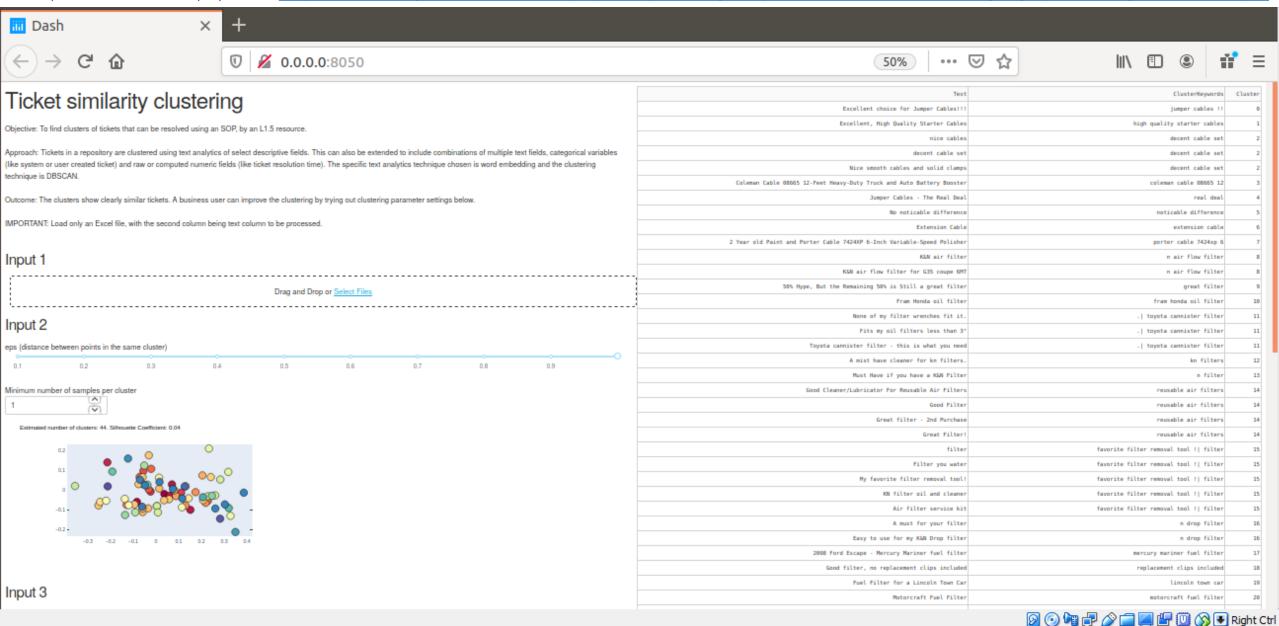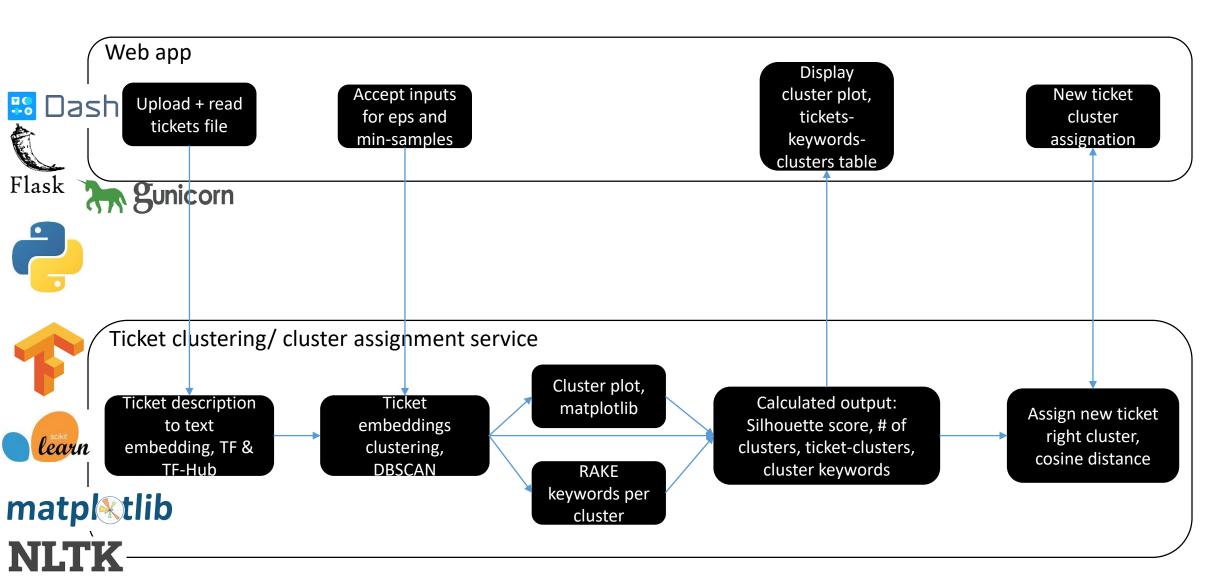# Optimizing IT Operations with Natural Language Processing - Implementation details

