

Capstone Project - Automatic Ticket Assignment

Background

Incident Management - Ticket Generation

One of the key activities of any IT function is to “Keep the lights on” to ensure there is no impact on the business operations. IT leverages Incident Management process to achieve the above Objective. An incident is something that is an unplanned interruption to an IT service or reduction in the quality of an IT service that affects the Users and the Business. The main goal of the Incident Management process is to provide a quick fix/workarounds or solutions that resolve the interruption and restores the service to its full capacity to ensure no business impact.

In most of the organizations, incidents are created by various Business and IT Users, End Users/ Vendors if they have access to ticketing systems, and from the integrated monitoring systems and tools. Assigning the incidents to the appropriate person or unit in the support team has critical importance to provide improved user satisfaction while ensuring better allocation of support resources. The assignment of incidents to appropriate IT groups is still a manual process in many of the IT organizations.

Manual assignment of incidents is time-consuming and requires human efforts. There may be mistakes due to human errors and resource consumption is carried out ineffectively because of the misaddressing. On the other hand, manual assignment increases the response and resolution times which result in user satisfaction deterioration / poor customer service.

Business Domain Value

In the support process, incoming incidents are analyzed and assessed by the organization’s support teams to fulfil the request. In many organizations, better allocation and effective usage of the valuable support resources will directly result in substantial cost savings.

Currently, the incidents are created by various stakeholders (Business Users, IT Users and Monitoring Tools) within IT Service Management Tool and are assigned to Service Desk teams (L1 / L2 teams). This team will review the incidents for right ticket categorization, priorities and then carry out an initial diagnosis to see if they can resolve. Around ~54% of the incidents are resolved by L1 / L2 teams. In case L1 / L2 is unable to resolve, they will then escalate/assign the tickets to Functional teams from Applications and Infrastructure (L3 teams). Some portions of incidents are directly assigned to L3 teams by either Monitoring tools or Callers / Requestors. L3 teams will carry out a detailed diagnosis and resolve the incidents. Around ~56% of incidents are resolved by Functional / L3 teams. In case if vendor support is needed, they will reach out for their support towards incident closure.

L1 / L2 needs to spend time reviewing Standard Operating Procedures (SOPs) before assigning to Functional teams (Minimum ~25-30% of incidents needs to be reviewed for SOPs before ticket assignment). 15 min is being spent on SOP review for each incident. Minimum of ~1 FTE effort needed only for incident assignment to L3 teams.

Project Description

During the process of incident assignments by L1 / L2 teams to functional groups, there were multiple instances of incidents getting assigned to wrong functional groups. Around ~25% of Incidents are wrongly assigned to functional teams. The additional effort needed for Functional teams to re-assign to right functional groups. During this process, some of the incidents are in a queue and not addressed timely resulting in poor customer service.

Ticket Classification

Guided by powerful AI techniques that can classify incidents to the right functional groups can help organizations to reduce the resolving time of the issue and can focus on more productive tasks.

In this capstone project, the goal is to build a classifier that can classify these incident management tickets by analysing texts in these tickets.

Details about the data and dataset files are given in below link,

<https://drive.google.com/file/d/1OZNJm81JXucV3HmZroMq6qCT2m7ez7IJ/view>

Project Objective

In the process, we aim to-

- Learn how to use different text classification models.
- Use transfer learning to use pre-built models.
- Learn to set the optimizers, loss functions, epochs, learning rate, batch size, checkpointing, early stopping etc.
- Read different research papers of a given domain to obtain the knowledge of advanced models for the given problem.

We achieve the same through the milestones mentioned below -

Milestone 1: Pre-Processing, Data Visualisation and EDA

- Exploring the given Data files
- Understanding the structure of data
- Missing points in data
- Finding inconsistencies in the data
- Visualizing different patterns
- Visualizing different text features
- Dealing with missing values
- Text preprocessing
- Creating word vocabulary from the corpus of report text data
- Creating tokens as required

Milestone 2: Ticket Classification Model Building - Initial Draft

- Building a model architecture which can classify the tickets.
- To train the model and test to understand the performance using the right evaluation metrics
- To deal with large training time, saving the weights so that you can use them when training the model for the second time without starting from scratch.

Milestone 3: Ticket Classification Model Building - Final Draft

- To try different models to identify the best performing one
- To iterate with different hyperparameters, by trying different optimizers, loss functions, epochs, learning rate, batch size, check-pointing, early stopping etc. for these models to fine-tune them
- To report evaluation metrics for these models along with your observation on how changing different hyperparameters leads to change in the final evaluation metrics

Project submissions and Evaluation

While we encourage peer collaboration and contribution, plagiarism, copying the code from other sources or peers will defeat the purpose of learning in this program and working on this project. We expect the highest order of ethical behaviour.

Submit the project as per the points below:

1. Each milestone should comprise a detailed presentable report on the steps taken to complete the milestone. The same is referred to as *Project notes*
2. Share the notebook (code file) showing the steps towards the completion of the milestone
3. [Optional] GitHub code source link. Ex. - <https://github.com/sri-teja/chemical-NER>

Final submission:

- Detailed report with the problem statement, related work, your approach, final insights, recommendations and comparison of results with other models.
- Detailed presentation to be used for the final project presentation session. The slides must be neat and must have a high present-ability with a defined structure and flow walking through the problem at hand, the approach and the solution
- Final submission notebook. Please make sure the notebooks are well commented and detailed.
- A 5-min video explaining the final submission, covering on the problem, approach and key takeaways (final model performance and other findings)
- [Optional] GitHub code source link for the final submission

Refer to the timeline document in the capstone course to understand the timeline of the submissions of the required documents.

Passing criteria: You must receive a minimum of 60% on each milestone to complete the project.

>60 % Points = Complete

>80 % Points = Excellent

Detailed rubrics are provided in the 'Capstone Project: Guidelines and Grading Criteria' section of the capstone course.

Project Support

You can clarify your queries related to project during the weekly mentor sessions.

Happy Learning