

# Knowledge Analytics with AI technology

## AI Techniques Used in Knowledge Discovery and Analytics

- We adopt several AI techniques to perform semantic search. Designing knowledge graph starts with human reading relevant texts about an entity. AI will later help to design better knowledge graph.

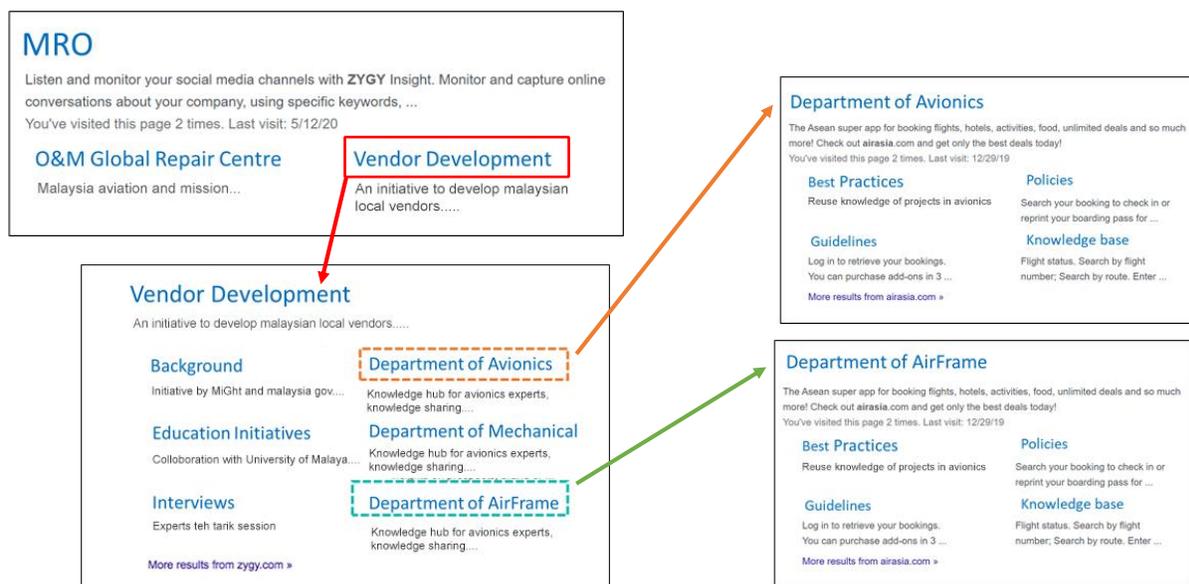
**“Semantic Search is a combination of Knowledge Graph, Natural Language Processing and index based Search Engine.”**

Semantic search highlight few important areas relevant to an entity (instead of just a link) in normal search. Those areas come from nodes of a knowledge graph relevant to the entity.

In order to map keywords to a node in a knowledge graph, a simple index-based approach will need to be extended. Since query keywords will need to point to any nodes, these keywords will be transformed into word embeddings first, before performing any lookup. Word Embeddings is a matrix of numbers representing the keywords. Producing Word Embeddings is a part of Natural Language Processing.

## Knowledge Analytics Use cases

To understand semantic search, we construct a sample user search simulation. Example, when a user queries **“MRO”** through Semantic Search, a sample search results is shown below:



The user can see the first level result under MRO contains two entities:

1. O&M Global Repair Center
2. Vendor Development

These 2 entities represent the context under MRO that are important to gain knowledge about MRO.

When clicking on Vendor Development, the user can see 6 different related knowledge contexts:

- a. Background
- b. Education Initiatives
- c. Interviews
- d. Department of Avionic
- e. Department of Mechanical
- f. Department of Airframe

Drill down further, user can click into Department of Airframe Development, and study about Airframe on:

- a. Best Practices
- b. Guidelines
- c. Policies
- d. Knowledge Base

User can search any keywords or phrases that are related to it such as vendor, airframe, development and more.

This is different that a normal index-based Search Engine. It only gives links (in web, URL links) to read, rather than contextual information about an entity or a thing.

