Knowledge Guided Hierarchical Multi-Label Classification over Ticket Data

[1]GADDAM SUPRIYA, [2]T . JALAJA.
[1]PG Scholar, Dept of CSE, Vasavi college of Engineering, Ibrahimbagh, Hyderabad, TS, India.
[2]Assistant Professor, Dept of CSE, Vasavi college of Engineering, Ibrahimbagh, Hyderabad, TS, India.

Abstract: Maximal automation of routine IT maintenance procedures is an ultimate goal of IT service management. System monitoring, an effective and reliable means for IT problem detection, generates monitoring ticket. Inlight of the ticketdescription, the underlying categories of the IT problem are determined, and the ticket is assigned to the corresponding processing teams for problem resolving. Automatic IT problem category determination acts as a critical part during the routine IT maintenance procedures. In practice, IT problem categories are naturally organized in a hierarchy by specialization. Utilizing the category hierarchy, this paper comes up with a hierarchical multi-label classification method to classify the monitoring tickets. In order to find the most effective classification, a novel contextual hierarchy (CH)loss is introduced in accordance with the problem hierarchy. Consequently, an arising optimization problem is solved by a new greedy algorithm named GLobal. Furthermore, as well as the ticket instance itself, the knowledge from the domain experts, which partially indicates some categories the given ticket may or may not belong to, can also be leveraged to guide the hierarchical multi-label classification. Accordingly, a multi-label inference with the domain expert knowledge is conducted on the basis of the given label hierarchy. The experiment demonstrates the great performance improvement by incorporating the domain knowledge during the hierarchical multi-label classification over the ticket data.

Keywords: System monitoring, Classification of monitoring data, Hierarchical multi-label classification, Domain Knowledge.

I. INTRODUCTION

Changes in the economic environment force companies to constantly evaluate their competitive position in the market and implement innovative approaches to gain competitive advantages. Without solid and continuous delivery of IT services, no value-creating activities can be executed. The complexity of IT environments dictates usage of analytical approaches combined with automation to enable fast and efficient delivery of IT services. Incident management, one of the most critical processes in IT Service Management, aims at resolving the incident and quickly restoring the provision of services while relying on monitoring or human intervention to detect the malfunction of a component. Thus, it is essential to provide an efficient architecture for the IT routine maintenance.[1], aims at resolving the incident and quickly restoring the provision of services while relying on monitoring or human intervention to detect the malfunction of a component. Thus, it is essential to provide an efficient architecture for the IT routine maintenance. A typical architecture of the IT routine maintenance is illustrated in Fig. 1, where four components are involved.
(1) In the case of detection provided by a monitoring agent on a server, alerts are generated and, if the alert persists beyond a predefined delay, the monitor emits an event.
(2) Events coming from an entire account IT environment are consolidated in an enterprise console, which analyzes the monitoring events and determines whether to create an incident ticket for IT problem reporting.
(3) Tickets are collected by IPC (abbr. Incident, Problem and Change) system and stored in the ticket database [2].
(4) A ticket accumulates the symptom description of an IT problem with a short text message and a time stamp provided.

According to the description of a ticket, the system administrators (i.e., sysAdmins) perform the problem category determination and assign the ticket to its corresponding processing teams for problem diagnosis and resolution. The last component gets involved with much labor intensive effort to resolve each ticket. The efficiency of these transient resources is critical for the provisioning of the services [3]. Many IT Service Providers rely on a partial automation for incident diagnosis and resolution, with an intertwined operation of the sysAdmins and an automation script. Often the sysAdmins' role is limited to executing a known remediation script, while in some scenarios the sysAdmin performs a complex root cause analysis. Removing the sys Admin from the process completely where it is feasible would reduce human error and speedup restoration of service. The movefrompartiallytofullyautomated problem.
Objective: The main objective of the application is to implement a controller placement strategy for wide area network (WAN), whose objective is to minimize the average latency. The central idea is to partition the WAN into smaller domains by using spectral clustering algorithm and assign a controller to each domain. The authors assumed that capacity of controllers is infinite, which is not a realistic assumption.

Scope Of Project: The main objective of the application is to provide fast and better solution for any issue which is raised in any IT solutions. By using controller placement strategy we will find out where the issue is occurring and which processing team done that. How the solution given to that issue.

