teaching Experience

6.1. Completed Supervision of Graduate Theses and Projects

#	Student	Title	Activity	L	Prog.	Date
1.	Barrad, Sherif	Impact of Artificial Intelligence and Analytics and Procurement Strategy on Cost Reduction; Co-directeur: Raul Valverde	Thesis	3	PhD STI	2020-07-01
2.	El-Kass, Wassim	Integrating Semantic Web and Unstructured Information Processing Environments; Co-directeur: Michal Iglewski	Thesis	3	PhD STI	2018-01-31
3.	Andriamaharosa, Sylvia	Causal Structure of Risk in Industrial Systems Using Dynamic Bayesian Networks	Thesis	3	PhD STI	2017-04-30
4.	Marquis, Guillaume	Perception du risque par les marchés financiers des nouvelles liées aux projets en technologies de l'information : Interprétations de la volatilité et de la flexibilité stratégique	Thesis	2	MSc PM	2016-08-31
5.	Ben Mahmoud, Nizar	Contagion Between Competitors of Risk Perception by Financial Markets: The Case of Information Technology	Thesis	2	MSc PM	2014-05-29
6.	Alakhras, Anas	Market-perceived risk of project-related announcements in the information technology industry	Thesis	2	MSc PM	2013-05-02
7.	Khosrojerdi, Farhad	The risk perceptions of strategic decisions and the project life cycle: An application of the event study method to the oil and gas industry	Thesis	2	MSc PM	2008-12-11
8.	Bett, Richard	Integrating governance, risk, and compliance management to enhance requirements engineering in IT projects	Thesis	2	MSc PM	2008-11-17
9.	Messaoudi, Sadia	Impact of Integrating a Standard XBRL Ontology to Automated Text Classification: An Application to Financial News; Co-Supervisor: Alain Charbonneau	Thesis	2	MSc STI	2011-05-13

1. PhD Thesis – Graduated 2020-07-01

Impact of Artificial Intelligence and Analytics and Procurement Strategy on Cost Reduction

Barrad, Sherif (2020). *Impact of Artificial Intelligence and Analytics and Procurement Strategy on Cost Reduction*. Thèse. Gatineau, Université du Québec en Outaouais, Département d'informatique et d'ingénierie, 130 p.

Procurement is playing an increasingly important role in helping organizations achieve their savings and profitability objectives. Cost reduction or containment can be referred to as an organizations commitment to identify and capitalize on savings opportunities, ultimately improving shareholder value. While there is evidence that pure cost reduction efforts enable organizations in achieving savings, there have been conflicting research suggesting that cost reduction efforts can also have a reverse effect on long-term savings and goes as far as suggesting that the 'lowest bid' approach is not always an effective and sustainable procurement strategy. In this study, we identify the conditions under which emerging AI technologies and analytics (AIA), coupled with more evolutive and "intelligent" procurement strategies, can drive cost reduction. We propose to look specifically at the required organizational context conducive to enhancing the impact of AI and analytics, as opposed to implementing simplistic AI seeking only "lowest cost" rules. We also explored the notion of procurement strategy to highlight the degree of influence generated from strategic sourcing and supplier relationship management activities, as a lower-order dynamic capability, on cost reduction, a higher-order dynamic capability. Our primary hypothesis is that the application of procurement strategies, in an ideal organizational context, coupled with robust and effective AIA technologies, can have a significantly positive effect on cost reduction. This research is empirically validated by surveying procurement executives and guides as to how to prioritize and leverage AIA for cost reduction. A model is tested using the Partial Least Squares (PLS) regression technique and algorithm.

Type de document:	Thèse (Thèse)
Directeur de mémoire/thèse:	Gagnon, Stéphane
Co-directeurs de mémoire/thèse:	Valverde, Raul
Départements et école, unités de recherche et services:	Informatique et ingénierie
Date de dépôt:	19 juin 2020
Dernière modification:	19 juin 2020
URI:	<u>Embargo 2021-07-01</u>

2. PhD Thesis – Graduated 2018-01-31

Integrating Semantic Web and Unstructured Information Processing Environments: A Visual Rule-Based Approach

El-Kass, Wassim (2018). *Integrating semantic web and unstructured information processing environments: a visual rule-based approach*. Thèse. Gatineau, Université du Québec en Outaouais, Département d'informatique et d'ingénierie, 161 p.