Compliment to white paper at: https://www.cognizant.com/whitepapers/optimizing-it-operations-with-natural-language-processing-codex4914.pdf

# Software Architecture



Web app

Upload + read tickets file

Accept inputs for eps and min-samples

Display cluster plot, tickets-keywords-clusters table

New ticket cluster assignation

Ticket clustering/ cluster assignment service

Ticket description to text embedding, TF & TF-Hub

Ticket embeddings clustering, DBSCAN

Cluster plot, matplotlib

RAKE keywords per cluster

Calculated output: Silhouette score, # of clusters, ticket-clusters, cluster keywords

Assign new ticket right cluster, cosine distance
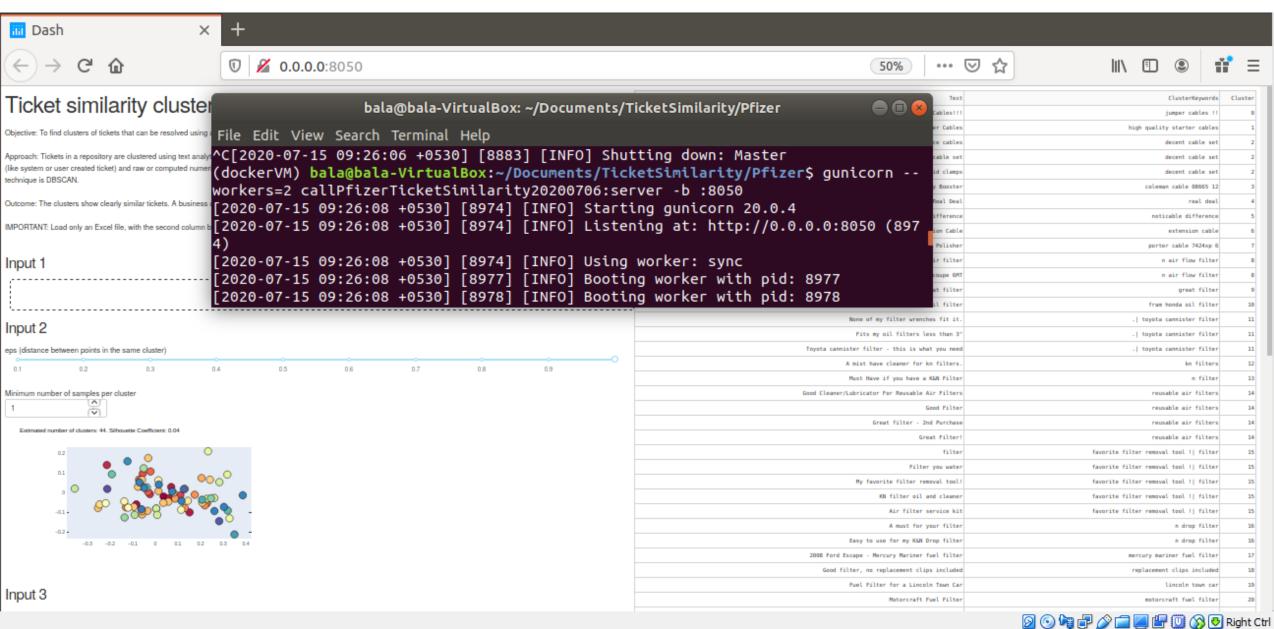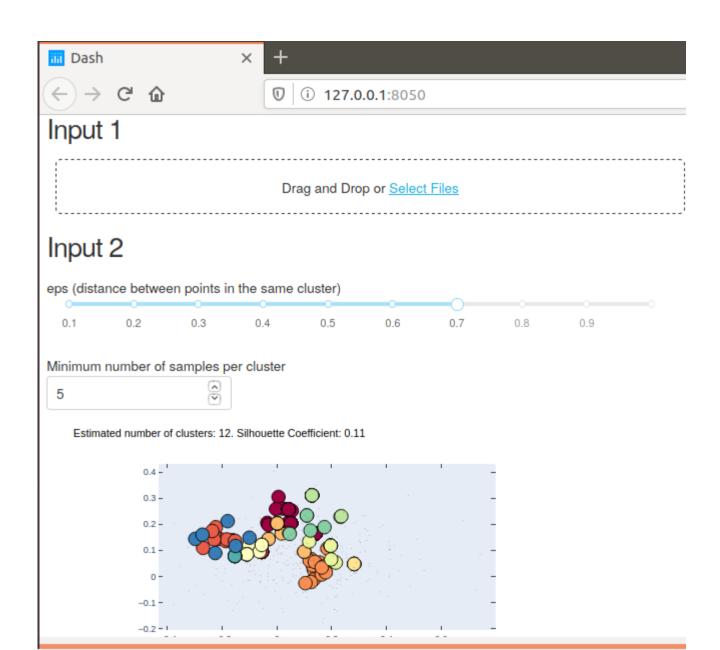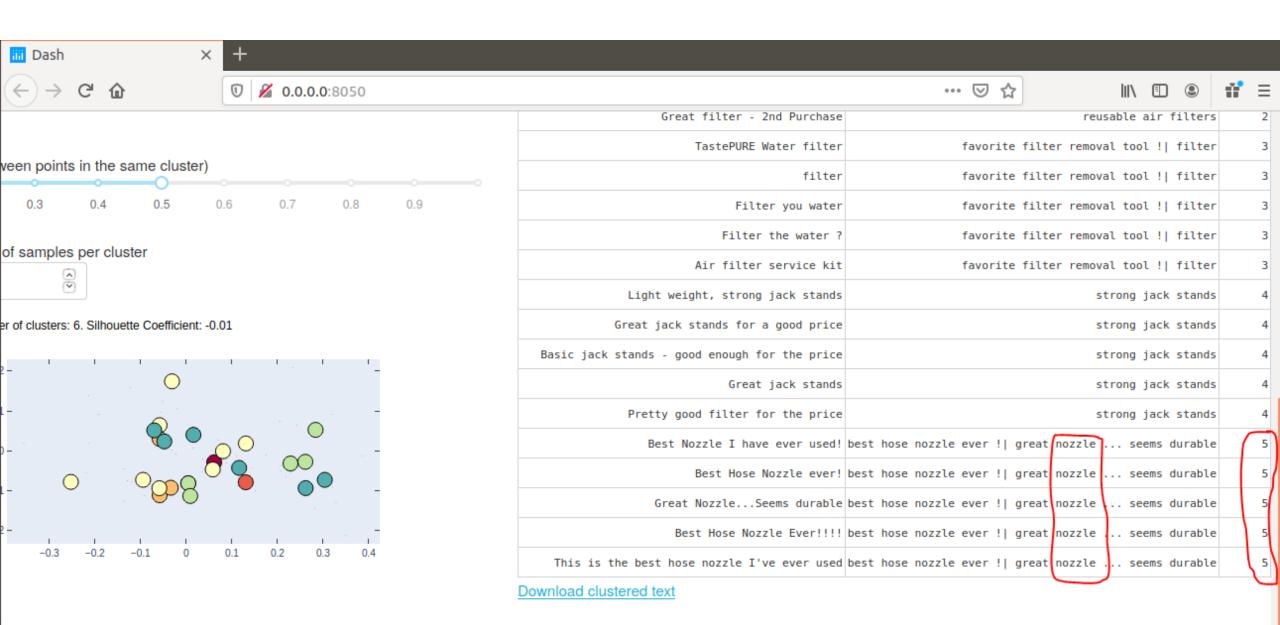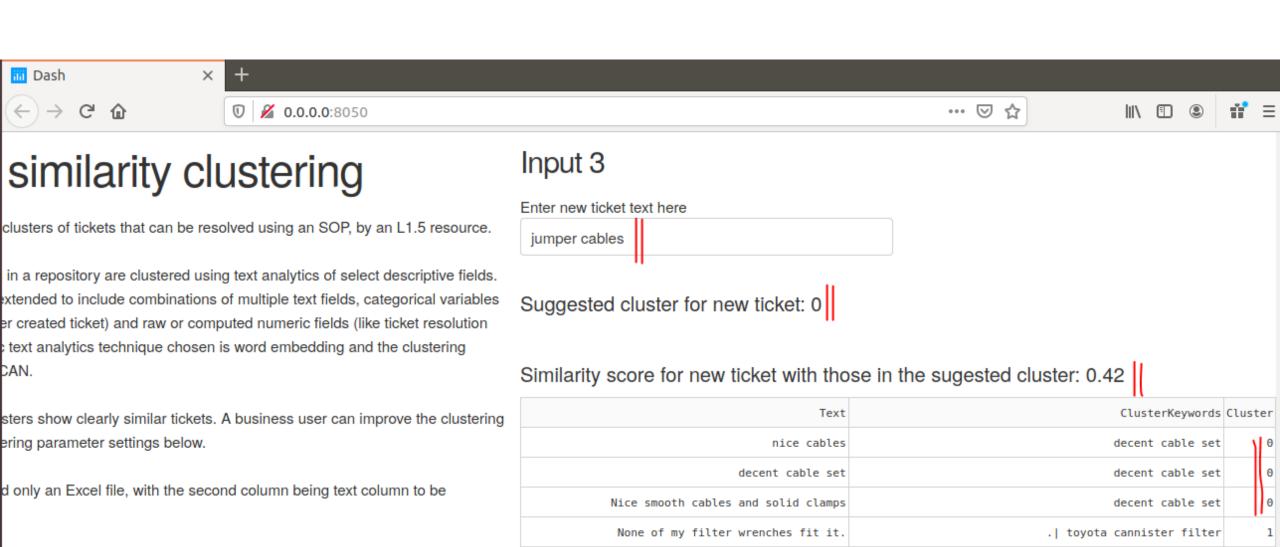
# gunicorn + flask