Proposed System: It is formulated as a mixed integer linear program (MILP). The objective is to minimize the maximum, for all switches, of the sum of the latency. The switch to the nearest controller with enough capacity (first reference controller) and the latency from the first reference controller to its closest controller with enough capacity (second reference controller). We also proposed a generalized model which can be used to minimize the average latency and extended it for multiple controller failures. Furthermore, we presented a simulated annealing heuristic that efficiently solves the problem on large scale networks. However, adversaries can leverage the statistical behavior of underlying ciphers to recover encryption key.

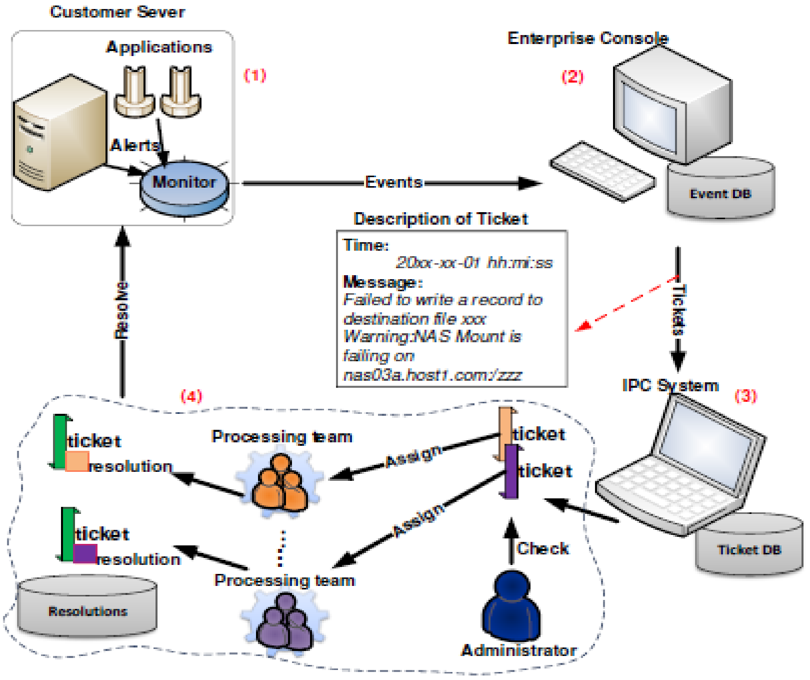


Fig.1: The overview of the IT routine maintenance procedure.

Propose system Advantages: Future work may include developing ranking mechanisms in order to rank the parses of a question. Unique feature of TR Discover is that it provides suggestions in order to help users to complete their questions.

II. PROJECT DESCRIPTION

Changes in the economic environment force companies to constantly evaluate their competitive position in the market and implement innovative approaches to gain competitive advantages. Without solid and continuous delivery of IT services, no value-creating activities can be executed. The complexity of IT environments dictates usage of analytical approaches combined with automation to enable fast and efficient delivery of IT services. Incident management, one of the most critical processes in IT Service Management, aims at resolving the incident and quickly restoring the provision of services while relying on monitoring or human intervention to detect the malfunction of a component. Thus, it is essential to provide an efficient architecture for the IT routine maintenance.

A. Methodologies

Modules Names:

Following modules we have in this project:

1. User interface design
2. IT Problem Detection
3. IPC System
4. Hierarchical Multi Label Classification
5. Automatic IT Problem Category

B. Module Description With Diagrams

1. User interface design

In this module we design the windows for the project. These windows are used for secure login for all users. To connect with server user must give their username and password then only they can able to connect the server. If the user already exits directly can login into the server else user must register their details such as username, password and Email id, into the server. Server will create the account for the entire user to maintain upload and download rate. Name will be set as user id. Logging in is usually used to enter a specific page.

2. IT Problem Detection

This is the first module of this project. In this module what is problem occurred at customer server need to detect. And that detected problem is sending in the form of event. That event is converted into ticket data. The ticket data is generated with time and error message with description.

3. IPC System

This is the second module of this project. In this module problem occurred in the customer server is received in the form of ticket data by IPC System. Based on the information provided in the ticket it will give to corresponding processing team by administrators.