Unstructured information refers primarily to text but also any information stored without a pre-defined data structure. Significant advances have been made in Natural Language Processing (NLP), with reliable syntactic and gazetteer annotations from Part of Speech (POS) tagging, Noun Phrase (NP) chunking, and Named-Entity Recognition (NER).

However, semantic annotation remains a challenging task, with precision and recall varying greatly across document types and application domains. While simple texts such as email messages in a single domain can be analysed with consistent results, professional and scientific documents of similar size, such as news and abstracts, present too much complexity with diverse vocabulary and ambiguous meanings throughout sentences and document sections. Major difficulties remain in accurately relating concepts with one another into annotation graphs and combining them for further classification across a hierarchy of classes with semantic relevance and completeness.

In this thesis, we demonstrate how to use semantic web technologies, in particular ontologies and graph databases, to help improve the quality (F-score) of such annotation and classification tasks. We integrate a formal ontology with a standard NLP platform, test it on a public research corpus, and report F-scores superior to prior Machine Learning algorithms.

We develop and test an innovative platform, the Adaptive Rules-Driven Architecture for Knowledge Extraction (ARDAKE). Our software integrates the Unstructured Information Management Architecture (UIMA) with a standard graph database to host our ontologies. We develop extensions to the UIMA Ruta rules language to invoke and verify class relationships from the ontology. Other extensions include computing additional text metrics useful in integrating conditional, statistical, and semantic distances for token-class matching. We also develop a new iterative n-grams algorithm to combine matching rules and optimize F-scores and area under the Receiver Operating Characteristic (ROC) curves. We propose a new pie-chart style to facilitate visualization of annotation performance evaluation. These components are integrated within a graphical interface allowing domain experts to visually compose rule sets within hierarchies of varying complexity, score and benchmark their relative performance, and improve them by integrating additional ontology sources.

Our platform is tested on a particular use case in the health sciences: the Population, Intervention, Control, and Outcome (PICO) medical literature analysis methods. We show that our platform can efficiently and automatically produce parsimonious rule sets, with higher F-scores on the P and I classes than prior authors using machine learning algorithms.

Type de document:	Thèse (Thèse)
Directeur de mémoire/thèse:	Gagnon, Stéphane
Co-directeurs de mémoire/thèse:	Iglewski, Michal

Départements et école, unités de recherche et services: [Informatique et ingénierie](#)

Date de dépôt: 21 juin 2018 13:04

Dernière modification: 21 juin 2018 14:29

URI: <http://di.uqo.ca/id/eprint/996>

3. PhD Thesis – Graduated 2017-04-30

Causal Structure of Risk in Industrial Systems Using Dynamic Bayesian Networks

Andriamaharosoia, Sylvia (2017). *Structure causale des risques dans les systèmes industriels par la méthode des réseaux bayésiens dynamiques*. Thèse. Gatineau, Université du Québec en Outaouais, Département d'informatique et d'ingénierie, 154 p.

The thesis deals with detecting the causal structure of risk in industrial systems. We focus on the prioritization of risks in the form of correlated events sequences. To improve the established prioritization methods, the application of a new methodology using Dynamic Bayesian networks (DBN) is proposed. We are studying the development of a new user interface for industrial control systems and data acquisition, known as Supervisory Control and Data Acquisition (SCADA), to demonstrate the analysis method of risk causal structure. We perform a test based on a dataset of an actual SCADA system, obtained by UK authors from a semiconductor manufacturing plant. Our analysis uses the R statistical software as a development platform, with classification algorithms implemented in the tool Tanagra. Our results show that: (1) the network of variables before and after the failure is represented by a limited and distinct number of factors; (2) the network of variables before and after the failure can be graphically represented dynamically in a user interface to assist in fault prevention and diagnosis; (3) variables related to the sequence of events at the time of failure can be used as a model to predict its occurrence (whose forecast quality is evaluated by the F1 measure), and find the main cause of it, thus making it possible to prioritize the requirements of the production system on the right variables to be monitored and manage in the event of a breakdown. The reliability of our fault forecasts is evaluated using the Train-Test, Cross-Validation and Bootstrap methods. These results have a significant value for industrial engineers, working as a team through a SCADA during the execution of the production system. Using this new, more intuitive interface, they will be able to detect the probable cause of a system failure more easily and can intervene on the right factors with a higher confidence level.