Dash web app running on local host. Allows uploading a ticket file, choosing clustering parameters and produces clustering output

# Clustered tickets - output

# New ticket cluster assignment with similarity score

0.0.0.0:8050

## similarity clustering

clusters of tickets that can be resolved using an SOP, by an L1.5 resource.

in a repository are clustered using text analytics of select descriptive fields.
extended to include combinations of multiple text fields, categorical variables
er created ticket) and raw or computed numeric fields (like ticket resolution
text analytics technique chosen is word embedding and the clustering
CAN.

sters show clearly similar tickets. A business user can improve the clustering
ering parameter settings below.

d only an Excel file, with the second column being text column to be

## Input 3

Enter new ticket text here

jumper cables

Suggested cluster for new ticket: 0

Similarity score for new ticket with those in the sugested cluster: 0.42

| Text | ClusterKeywords | Cluster |
|---|---|---|
| nice cables | decent cable set | 0 |
| decent cable set | decent cable set | 0 |
| Nice smooth cables and solid clamps | decent cable set | 0 |
| None of my filter wrenches fit it. | .\| toyota cannister filter | 1 |
| Toyota cannister filter - this is what you need | .\| toyota cannister filter | 1 |
| Fits my oil filters less than 3" | .\| toyota cannister filter | 1 |