4. Hierarchical Multi Label Classification

This is the third module of the project. In this module the ticket data is converted into different categories. Based on those categories ticket data is allocated to different team administrators. Administrators verify that and forward that to corresponding to fix that problem send it to customer server.

5. Automatic IT Problem Category

This is the fourth module of this project. In this module whatever the problem occurred in the customer server that problem is analyzed by expert. And he will directly send the ticket to particular processing team. Whatever the problem sended by expert that is solved by processing team and sends to customer server.

C. Technique Used Or Algorithm Used

Controller placement strategy: Proposed a controller placement strategy for wide area network (WAN), whose objective is to minimize the average latency. The central idea is to partition the WAN into smaller domains by using spectral clustering algorithm and assign a controller to each domain. The authors assumed that capacity of controllers is infinite, which is not a realistic assumption.

III. SOFTWARE TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, sub assemblies, assemblies and/or a finished product It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

A. Developing Methodologies

The test process is initiated by developing a comprehensive plan to test the general functionality and special features on a variety of platform combinations. Strict quality control procedures are used.

The process verifies that the application meets the requirements specified in the system requirements document and is bug free. The following are the considerations used to develop the framework from developing the testing methodologies.

B. Types Of Tests

1. Unit testing: Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program input produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

2 Functional test: Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:
Valid Input: identified classes of valid input must be accepted.
Invalid Input: identified classes of invalid input must be rejected.
Function: identified functions must be exercised.
Output: identified classes of application outputs must be exercised.
Systems/Procedures: interfacing systems or procedures must be invoked.

3. System Test: System testing ensures that the entire integrated software system meets requirements. It tests a configuration to ensure known and predictable results. An example of system testing is the configuration oriented system integration test. System testing is based on process descriptions and flows, emphasizing pre-driven process links and integration points.

4. Performance Test: The Performance test ensures that the output be produced within the time limits, and the time taken by the system for compiling, giving response to the users and request being send to the system for to retrieve the results.

5. Integration Testing: Software integration testing is the incremental integration testing of two or more integrated software components on a single platform to produce failures caused by interface defects. The task of the integration test is to check that components or software applications, e.g. components in a software system or – one step up – software applications at the company level – interact without error.

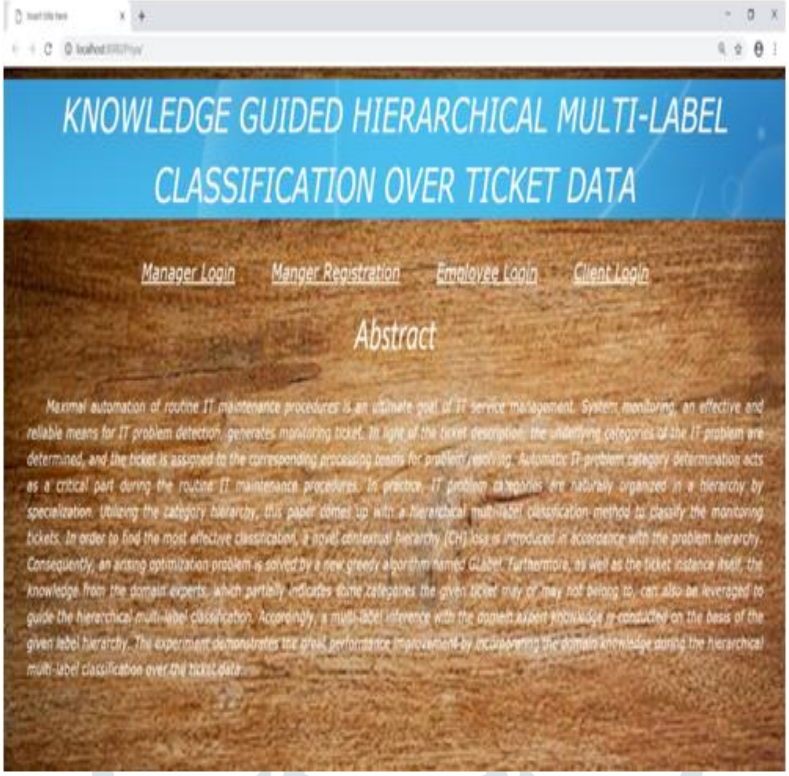
6. Acceptance Testing: User Acceptance Testing is a critical phase of any project and requires significant participation by the end user. It also ensures that the system meets the functional requirements. Acceptance testing for Data Synchronization:

