# Safeguarding People against Social Media Frauds during the COVID-19 Oxygen Supply Crisis in India

**A. Kapur**
Vellore Institute of Technology
akapur258@gmail.com

**Himanshu Thakur**
Vellore Institute of Technology
scihimanshu10@gmail.com

**Harsh Kumar**
University of Toronto
harsh@cs.toronto.edu

## Abstract

During the second wave of the COVID-19 pandemic in India, the drastic increase in the number of COVID cases led to a positive demand shock for medical grade oxygen. However, an inadequate supply of oxygen created a huge supply-demand gap, making people resort to social media platforms in search of oxygen cylinders for their next of kin. While it alleviated problems for the masses, these desperate posts for oxygen attracted fraudsters, resulting in numerous people not getting oxygen on time. In this paper, we present research problems which arise from this crisis and argue that deep learning can be instrumental towards their solutions. Also, we propose a graph deep learning based framework to elucidate a possible solution and incite further research in the domain.

## 1 Introduction

### 1.1 Developing world and Pandemic

The COVID-19 pandemic had far-reaching effects throughout the whole world. However, the manifestations of those effects proved to be distinct in different regions. Due to differences in the intensity of pandemic and handling capability present, various region-specific issues were seen as a result of COVID-19 spread. This means that problems seen in one country may not even be a concern worth considering in another country. As a result, such issues can go unnoticed on the global stage owing to relatively low influence and awareness about them. For instance, a large population, unequally distributed health infrastructure, and a highly contagious infection running wild can quickly overwhelm the people of a country, which is what happened in India. Then the resulting situation created distinct local variations of global challenges which were not seen before.

### 1.2 Background

The second wave of COVID-19 in India during the months of April-May 2021 was a particularly devastating one. Owing to a dramatic increase in the number of COVID cases, there were drastic consequences in terms of resource crunch and logistics of the available supplies. Many of those testing positive for COVID-19 were developing serious symptoms and needed immediate medical care. This manifested as massive demand for medical-grade oxygen cylinders to stabilize the worsening symptoms of the patients. The demand not only came from hospitals but also from individuals in private care centers because the number of infected people far exceeded the capability of hospitals to treat. In addition to this, people were also quarantined at home, so the spike in demand for oxygen cylinders was all-encompassing.

Thus an immediate supply-demand gap for medical grade oxygen was created. As authorized institutions were no longer able to satiate the demand, people started turning to social media to spread their message for help from the community. This proved to be instrumental for a lot of people

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who could get the supplies needed in those critical moments. However, some mischievous elements exploited this as a way to dupe people. These fraudsters would target the vulnerable people who needed oxygen supply for their dear ones and had posted on Twitter about the immediate requirement of oxygen to spread their message to the community, fraudsters would reply to their tweets promising them oxygen supply at exorbitant prices and would demand a token amount be paid to secure the supply. During those critical times, unsuspecting people would immediately agree to secure the oxygen supply for their sick loved ones who needed this scarce resource. After receiving payment, they would disappear. Since the victims were more concerned with securing oxygen supply for their loved ones rather than pursuing these fraudsters, often they would face no consequences and continue unabated.

## 2 Problem statement

To safeguard oxygen seekers against scams and identify potential fraudsters based on the contents of their tweets as well as the relationships between users and their tweets in the network graph.

**Scope** Specifically, given a large corpus of social network data comprising of users and their posts, the intention is to learn model(s) which achieves the following:

1. Predict if a post is a scam or not.
2. Estimate if a user will be scammed or not based on their post content and relation to other users.

**Feasibility** Given widespread availability of social media data from APIs and existing datasets, the proposed research can be pursued with minimal overhead. There is a requirement of labelling the dataset available in context of the problem. The difficulty of acquiring labels for such a large amount of data can be further relieved by using label efficient learning techniques and active learning. Moreover, significant literature in relevant fields like social network data mining, sentiment analysis, text classification already exists which further eases the adoption of this subject.

## 3 Potential Solution

A heterogeneous graph of users and their tweets can be constructed using massive social network data mined from the Twitter API. This graph can then be learned to perform node classification and link prediction to predict users susceptible to scams and posts which are likely fraudulent. Broad steps involved,

**Data Annotation** Utilizing the set of keywords (or) hashtags relating to the Oxygen supply crisis, we extract tweets from Twitter based on which we classify - people who have been scammed, people who talk about someone being scammed, people looking for oxygen for themselves, people looking for oxygen for others and other.

**Graph Construction** We construct a heterogeneous graph consisting of users and their tweets. Further we enrich it by running Named Entity Extraction over tweets. The final graph has the following configuration: a. Person node - represents an actual Twitter user. b. Topic Node - represents anything being talked about. c. Person attribute nodes - represent twitter profile-related interests and other information of a person.

**Graph Deep Learning** We now utilise a graph convolutional network to learn the graph for node classification obtained from the previous step. Using the text embedding of each tweet obtained from a pre-trained model like BERT or FastText, we intend to learn a function that maps these to one of the five predefined classes. Based on the classes obtained, we can then write queries on the graph to find scam nodes and people susceptible to it.

**Additional Analysis** Utilising clustering, we can find groups of people who were scammed. The morphology of the final cluster can explain the reason for the susceptibility of certain people to scams. Geo-referenced visualisation can show the relation between various regions and the shortage of beds/ oxygen. Also, utilising a Temporal Graph Convolutional Network, we can forecast the susceptibility of a post ahead in time.

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