SOCIAL NETWORK ANALYSIS

UNIT- I : INTRODUCTION

Social Network Definitions

- Practice of expanding one's business and / or **social** contacts by making connections through individuals through **social** media sites
- The use of internet-based social media programs to make connections with friends, family, classmates, customers and clients
- To build **social** relations with other people **who share similar personal or career interests, activities, backgrounds or real-life connections**

Social Network Analysis

- **Social network analysis** (**SNA**) - is the process of investigating social structures (mapping and measuring of relationships and flows) through the use of network and graph theories
- It characterizes networked structures in terms of *nodes* and ties, edges or links
- Nodes represents individual actors, people, or things within the network
- The *ties*, *edges*, or *links* represents relationships or interactions that connect them

SEMANTIC WEB Definitions

- Tim Berners-Lee inventor of WWW - **Web** as a whole can be made more intelligent and perhaps even intuitive about how to serve a user's needs

- W3C - The Semantic Web provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries

- The Semantic Web, Web 3.0, the **Linked Data Web**, the Web of Data, enables data to be linked from a source to any other source and to be understood by computers so that they can perform increasingly sophisticated tasks on our behalf

LINKED DATA Definitions

- **Linked data** is an approach to publishing structured data and sharing **data** on the **web,** so that it can be interlinked and become more useful through semantic queries

- a term used to describe exposing, sharing, and connecting pieces of **data**, information, and knowledge on the Semantic **Web** using URIs and RDF (Resource Description Format)

Relationship between SNA and Semantic Web

- Social Network Analysis (SNA) - has to understand and exploit on-line social interactions
- Semantic Web provides models to leverage these interactions in social networks

Limitations of Current Web

- Example:
- Who is Frank van Harmelen?
- Results – top 10 related to Frank van Haremelen, next Mark van Harmelen, town name Harmelen
- Giving specific query “Frank van Harmelen” - returns FVH of vriji university and other persons with same name
- Problems
- query becomes over-specified
- no guarantee it returns for whole name
- other format of name like FV Harmelen not recognized

Limitations of Current Web

- Example
- Show me photos of Paris
- returns – paris city, Paris Hilton popular person on web
- Problems:
- Associating keywords with photo difficult – computers cannot recognize objects in photos
- Search engine recognize based on context (name of file, text around image)

Limitations of Current Web

- Example:
- Find new music that I (might) like
- Need to think to pose this query
- Problems:
- Like image search understands by context, cant understand content of music
- Most music are shared illegal, not reachable by web (shared peer-to-peer)
- Music fast moving, web too slow to update
- Next option - Change search by band name or its alias – query by example
- This retrieve music by different artists similar – not discover new music

Limitations of Current Web

- Example:
- Tell me about music players with a capacity of atleast 4GB
- Problems:
- SE don’t know 4GB as capacity, music player properties and how to compare
- SE can search specific info not by description of item
- Problem of information extraction difficult (Ex. Making SE to understand to extract price amount)
- More than one names “capacity” and “memory”
- Altogether it is unreliable to use for product search

Inference – Lack of knowledge

- Knowledge gap between computer and user
- Technological difficulties – understanding natural language, to see the content of image or multimedia
- Lack of background knowledge – only human possess
- Extensive background knowledge (Ex. Beyond music database)
- Problem of information retrieval or aggregating information (Ex. Not all shop owners provide info’ or format not same to compile)

Solution – Semantic Way

- **Semantic Web** – apply advanced knowledge technologies to fill knowledge gap between human and machine

- Provide knowledge in a form (already available / additional background knowledge) readily process and reason with

- Solution for first query: (Who is Frank van Harmelen?)
- Attach semantic profile to personal web pages (Ex. FOAF)
- Search Engine resolves or report ambiguity and ask for additional info'
- Also used in Ads along side queries

Solution – Semantic Way

- Solution for Second Query: (Show me photos of Paris)
- Attach metadata to images
- Ex. Flickr allows annotate images with geographic coordinates
- Enables upload image & drag and drop in map, to see other users images also in map
- Enables visualization searching and based on hit to conclude query results
- Ex. used in multimedia research project - artwork housed in different locations
  - Stores metadata about images and artists
  - Retrieves artists of the style, other artists belong to the movement following the style, even results with different terms for the same style

Solution – Semantic Way

- Solution for Third Query: (Find new music that I (might) like)
- Background knowledge for music needed Ex. Online Radio (Music Genome project) **Pandora**
- Pandora - create vocabulary describing the characteristics of music (all attributes)
- Re-use music from other sources, most/recently played music from personal playlist, tracks new music updated by data providers

Solution – Semantic Way

- Solution for Fourth Query: (Tell me about music players with a capacity of atleast 4GB)
- Create minimal, shared, top-level schema in ontology language
- Semantic language allows for extensibility
- In the example query, vendor specific extension possible if described in existing shared element format
- Mapping between entire schema or part of a schema is possible
- Ex. Vodafone Live! Portal - catalog of contents provided by partners
- Captures commonatlities of mobile content in a single shared top-level schema
- Has flexibility partner to extend general schema
- If another operator wants to classify differently just change the mapping between 2 companies