- The Acknowledgements will be received by the Sender Node after the Packets are received by the Destination Node
- The Route add operation is done only when there is a Route request in need
- The Status of Nodes information is done automatically in the Cache Updating process

7. Build the test plan: Any project can be divided into units that can be further performed for detailed processing. Then a testing strategy for each of this unit is carried out. Unit testing helps to identity the possible bugs in the individual component, so the component that has bugs can be identified and can be rectified from errors.

IV. RESULTS AND DISCUSSIONS

Snapshot is nothing but every moment of the application while running. It gives the clear elaborated of application. It will be useful for the new user to understand for the future steps.



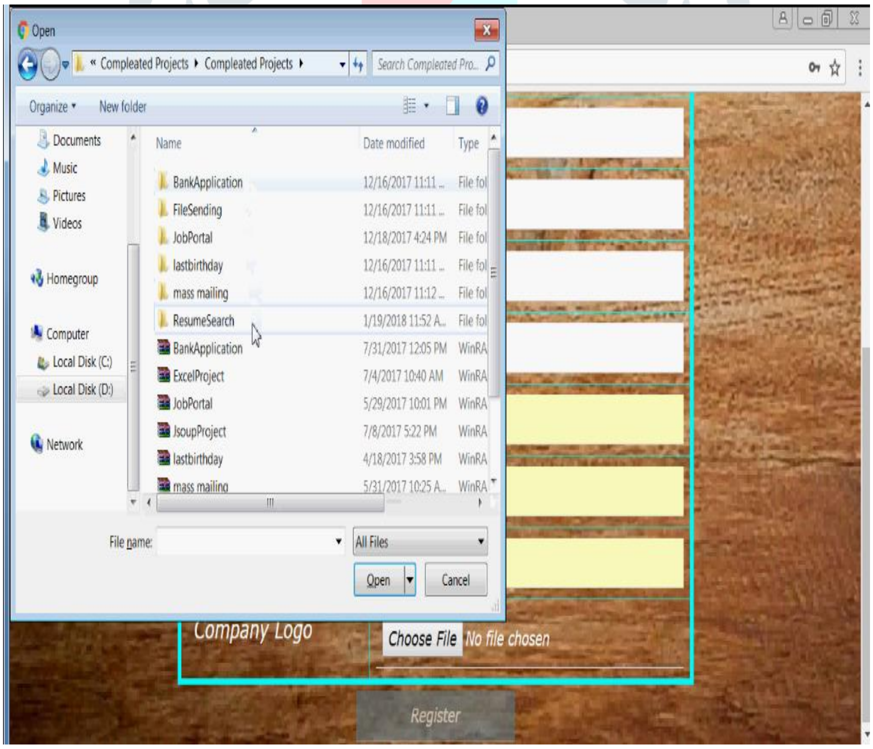
KNOWLEDGE GUIDED HIERARCHICAL MULTI-LABEL CLASSIFICATION OVER TICKET DATA

Abstract

Maximal automation of routine IT maintenance procedures is an ultimate goal of IT service management. System monitoring, an effective and reliable means for IT problem detection, generates monitoring ticket. In light of the ticket description, the underlying categories of the IT problem are determined, and the ticket is assigned to the corresponding processing teams for problem resolving. Automatic IT-problem category determination acts as a critical part during the routine IT maintenance procedures. In practice, IT problem categories are naturally organized in a hierarchy by specialization. Utilizing the category hierarchy, this paper comes up with a hierarchical multi-label classification method to classify the monitoring tickets. In order to find the most effective classification, a novel contextual hierarchy (CH) loss is introduced in accordance with the problem hierarchy. Consequently, an arising optimization problem is solved by a new greedy algorithm named GLabel. Furthermore, as well as the ticket instance itself, the knowledge from the domain experts, which partially indicates some categories the given ticket may or may not belong to, can also be leveraged to guide the hierarchical multi-label classification. Accordingly, a multi-label inference with the domain expert knowledge is conducted on the basis of the given label hierarchy. The experiment demonstrates the great performance improvement by incorporating the domain knowledge during the hierarchical multi-label classification over the ticket data.