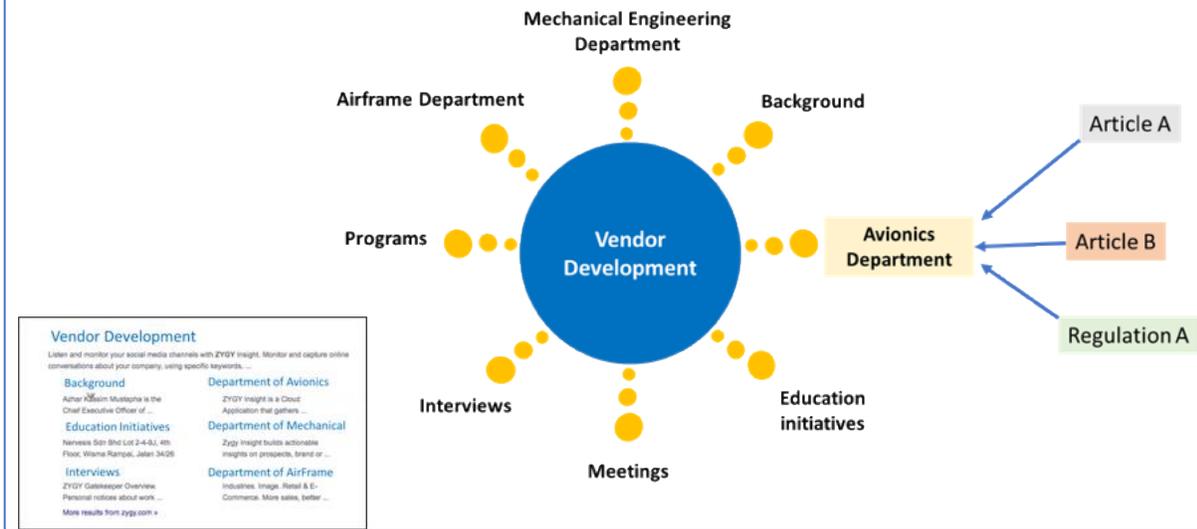
## Knowledge Modelling

In order to get a drill down knowledge shown above, we make a sample model. The model is an organizational knowledge on the department as shown below:

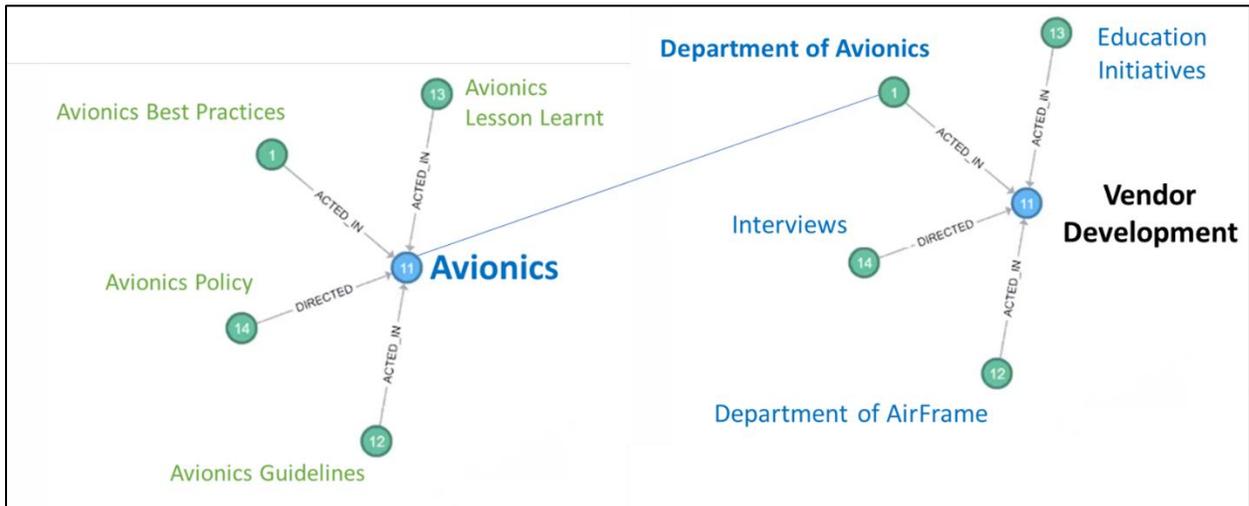


Below is a snapshot of Vendor Development graph, and potential result from a query related to the “Vendor Development”.

## Develop local vendors for aerospace sector



The child node on “Avionics Department” can be drilled further down as below:



Each node represents an entity, while the edge represents the relationship.