**SNA-LAB ASSIGNMENT-2 Report:-**

**Name:-**

**Roll No:-**

# Table of Influential Papers: -

**Rank Paper Title Degree Centrality**

**Betweenness Centrality**

**Closeness Centrality**

1. Transfer Learning Based Multi-Objective…

0.0435 0.0 0.0435

1. Community Detection Using Non-Negative…

0.0373 0.0 0.0373

1. Detecting The Evolving Community Structure ...

0.0373 0.0 0.0373

1. Hybrid Evolutionary Algorithm…

0.0373 0.0 0.0373

1. Multi-Objective Optimisation Algorithm…

0.0373 0.0 0.0373

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# Report on Research Trends in Social Network Analysis:-

The most cited papers focus on **community detection in dynamic networks**, employing techniques such as:

* **Evolutionary algorithms** to improve clustering accuracy.
* **Multiobjective optimization** for balancing trade-offs in detection methods.
* **Hybrid approaches** combining evolutionary computation with machine learning.

Their importance stems from their ability to analyse large-scale social networks efficiently.

**Key Contributions Of Influential Papers:-**

1. **Evolutionary Community Detection in Dynamic Social Networks**
   * Introduces an adaptive approach to detect evolving communities over time.
   * Helps in tracking changes in social structures dynamically.
2. **Multiobjective Biogeography-Based Optimization for Network Clustering**
   * Uses bio-inspired techniques to optimize the accuracy of clustering.
   * Offers a novel method that balances diversity preservation and convergence.
3. **An Evolutionary Multiobjective Approach for Community Detection**
   * Focuses on multiple criteria like modularity and structural consistency.
   * Enhances performance using a non-dominated sorting approach.
4. **A Hybrid Evolutionary Algorithm for Community Detection**
   * Integrates machine learning with evolutionary computation.
   * Provides an efficient solution for large-scale networks.
5. **Memetic Based Online Community Detection**
   * Employs memetic algorithms for real-time community identification.
   * Useful for applications in recommendation systems and social media analytics.

These papers collectively push the boundaries of community detection methodologies, making them crucial for advancements in social network analysis.

1. **Research Clusters and Communities:-**

The Research can be grouped into three major clusters:

**1. Community 1: General Network Science & AI**

* Journals: Inf. Sci., IEEE Transactions on Knowledge and Data Engineering
* Focus: Network theory, machine learning applications in network science.

1. **Community 2: Soft Computing & Machine Learning**

* Journal: Soft Computing
* Focus: Evolutionary computing, fuzzy logic, neural networks for network optimization.

1. **Community 3: Mathematical Models & Evolutionary Computing**

* Journals: Computational Intelligence, Swarm & Evolutionary Computing
* Focus: Algorithmic approaches to community detection and network clustering.

**4. Trends in Social Network Analysis:-**

The following key trends have been observed:-

* **2010-2015:** Early focus on static network structures and basic clustering methods.
* **2016-Present:** Shift towards dynamic analysis, prediction models, and real-world applications.
* **Recent Innovations:**
  + **Influence propagation:** Studying how information spreads in networks.
  + **Machine learning in SNA:** Using deep learning to predict community formation.
  + **Real-life applications:** Marketing analytics, cybersecurity, social media recommendations.

These trends indicate that SNA is evolving beyond traditional graph theory into interdisciplinary applications involving AI and big data.