Fig2: Home page

In Figure-2 the manager login, manager registration, employee login and client login into the home page



Open

« Compleated Projects ▸ Compleated Projects ▸

Name	Date modified	Type
BankApplication	12/16/2017 11:11 ...	File fol
FileSending	12/16/2017 11:11 ...	File fol
JobPortal	12/18/2017 4:24 PM	File fol
lastbirthday	12/16/2017 11:11 ...	File fol
mass mailing	12/16/2017 11:12 ...	File fol
ResumeSearch	1/19/2018 11:52 A...	File fol
BankApplication	7/31/2017 12:05 PM	WinRA
ExcelProject	7/4/2017 10:40 AM	WinRA
JobPortal	5/29/2017 10:01 PM	WinRA
JsoupProject	7/8/2017 5:22 PM	WinRA
lastbirthday	4/18/2017 3:58 PM	WinRA
mass mailing	5/31/2017 10:25 A...	WinRA

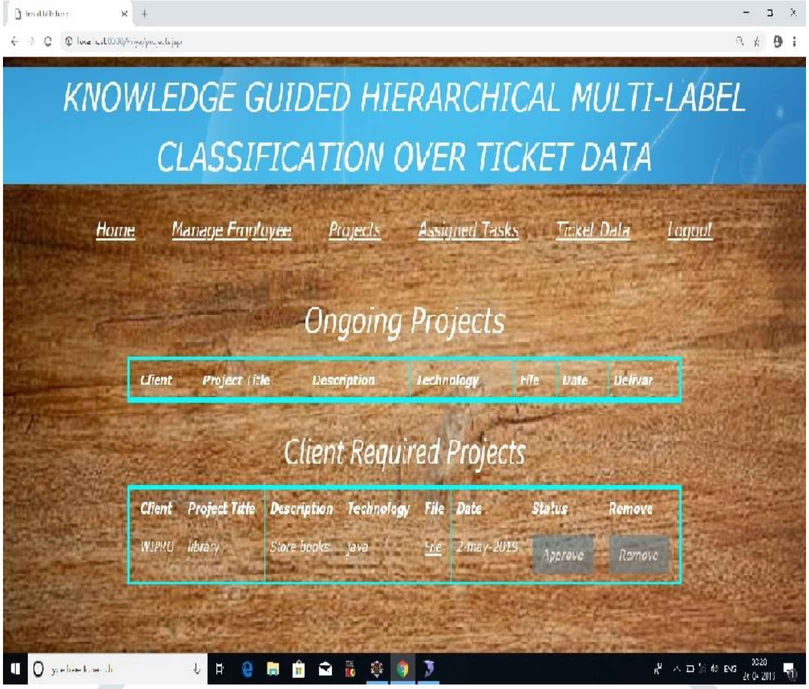
File name:

All Files

Company Logo Choose File No file chosen

Fig3. Choose company logo

In Figure-3, In this figure shows to manager of the some company in that registration process they need to choose their logo.



KNOWLEDGE GUIDED HIERARCHICAL MULTI-LABEL CLASSIFICATION OVER TICKET DATA

Ongoing Projects

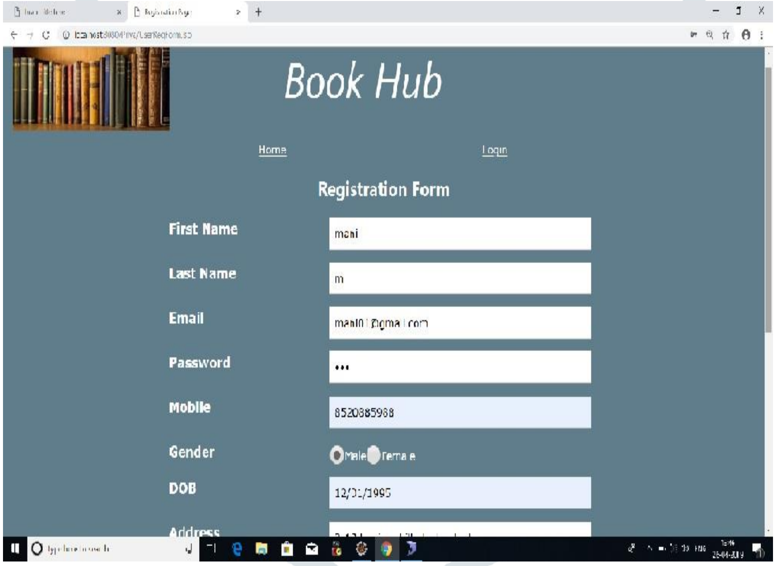
Client	Project Title	Description	Technology	File	Date	Delivar

