

# Auto-ticket Resolution System

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## *Problem:*

You are a data scientist in charge of analyzing issues and problems with regard to your organization's infrastructure. Your current task involves your organization's service ticketing system.

Daily tickets are raised by customers based on issues faced by them, which are manually read, understood and analyzed by the operations team. Tickets are then tagged with a 'root\_cause' label. Tickets for specific root causes are assigned to specific specialists in that domain who run special scripts and programs to resolve the necessary problem.

This is an involving task and operations team is looking at automating some of these processes where root cause can be automatically inferred from the ticket data and specific scripts tied up with each root cause can be automatically run to resolve the problem.

## *Opportunity:*

You have over five years' worth of historical ticketing data in JSON file dumps on a server, which consist of the following attributes.

- `ticket_id`: A unique identifier for a customer ticket
- `short_desc`: Short description of the issue faced by the user
- `long_desc`: A JSON field consisting of detailed information like the employee id, location, site and detailed description of the issue.
- `attachments`: Depicts path to optional image attachments depicting more information about the issue
- `root_cause`: The root cause or the issue behind the problem which has been manually assigned by specialists (**unique root causes are shown in the following page**)

The idea is to understand, clean, process, analyze and model on this data such that you can automatically infer and predict the root cause of a ticket in the future.

## *Caveats\Warnings:*

- Look closely at the sample snapshot of data in the following page and try to understand what fields could be useful for your model
- Try to understand which attributes\fields might need to be pre-processed\cleaned before usage

## *Objective:*

- Look at the data snapshot and sample root causes in the following pages and describe in detail about the problem you are solving from the business perspective as well as the type of machine learning task it represents
- Focus on how you can build a complete end to end system for predicting root cause and cover the following steps in details (methods, tools, techniques, approaches)
  - Data Retrieval
  - Data Cleaning \ Wrangling
  - Exploratory Data Analysis
  - Feature Engineering & Feature Selection
  - Modeling
  - Model Evaluation \ Interpretation
  - Deployment

```
[{'attachments': None,
  'long_desc': {'Employee ID': '#112342123',
    'Issue Desc': 'It has been very difficult to connect to skype since monday morning. It keeps getting hanged on theSign-in screen and I am unable to sign-in, take calls or attend meetings. Please fix this.',
    'Location': 'Arizona, US',
    'Product': 'Skype',
    'Site': 'Chandler'},
  'root_cause': 'Network Issue',
  'short_desc': 'skype is not connecting',
  'ticket_id': 'tk013019'},

{'attachments': ['/usr/tktsystem/archive/2017/tk109201/img1.png',
  '/usr/tktsystem/archive/2017/tk109201/img2.png'],
  'long_desc': {'Employee ID': '#11000283',
    'Issue Desc': 'Not able to get updated mail please help',
    'Location': 'Oregon, US',
    'Product': 'Outlook',
    'Site': 'Portland'},
  'root_cause': 'Mail Sync Issue',
  'short_desc': 'outlook mail is not loading up',
  'ticket_id': 'tk109201'},

{'attachments': ['/usr/tktsystem/archive/2017/tk112232/img1.png'],
  'long_desc': None,
  'root_cause': 'Network issue',
  'short_desc': "Can't connect to skype or outlook",
  'ticket_id': 'tk112232'},

{'attachments': ['/usr/tktsystem/archive/2017/tk110091/img1.png'],
  'long_desc': {'Employee ID': '#112342123',
    'Issue Desc': "Since today morning, every skype meeting I'm joining, I am unable to share any content on skype. Other members in the meetings keep seeing either a loading or a black screen. Please help",
    'Location': '',
    'Product': 'Skype',
    'Site': ''},
  'root_cause': 'Skype Share Issue',
  'short_desc': 'Unable to share content on skype meetings',
  'ticket_id': 'tk110091'},

{'attachments': None,
  'long_desc': None,
  'root_cause': 'Sharepoint login issue',
  'short_desc': 'Cannot login to office sharepoint with my credentials',
  'ticket_id': 'tk1070563'},

{'attachments': ['/usr/tktsystem/archive/2017/tk1102413/img1.png',
  '/usr/tktsystem/archive/2017/tk1102413/img2.png'],
  'long_desc': {'Employee ID': '#115241912',
    'Issue Desc': 'Outlook or skype is refusing to connect and load. Not able to either send or receive mail. Cannot sign-in to skype either and join meetings. Please fix this ASAP!',
    'Location': 'California, US',
    'Product': ['Outlook', 'Skype'],
    'Site': ''},
  'root_cause': 'Network Issue',
  'short_desc': 'outlook mail & skype not loading up',
  'ticket_id': 'tk1102413'},

{'attachments': None,
  'long_desc': {'Employee ID': '#110002813',
    'Issue Desc': '',
    'Location': '',
    'Product': '',
    'Site': ''},
  'root_cause': 'Mail Sync Issue',
  'short_desc': 'outlook not getting updated e-mail',
  'ticket_id': 'tk1210652'},

{'attachments': None,
  'long_desc': {'Employee ID': '#11207103',
    'Issue Desc': '',
    'Location': '',
    'Product': '',
    'Site': ''},
  'root_cause': 'System login issue',
  'short_desc': 'Cannot login to my system account',
  'ticket_id': 'tk11570091'},

{'attachments': None,
  'long_desc': None,
  'root_cause': 'Sharepoint Content Issue',
  'short_desc': 'Cannot create new website in office sharepoint',
  'ticket_id': 'tk1007186'},

{'attachments': None,
  'long_desc': None,
  'root_cause': 'Sharepoint Login Issue',
  'short_desc': 'Unable to sign-in to office sharepoint',
  'ticket_id': 'tk11050433'}
]
```

	root_cause
0	Network Issue
1	Mail Sync Issue
2	Network issue
3	Skype Share Issue
4	Sharepoint login issue
7	System login Issue
8	Sharepoint Content Issue
9	Sharepoint Login Issue