Type de document:	Thèse (Thèse)
Directeur de mémoire/thèse:	Gagnon, Stéphane
Informations complémentaires:	Comprend des références bibliographiques : p. 149-154.
Mots-clés libres:	Systèmes industriels; Réseaux bayésiens dynamiques
Départements et école, unités de recherche et services:	Informatique et ingénierie
Date de dépôt:	26 mai 2017 18:22
Dernière modification:	08 juin 2017 15:25
URI:	http://di.ugo.ca/id/eprint/903

4. MSc Thesis – Graduated 2016-08-31

Contagion of Perceived Risk Related to Project News: Comparison of Co-Jumps in Information Technology and Consumer Product Industries

Marquis, Guillaume (2016). *Contagion du risque perçu face aux nouvelles liées aux projets : comparaison des co-jumps dans les industries des technologies de l'information et des produits de consommation*. Mémoire. Gatineau, Université du Québec en Outaouais, Département des sciences administratives, 95 p.

Publicly traded companies are the subject of financial news covering a variety of events. The news can be classified as relating to ongoing projects (e.g. new products, major investments, and diversification) or relating to organizational and economic contexts (e.g. leadership, financing, markets). Interpretations of such news affect the financial market's risk perception, which depends on the potential impact of events on profitability.

We evaluate the perception of two key factors which may vary according to a company's cost structure, namely volatility and strategic flexibility. These factors may vary according to the types of companies, whether project-based organizations (i.e. partnership networks under rigid contracts, high fixed costs, absorption of losses) or manufacturers (i.e. outsourcing network, low-cost agility, prevention of losses).

We perform a factual study of events in two industries, one the information technology industry and the consumers industry. These segments face the same market conditions; therefore, we can clearly isolate the interpretations of risk according to organizational contexts. We analyze a Bloomberg database and a newswire from Dow Jones Factiva updated by the minute over a period of 102 workdays and focused on segments of the S&P 500. We extract 188 relevant news items, 76,74% of which relate to projects of companies.

The indicator selected to analyze perceived-risk contagion is the result of co-jump analysis, or the occurrence of simultaneous shocks or variations, between multiple stocks, instruments, or markets, as measured by yield and volatility. We apply the model used to detect co-jumps in an equity portfolio, also weighted using the method based on mean cross products developed by Barndorff-Nielsen and Shephard (2003), and further refined using the standardized mean cross product (Zmcp) method by Bollerslev, Law et Tauchen (2008).

Our study brings us to conclude that the perceived risk contagion is most significant in the IT and consumers industries, with more impact in the consumers industry than in the IT industry. Moreover, we notice that project-oriented news creates more significant contagion in the consumers industry than that resulting from enterprise-related news and they do the same in the IT industry. The effect of perceived risk contagion is amplified by market volatility. High-volatility periods have considerable impact on project-oriented news in the IT and the consumers industries, and low-volatility periods have an impact, on enterprise-related news in the IT sector, as well as on project-oriented news in the consumers sector. Finally, we also notice that the equipment segment of the IT industry and the consumer durables segment of the consumer goods industry behave in the same way as other segments in their respective industries. In both cases, news cause perceived risk contagion and, in both cases, news from the consumer goods industry cause more contagion than those from the IT industry, but

project-related news items generate more perceived risk contagion in the equipment segment of the IT industry, and enterprise-related news generate more contagion in the consumer durables segment.

