## *Disclaimer: The following document is intended to provide general guidance on the use of this template. Please refer to the template for the specific format and content requirements. You may also add additional information to the template as needed for your specific progress.*

**Individual Report**

**Member name:** [Rahul Nayak](mailto:rrnayak@asu.edu)

**Evaluated by:** [Anuranjan Dubey](mailto:adubey37@asu.edu) [Gautham Vijayaraj](mailto:gvijaya6@asu.edu)

**Date: 10/13/2023**

**Tasks Assigned:**

* *Preparing Weekly Report*
* *Preparing individual progress report*
* *Preparing individual in-depth report on the paper “SybilBelief: A Semi-Supervised Learning Approach for Structure-Based Sybil Detection”*
* *Evaluating* [Avani Mundra](mailto:amudra@asu.edu)*’s individual progress and in-depth reports(if any)*
* *Reading Not so important papers*
* *Visiting the writing center*

**Summary:**

* This week I was responsible for visiting the writing center. I got my report reviewed in the writing center and incorporated the changes as per the suggestions.
* I also continued studying about various types of suspicious activities that go on social media this week. I Sybil attacks that happen on social media.
* The paper presents SybilBelief, a semi-supervised learning framework, to tackle the challenge of detecting Sybil nodes in social networks. Sybil nodes are malicious entities aiming to deceive the network, making this method relevant to identifying suspicious activities on social media platforms.
* SybilBelief is designed to incorporate both known benign and known Sybil labels, which are users with verified trustworthiness or malicious intent.
* The framework included in this paper employs a probabilistic model based on Markov Random Fields (MRFs) to propagate label information and calculate the likelihood of nodes being benign. This enables both Sybil classification and ranking
* Experiments show that SybilBelief is robust to factors like network structure, the number of labels, and label noise, and it outperforms previous Sybil classification and ranking methods.
* SybilBelief demonstrates the ability to be effective with only a small number of labeled nodes per community, making it practical for real-world applications.
* The paper provides insights into how the structure of real-world social networks impacts the detection of Sybil nodes.

**Outcome:**In summary, this research represents significant progress in using data mining and machine learning techniques to address the issue of detecting suspicious activities on social media, particularly in the context of Sybil attacks where malicious entities impersonate multiple users. SybilBelief, with its probabilistic model and resilience to noise, offers a promising solution for identifying and mitigating security threats on social media platforms.

**References** *(with citation)*

[1] N. Z. Gong, M. Frank and P. Mittal, "SybilBelief: A Semi-Supervised Learning Approach for Structure-Based Sybil Detection," in IEEE Transactions on Information Forensics and Security, vol. 9, no. 6, pp. 976-987, June 2014, doi: 10.1109/TIFS.2014.2316975.

**Evaluation of Report  
  
Evaluation by:** [Anuranjan Dubey](mailto:adubey37@asu.edu) **Date:** 14th October 2023

**Is the weekly member report complete with all the major result(s) of the paper(s)? If not, provide as many examples of the major result(s) missing in the written report as possible. (in bullet form). [within 100 words]**

* Yes, the weekly member report is complete and In this study, SybilBelief is introduced as a semi-supervised learning framework for finding Sybil nodes in social networks.
* It uses a probabilistic model based on Markov Random Fields to propagate labels and that is performing better than earlier methods.

**Is each section of the guidelines sufficiently completed? If not, point out what is missing. [Normally within 40 words].**

Yes, the guidelines have been sufficiently followed.

**Is the quality of this version of the written report satisfactory? If not, then why not? [Normally within 40 words]**

Yes.

**Approved by:** [Gautham Vijayaraj](mailto:gvijaya6@asu.edu) **Date:** 14th October 2023