Client Required Projects

Client	Project Title	Description	Technology	File	Date	Status	Remove
WIPRO	library	Store books	java	File	2-may-2019	Approve	Remove

Fig4. Client required Projects Approval page.

In Figure-4 here, the client will login to take the projects after that we want to send the approval of the project request, if they accept the project or remove the request.



Book Hub

Registration Form

First Name	mani
Last Name	m
Email	mani01@gmail.com
Password	•••
Mobile	8520885988
Gender	● Male ○ Female
DOB	12/01/1995
Address	

Fig5. Book Hub registration form.

In Figure5 In this page mainly inform of the project books there in the book which author, project description and which language used to solve the project it show when peoples are register into the book hub.

V. COCLUSION

We implement a system which will provide better solution for the issues occurred in any IT companies. By using this project we can find out where the issue occurred and how to solve that issue. The issue will generate in the form of ticket by using IPC system which will add the time stamp and description to that. And by using that ticket data manager will verify and find out from which route the issue raised and forward to them and get fast solution for that.

VI. REFERENCES

[1]“ITIL,”http://www.itilofficialsite.com/home/home.aspx, 2016.

[2] L. Tang, T. Li, L. Shwartz, F. Pinel, and G. Y. Grabarnik, “An integrated framework for optimizing automatic monitoring systems in large IT infrastructures,” in Proceedings of the 19th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. ACM, 2013, pp. 1249–1257.

[3] Y. Jiang, C.-S. Perng, T. Li, and R. Chang, “Intelligent cloud capacity management,” in Network Operations and Management Symposium (NOMS), 2012 IEEE. IEEE, 2012, pp. 502–505.

[4]WIKI,2016,https://en.wikipedia.org/wiki/Network-attached storage.

[5] J. De Knijff, F. Frasincar, and F. Hogenboom, “Domain taxonomy learning from text: The subsumption method versus hierarchical clustering,” Data & Knowledge Engineering, 2012.

[7] L. Li and T. Li, “An empirical study of ontology-based multi-document summarization in disaster management,” IEEE Transactions on Systems, Man, and Cybernetics: Systems, 2013.

[8] O. Dekel, J. Keshet, and Y. Singer, “Large margin hierarchical classification,” in Proceedings of the Twenty-first International Conference on Machine Learning. ACM, 2004, p. 27.

[9] N. Cesa-Bianchi, C. Gentile, and L. Zaniboni, “Incremental algorithms for hierarchical classification,” The Journal of Machine Learning Research, vol. 7, pp. 31–54, 2006.

[10] N. Cesa-Bianchi and G. Valentini, “Hierarchical cost-sensitive algorithms for genome-wide gene function prediction,” 2010.

[11] W. Bi and J. T. Kwok, “Multi-label classification on tree-and dagstructured hierarchies,” in Proceedings of the 28th International Conference on Machine Learning (ICML-11), 2011, pp. 17–24.

[12] L. Tang, T. Li, L. Shwartz, and G. Grabarnik, “Recommending Resolutions for Problems Identified by Monitoring,” pp. 134–142, 2013.

[13] L. Cai and T. Hofmann, “Exploiting known taxonomies in learning overlapping concepts.” in IJCAI, vol. 7, 2007, pp. 708–713.

[14] C. Zeng, T. Li, L. Shwartz, and G. Y. Grabarnik, “Hierarchical multilabel classification over ticket data using contextual loss,” in Network Operations and Management Symposium (NOMS), 2014 IEEE. IEEE, 2014, pp. 1–8.

[15] C. Bozdogan and N. Zincir-Heywood, “Data mining for supporting it management,” in 2012 IEEE Network Operations and Management Symposium. IEEE, 2012, pp. 1378–1385.