The interpretation of results provides an opportunity to make recommendations with regards to project management. Indeed, risk management can be adjusted according to business segment, type of news and current market volatility. When market volatility is low and investors are looking for medium- and long-term returns, Merger & Acquisition news have more impact than when the market is more volatile. It would then be wise, time permitting, to wait until the market stabilizes before publishing such an ad in order to leverage maximum investor impact, however avoiding any leak of the information, failing which the market could adjust and neutralize the impact of the announcement. Conversely, Project & Product Release ads have more impact when the market is volatile, and investors are looking for a quick gain.

Type de document: Thèse (Mémoire)

Directeur de mémoire/thèse: Gagnon, Stéphane

Informations complémentaires: Comprend des références bibliographiques : p. [91]-95

Mots-clés libres: Étude événementielle; Moyenne des produits croisés standardisée; Perception du risque; Flexibilité stratégique; Volatilité

Départements et école, unités de recherche et services: [Sciences administratives](#)

Date de dépôt: 05 oct. 2016 20:18

Dernière modification: 26 oct. 2016 18:11

URI: <http://di.uqo.ca/id/eprint/850>

5. MSc Thesis – Graduated 2014-05-29

Contagion Between Competitors of Risk Perception by Financial Markets: The Case of Information Technology

Ben Mahmoud, Nizar (2014). *Contagion entre concurrents du risque perçu par les marchés financiers : le cas des nouvelles dans l'industrie des technologies de l'information*. Mémoire. Gatineau, Université du Québec en Outaouais, Département des sciences administratives, 81 p.

Large, publicly traded firms often issue public announcements, whether related to ongoing projects (e.g., new product, major investment, joint venture) or general organizational issues (e.g., leadership, markets, finances).

We evaluate the contagion of the risk between competitors in the same sector, that of information technology (IT). We focused on two segments exposed to the same economic conditions, but with a very different cost structure: the software segment, which is of type organization by project and of type of organization and project focused on licensing revenues (ie d, partner networks. rigid contracts, high fixed costs, loss absorption), and the computer segment, including manufacturing companies are very flexible (ie d., network outsourcing, agility, low-cost, prevention against losses).

We analyze a database of news from Yahoo! Finance, compiled the minute 10 working days (February 28, 2011 to March 11, 2011 between 9:30 am and 16 pm), and related segments of the S&P500. The news is filtered and reduced to 36 news items, 23 news items (63%) are project-related as follows: 14 software firms (of which 3 firms had 8 news items) and 10 computer and peripherals manufacturers (of which 5 firms had 15 news items).

The data was then analyzed using an event study methodology. The Capital Asset Pricing Model (CAPM) was used to estimate the Abnormal Returns (ARs) for each firm and event, but unfortunately produced insignificant results, so we pursued our research with raw returns.

We calculated the covariance matrix between each undertaking concerned members and competitors in its segment, as well as the evolution of the matrix over time. We also used the centrality measures applied to networks of covariance to group companies / events by common types of market reactions, and thus detect patterns in the diffusion or contagion risk.

Our study allows us to conclude that there is a contagion effect of perceived risks in the IT sector. This contagion is different, depending on the different sectors, namely software and computer. It is also different according to the weeks of high or low volatility.

This study confirms that the analysis of financial news and events is an essential skill for project management, program and portfolio management in IT companies, especially those project-oriented. We therefore recommend the integration of the analysis of contagion perceived risks in the whole process of project management as risk management and cost management to ensure project success.

Type de document: Thèse (Mémoire)
Directeur de mémoire/thèse: Gagnon, Stéphane

Informations complémentaires: Localisation : Bibliothèque L.-Brault HD 69 P75 B466 2014.
Comprend des réf. bibliogr. : p. 77-81

Mots-clés libres: Gestion de projet; Technologie de l'information; Industrie;
Études de cas

Départements et école, unités de recherche et services: [Sciences administratives](#)

Date de dépôt: 10 juin 2014 17:40

Dernière modification: 04 nov. 2016 16:52

URI: <http://di.uqo.ca/id/eprint/692>

Market-Perceived Risk of Project-Related Announcements in the Information Technology Industry

Alakhras, Anas (2013). *Market-perceived risk of project-related announcements in the information technology industry*. Mémoire. Gatineau, Université du Québec en Outaouais, Département des sciences administratives, 59 p.

