

## **Skills Ontology: What is it and why is it needed?**

Skills Ontology is a structured resource on skills. Ontology is not merely a collection or a list or a database. To better understand Skills Ontology its necessary to first comprehend the basic problem it aims to solve.

The talent marketplace suffers huge inefficiencies because of poor and inadequate information on skills. While demographic information such as age, gender, education, previous companies worked are captured fairly well. The same cannot be said of skills.

The information on skills suffer from one or more of the following issues:

### **1. Incomplete or partial information**

Take the example where one says that one is a Java Programmer. One could be doing Java programming in many different contexts and also with different levels of proficiencies. By saying Java Programmer itself is not enough.

In other cases vital and often decisive information is missing. For example a company may be wanting to hire a HR recruiter for its investment banking arm and receives a spate of resumes from the financial services space which may not meet its needs. The skills and knowledge desirable in recruiting for sales of Insurance products is different from recruiting for an investment banking analyst

(The problem often happens because we are able to easily articulate what is on top of our head but find it difficult to articulate those that are below the surface. Such below the surface articulation is enabled by probing (example Doctor asking questions on health) and suggesting options (like in diagnostic menu card))

### **2. Issue with Semantics**

Different people could call or write the same thing in different ways for example one may say he is into Digital Marketing. The same thing may be referred by others in different ways for example Internet Marketing, Web Marketing, Online Marketing. Thus the probability of matching a resume where one mentions "Web Marketing" to a Job requirement which mentions "Digital Marketing" is very low.

### **3. Textual and unstructured nature of resumes and JDs**

Parsers may do a good job on demographic information. However, when it comes to parsing skills they are inefficient given the complexity of words, the manner in which different people

write the same thing, the different forms and formats in which the resumes and JDs are presented.

(A recruiter's job gets exceedingly tough given the number and varying types of resumes they receive. To solve the problem they oversimplify by searching for keywords which leads to inefficiency)

#### **4. Lack of quantification in proficiencies**

The most common form of data that one would get from resumes and job descriptions alike is the experience level. This is easiest to articulate (say 5 years experience). But this itself is not wholly relevant or complete. Different skills are articulated in different ways when it comes to proficiencies. Assessing them on these proficiencies is another thing. So far we have matched only on keywords i.e. skills but not proficiency levels of skills – they are almost always not articulated either in resumes or job descriptions. But this is important. Let us say we want to chart out a training plan. We would want to know what is the gap level of skill of employees and which of the employees is having larger gap (so that we can focus on them on priority).

Learning from the ways the issues on language and articulation are handled and from an appreciation of the complexity of skills space, It's Your Skills embarked on creating the Skills Ontology.

In short the Skills Ontology tries to bring a rich resource where skills are organized in a such manner that we can articulate, analyse and infer information on skills in a universally understood, meaningful and simple manner.

#### **Highlights of Skills Profiler and Ontology**

##### **1. Skills Profile and not just skills: "*I love "Java" - is that coffee or technology?*"**

The focus is on "Skills Profile" and not just skills of an individual. The former is a structured pattern for capturing skills in various aspects of one's skills based on one's function. Adding skills randomly, as is commonly done, provides little insight to one's profile.

Example: IT skills like Java, Mobile Application Development, Puppet etc are widely mentioned by people with just about any technology background

In the case of IYS Skills Profile we prompt individuals to add skills in different areas such as technical skills, domain experience, role/ activities, behavioral skills, certification, knowledge etc. Each function attaches varying importance to each of these skill areas. For instance for a call center support agent we would want to know proficiency level in one or more languages, their proficiency in using software tools, their behavioral skills such as engaging customers, managing difficult customers and so on.

In another case say an Automotive Engineer we may want to know one's proficiency levels in Mechanical Analysis, tools used for FEA and CFD, the experience in designing or engineering of particular automotive system such as Power Train, Chassis. Contrast this with one just mentioning Automotive Engineering, Autocad, FEA as their skills.

**2. Widest coverage of functions: "*Been there done that*"**

The Skills Ontology covers almost all functions including Information Technology, various Engineering areas, Accounts, Investment Banking, Skilled Trades, Arts & Crafts, Sports and so on.

**3. In-depth: "*Non-Ferrous metals-Titanium-Welding-TIG-Argon.....*"**

In-depth Skills are captured layer by layer to get a comprehensive view of the Skills. For example we may want to know one's proficiency level in say Data Structure or Welding. It is not enough to ask how good one is either of these. The Skills Ontology goes on to list the different Data Structures and similarly different types of Welding. This enables a user to reflect on how much the potential candidate knows the different areas within Data Structures or Welding.

**4. Associations between clusters of skills: "*Doing audit in the quality function*"**

The Skills Ontology establishes relationships between different categories of skills. For example the category of Programming Languages is linked to Software Application as also Operating Systems, Development Methodologies.

In the case of say an Accounts & Finance, the category of types of Risks (Tax Risk, Compliance Risk, Governance Risk etc.) is associated with one performing Financial Control function. The category of risks is also linked in Banking function for one playing a role in Governance and Risk Management.

Such association of skills have profound impact on the Talent Landscape. Imagine a situation where we need to fill a position for Data Analytics in Healthcare domain. It is quite possible that knowledge of healthcare domain is paramount in this case and that of data analytics secondary. When we compare or match skills profiles of different people we may analyse and realise that there are many good (and some excellent) on Data Analytics while there are very few with very good Healthcare Domain expertise but almost all of who have no exposure to Data Analytics but within that there are a few who have used tools like Excel. Maybe these are better fit as they can be trained on Data Analytics while leveraging on their Healthcare domain expertise.