Large, publicly traded firms often issue public announcements, whether related to ongoing projects (e.g., new product, major investment, joint venture) or general organizational issues (e.g., leadership, markets, finances). Financial markets have varying perceptions of the risks implied by these announcements and their potential impact on profitability. They are perceived differently depending on the relative rigidity of the organization's cost structure.

For example, if faced with the same event, a highly flexible manufacturing company that easily adapts to demand fluctuations should be perceived as less risky, compared to a project-oriented company where large, ongoing projects represent significant fixed costs, with a high risk of difficulties in adapting to shifting economic conditions. Furthermore, project-related news should have more of an impact on project-oriented companies, as these directly affect their riskiness, while the perceived risk in the manufacturing sector should be more affected by general organizational issues that may impede or reduce the flexibility of the production network.

To explore these hypotheses, we perform an event study to test how financial markets perceive the implicit risks from a firm's public announcements, related both to specific projects and to general organizational issues. To clearly isolate organization-specific risk, we choose to compare the responses of two segments of the information technology industry, software, and computers. Both segments face the same demand fluctuations and economic conditions, while they differ radically in terms of organizational and cost rigidities: software companies are project-oriented, while computer manufacturers are among the most flexible and efficient in the entire economy, mostly due to extensive network-driven and outsourced production.

We developed a web solution that automatically downloads from Yahoo! Finance all the data and news related to the S&P 500 index companies. The software runs over a 10-day or 2-week period, and downloads data and news minute-by-minute. The news is filtered and reduced to 76 news items, selecting only those dealing clearly with the target companies in our 2 segments, which consist of 14 software firms (of which 12 firms had 35 news items) and 10 computer and peripherals manufacturers (of which 7 firms had 41 news items). Overall, 52 news items (68%) are project-related, while the rest are regarding organizational and economic issues.

The data was then analyzed using an event study methodology. The Capital Asset Pricing Model (CAPM) was used to estimate the Abnormal Returns (ARs) for each firm and event, but unfortunately produced insignificant results, so we pursued our research with raw returns. The minute-by-minutes were cumulated -30 prior and +30 after each event. We computed the key changes and moments in these windows and produced pivot tables to help compare the market perceived risk of each industry segment for each type of news. We tested our hypotheses for distinctive and significant differences in the perceived risks, using a paired-sample t-test on difference between the means of each period.

Our results allow us to confirm almost all our hypotheses, with only 1 of 8 unsupported. This study may provide valuable information to both project and company executives who wonder about the market-perceived risk of project and non-project announcements. For instance, our results show that the risk responses for the computer industry are less than the risk responses for the software industry. Moreover, the news has a larger impact in the case of non-project news in the computer segments, compared to project news in the software segment.

Project managers in the IT industry are therefore invited to consider planning their project announcements by optimizing the perceived risk by financial markets.

Type de document:	Thèse (Mémoire)
Directeur de mémoire/thèse:	Gagnon, Stéphane
Informations complémentaires:	Localisation : Bibliothèque L.-Brault HD 69 P75 A435 2013 Le texte de ce mémoire est en anglais. Comprend des réf. bibliogr. : p. [57]-59.
Mots-clés libres:	Gestion de projet; Technologie de l'information; Industrie
Départements et école, unités de recherche et services:	Sciences administratives
Date de dépôt:	29 mai 2013 16:33
Dernière modification:	04 nov. 2016 16:00
URI:	http://di.uqo.ca/id/eprint/616

7. MSc Thesis – Graduated 2008-12-11

The Risk Perceptions of Strategic Decisions and the Project Life Cycle: An Application of the Even Study Method to the Oil and Gas Industry

Khosrojerdi, Farhad (2008). *The risk perceptions of strategic decisions and the project life cycle: an application of the even study method to the oil and gas industry*. Mémoire. Gatineau, Université du Québec en Outaouais, Département des sciences administratives, 127 p.

The announcement of a major investment project by a publicly traded company generally has a clear impact on the value of its stock. As demonstrated since 1973, based on hundreds of Event Studies in the field of Finance, market fluctuations associated with key events are an accurate gauge for perceived risks in a project, especially for systemic and financial feasibility or cost-benefit risk purposes. However, the literature is scarce on the key dimensions of decision-making process to manage the risk, especially throughout the life cycle projects.

Hereby, an Event Study is proposed on how publicly traded companies in the Oil & Gas industry manage the market-perceived risks linked with major exploration and drilling projects during their life cycle. We identify, for a set of companies, news related to announcements of their major investment projects in 2007. An event-study method is used to measure the perceived risks by the market, and the efficiency level of strategies applied by the companies to manage risk, and this at various life cycle stages of each project announced. In this study, Exploration & Drilling as well as Independent Oil & Gas firms in S&P500 index are investigated. A total of 64 exploration/drilling announcements and prior days (from 2006 to 2007) regarding important contingencies concerned in PM have been observed and analyzed in this research.

Based on the result of this study, three contingency factors have been identified - project objectives, project risk factors, and project operation - affecting exploration projects in oil and gas industry. The projects experiencing changes in their implementation have found to be affected more than those projects being operated regularly. Furthermore, we found that a project announcement with probability of occurring high severity of risk factors causes significant negative abnormal returns compared to projects with lower degree of complexity in terms of implementation. Finally, exploration projects with planning intents awarded more than projects with development and acquisition purposes.

Employing epistemology approach was one of the most important applications for recognizing appropriate events. Stock market behavior was studied based on positivism and postmodernism ideas to fully understand environment of financial markets for strategic decisions.

Portfolio management is provided as a solution to define project characteristics during planning phase. Furthermore, due to its vital role in describing project characteristics, project appraisal is also introduced in planning stage. At execution phase, time and budget, project requirements, and communication were addressed as significant parameters toward mitigation and control of irregularity in project implementation. Using PMBOK (Project Management Body of Knowledge) techniques and approaches have been also introduced to design, manage, and analyze project phases and characteristics. Additionally, several PM discipline criteria were proposed to be considered for strategic decisions including Project Change Management and Scope Change Management.

Type de document: Thèse (Mémoire)

Directeur de mémoire/thèse: Gagnon, Stéphane

Informations complémentaires: Bibliothèque L.-Brault HD 61 K46 2008 Comprend des réf. bibliogr. : p. 124-127. Le texte de ce mémoire est en anglais

Mots-clés libres: Perception du risque; Prise de décision; Gestion; Méthodologie; Gaz; Industrie

Départements et école, unités de recherche et services: [Sciences administratives](#)

Date de dépôt: 08 mars 2013 19:36

Dernière modification: 08 mars 2013 19:36

URI: <http://di.uqo.ca/id/eprint/605>

8. MSc Thesis – Graduated 2008-11-17

Integrating Governance, Risk, and Compliance Management to Enhance Requirements Engineering in IT Projects

Bett, Richard (2009). *Integrating governance, risk, and compliance management to enhance requirements engineering in information technology projects*. Mémoire. Gatineau, Université du Québec en Outaouais, Département des sciences administratives, 176 p.

A typical Information Technology (IT) project involves several disciplines working concurrently throughout a Systems Development Lifecycle (SDLC). Requirements Engineering (RE) is one of the key project activities in the front-end of the lifecycle, generally performed jointly by Business and Systems Analysts.

Several studies of IT project failures have revealed that key factors include a lack of proper IT project management methods, and especially the absence of a well-defined RE process. While PM best practices, both generic and IT-focused, are highly evolved and sufficient to deal with the first factor, there is still a lack of standardized RE framework to serve as a guide for IT projects.