#### 5. Proficiency Levels: "*Expert but back seat driver?*"

To help capture proficiency levels IYS provides different methodologies. One is to normalize the scales and another is to use customized scales for different skills. In order to make analysis on skills such as matching skills of person to that of job or to identify gaps in skills, we use two or three kinds of scales. Where there is a graded nature of proficiency level we use four scale rating (after carefully researching of the different levels that are used by different players). In another context, for example to check if a person has a particular certification or not, we allow for Yes/No kind of rating.

The more important exercise is that of customizing the rating scale based on skills. The rating scale that is used in the case of a person's proficiency level in programming, proficiency in using a particular tool say Laboratory Information System, familiarity with standards say ISO, knowledge level of say Earthquake Resistant Structures need different kinds of scales to help understand the proficiency levels. Thus in the IYS Skills Ontology the legends for the various types of skills are customized or tailored to the skills.

#### 6. Constant updation: "*Heard of a new skill this morning...*"

The IYS Skills Ontology is backed by the most comprehensive relational database on skills. Yet it is constantly evolving itself as the skills space is in a state of flux and is continuously changing, as new skills emerge with time. For instance SDN (Software Driven Networks) is a recent skill phenomenon and growing fast.

IYS constantly updates the skills in the Ontology. It does so in two ways. First, by using tools to mine the web for skills and using Human Intelligence to select, classify and associate these skills. The other is by adopting User contributions with Governance from IYS model. IYS very well understands that by itself it cannot have a complete and correct

Skills Ontology. It banks on users to contribute to the skills ontology by suggesting new skills to be added. However the contributions will be vetted and added to the Ontology after appropriate classification. This way the Skills Ontology grows meaningfully to the benefit of all.

**7. Behavioral Skills :** *"Been doing that all my life..."*

IYS has taken an unique approach to profiling the "soft" side of skills profile. It places emphasis on two key aspects. The "Role" and attributes related to the role and the other being "Attitude". This structure has been arrived after considerable research on profiling the "soft" side of skills. After considering different approaches including competencies, psychometric assessments and generic behavioral skills, we have arrived at clusters of roles which in turn depend on certain attributes. The essence of this approach is that we all have, naturally, certain attributes and these are suitable for certain roles. Honing these attributes help us get better at playing these roles. More importantly, roles are perennial while technologies and functions change with time. Thus there is an attempt to give emphasis to honing one's attributes.

Similarly attitudes though underplayed normally have significant effect on our performance. There are two dimensions of it. In some cases absence of or weakness in certain attitude can be disabling to performance and on the other hand an outstanding strength in certain attitudes aid performance.

**8. Contextual references:** *"Did you say risk management in grocery delivery?"*

Consider Basketball. Different people could be doing different things in reference to Basketball. Many could be playing Basketball (at different levels of proficiency levels), some could be training others on Basketball. Then there are Basketball commentators, Writers on Basketball, Administrators of Basketball, Analytics on Basketball. So adding Basketball as a skill (as would most skills search or skills adding mechanisms) does not give us a proper picture. When we add context to Basketball such as playing, training, administration, analytics, writing we get better insight on the person's skill in Basketball.

Skills Ontology appreciates the importance of contextual references, captures them within the ontology and prompts the individual in expressing the context of a particular skill.

**9. Common structure / template:** *"Programming skills and skilled programmer"*

The Skills Profiler is similar for jobs and people. In some cases there is a difference in terminologies used. However, all other aspects are same.

This has very profound impact on talent acquisition and management. The common structure helps create simple precise skill level "data" which then becomes useful for analytics.

#### **10. Acronyms: "A to Z of skills"**

Phrases, where required also have Acronyms so that even when different people use either the full phrase or the Acronym they can be correlated. Example: Cisco Certified Network Associate (CCNA)

#### **11. Aliases: "Name is .... but you call me John"**

Many a time different people refer to the same thing in different ways or by using different words and phrases. For example Digital Marketing, Online Marketing, Internet Marketing, Web Marketing refer to the same thing. In the case of IYS Skills Ontology these are matched or normalized at the backend. So no matter which of these phrases one uses we will be able to match them

### **Use cases of IYS Skills Ontology and Skills Profiler**

#### **Job Sites**

Getting applicants to map their skills and proficiencies in the skills

Getting job providers to precisely map the different skills and proficiencies required for the jobs

Improved quantitative matching of skills of jobs and that of applicants

#### **Skills Inventory**

Organizations can map skills and proficiencies of direct and indirect employees thereby creating a skills inventory for the organization and perform analytics for decisions on deployment and sourcing

#### **Skills Gap Analysis**

Based on the job level and employee level skills profiling, skills gap can be analyzed at individual, organization unit and organization level. This will help better plan the development activities.

#### **LMS**

Mapping the different learning needs to the different learning opportunities is enabled by skills profiling

### **Employee Role Transition**

Best fit or close fit employees to open positions in the company can be analyzed based on the skills profile for that job and that of the different employees in the company

### **Skills Development**

Employees can be provided inputs on skills that they need to develop based on the skills gap in the current job or that for the positions that they are aspiring for. Further as the Skills Analytics draws insights from market like that of emerging skills closer to that of the individual's profile can be recommended for development opportunities.

### **Career Guidance**

The IYS Skills Ontology and Profiler can be very useful resource for one to understand what skills are normally sought in areas related to one's skills. It can help one identify the areas one may want to develop.

### **Data backed HR**

The rich data on skills and proficiencies in skills at job and people level forms a vital resource for HR community which is now able to draw better inferences through analytics and thus is able to make better impact on businesses.

### **Predictive Analysis on Skills?**

With large quantity of high quality data predictive analytics is a distinct possibility. While its still early days, we could move in this direction and thus be able to empower governments and institutions to focus on skills that would be required