We propose to explore an opportunity to enhance the RE process by integrating emerging best practices in a related discipline, namely Governance, Risk, and Compliance Management (GRCM). Founded on the concepts of Strategic Management, Corporate Governance, and Policy Deployment, GRCM provides a framework for managing organization-wide risks, meet regularly compliance imposed by the organization's environment, and establish a governance infrastructure to deploy risk management policies and ensuring compliance across multiple projects.

The objective of this thesis is to see if a new GRCM discipline could be integrated in a standard SDLC. It could provide a new basis to improve Software Engineering methods to ensure the organization has enterprise-wide coherence into performing RE activities in every IT projects.

The research methodology used in this paper is based on the academic journal entitled "Investigating Information Systems with Positivist Case Study Research" authored by Guy Paré.

We performed a comparative analysis of RE activities in four key enterprise-wide IT projects. Data analysis is performed to see if the two following objectives can be fulfilled.

- a. Develop and validate a new GRCM and RE capability measurement framework
- b. Explore to what extent GRCM capabilities are correlated with RE capabilities

We concluded with a future research section, where examples of moving the GRCM and RE disciplines forward in IT projects are given.

Type de document:	Thèse (Mémoire)
Directeur de mémoire/thèse:	Gagnon, Stéphane
Informations complémentaires:	Bibliothèque L.-Brault T 58 .64 B48 2009. Comprend des réf. bibliogr. : p. 168-176. Le texte de ce mémoire est en anglais.
Mots-clés libres:	Systèmes d'information; Gestion; Technologie de l'information; Ingénierie des systèmes; Gestion de projet

Départements et école, unités de recherche et services: [Sciences administratives](#)

Date de dépôt: 10 déc. 2012 20:00

Dernière modification: 12 déc. 2013 14:35

URI: <http://di.uqo.ca/id/eprint/392>

9. MSc Thesis – Graduated 2011-05-13

Impact of Integrating a Standard XBRL Ontology to Automated Text Classification: An Application to Financial News

Messaoudi, Sadia (2011). *Impact de l'intégration d'une ontologie normée XBRL à la classification automatique de textes : une application aux nouvelles financières*. Mémoire. Gatineau, Université du Québec en Outaouais, Département d'informatique et d'ingénierie, 136 p.

Even though many methods, developed in the field of automatic text categorization, have achieved significant levels of precision when it comes to simple structure of texts (e.g. emails, summaries, etc.). Nevertheless, there remains much to do in the case of complex documents such as financial news and similar knowledge-based analyses. This complexity makes it more difficult to formalize and update a representative knowledge base, which directly influence text mining in the identification of common issues between the text and the components (by analysis of similarities and hierarchies) and there monitoring through time (e.g., Topic Detection and Tracking).

In this research, we propose to adopt, as a model for formal representation of knowledge, normalized ontology which has recently demonstrated an improvement in classification results. Among the research conducted in this area we include Wikipedia ontology that contains, in 2007, two million entries by itself [1], the multilingual classification based on ontology [2] and the integration of the ontology inside information retrieval tasks (especially in the grouping of texts and tasks of classification) [3]. To validate our approach, experiments will be conducted using a commercial classifier IBM Classification Module (ICM, a module of IBM OmniFind). Our classification tests are performed on a specific subset of new financial sector from the Reuters Corpus Version 1 (RCV1) which, with its 810 000 news, is considered as the largest collection of news available.

Type de document:	Thèse (Mémoire)
Directeur de mémoire/thèse:	Gagnon, Stéphane
Co-directeurs de mémoire/thèse:	Charbonneau, Alain
Informations complémentaires:	Comprend des références bibliographiques : 119-122
Mots-clés libres:	Exploration de données; Regroupement des documents; Classification automatique
Départements et école, unités de recherche et services:	Informatique et ingénierie
Date de dépôt:	10 déc. 2012 15:42
Dernière modification:	17 juin 2019 12:39
URI:	http://di.ugo.ca/id/eprint/489