Research Diary

The device is ready with a design for manufacture and the clinical testing are currently running. The team is looking for scale-up manufacturers and deployment in various places.

As per ICMR guidelines, Nemocare Raksha will be able to track symptoms such as cough, fever, respiratory illnesses such as shortness of breath, heart rate, SpO2, respiration rate, body temperature, cough sounds, Geolocation of the subject and a few passive symptomatic data.

Nemocare Raksha can:

(a) Provide disease surveillance by remote monitoring quarantined patients with suspected COVID-19 and detecting signs of disease progression

(b) Remotely monitor diagnosed cases to learn how this new strain of the virus affects the body

(c) Geotagged remote symptoms monitoring of most vulnerable /prone subjects and aid in timely reporting

Post the initial academic study, based on the results we have further designed with the help of UNICEF (AP and Telangana state office) studies to evaluate the health outcomes of the usage of our solution in both public and private setups.

Manoj Sanker and Pratyusha Pareddy, Cofounders of the Nemocare Wellness Pvt. Limited are part of the one-year Fellowship in Healthcare Entrepreneurship at CfHE, IIT Hyderabad. They have been winners of various prestigious International grants like the Bill and Melinda Gates Foundation Grant and Indo-US Millennium grant. The Company has been supported by BIRAC BIG grant and CfHE seed grant, Pratyusha Pareddy has won several awards including the Niti Ayog Women Transforming India (WTI) 2019 award and the BIRAC TIE Women Entrepreneur Award 2019.

Prof. Renu John
Head - Department of Biomedical Engineering &
Faculty In-Charge - Center for Healthcare
Entrepreneurship (CFHE)

"Work on Effective Framework for Managing supply and demand post lockdown using Federated Learning"
KID: 20200119

Post lockdown when the situation moves towards normalcy there can be supply shock on the local grocery store as believed that there will be a new lifestyle after this lockdown. Rather than people going directly to the store will prefer ordering the grocery using other means so that they can maintain social distancing to avoid the situation of COVID-19. We propose a solution where consumers can be able to place the order via chat or phone to the local grocery store. The other problem arises here is the inventory management for the stores as the local grocery stores don't know all the demand for goods by the people post lockdown. If they are not able to maintain the proper inventory management for their stores it can affect the supplies of groceries to the people. Good inventory management revolves around a single contradiction: keeping enough stock in the warehouse to ensure the business keeps moving but not enough stock to drain its limited cash reserves.

Usually to avoid such kind of circumstances large stores have their own machine learning-based inventory management system with the help of which they can maintain the inventory stock in their stores. Since they have a large amount of customer data they can train the system good enough to perform well in real-time scenarios. But the same is not the case with small local grocery stores. The customer base of these local stores is not huge to train a model that can perform well in real-time scenarios. To overcome this situation one can have a centralized system where all the local grocery stores share their data to the central unit and the central unit will train the system using the data accumulated from all the grocery stores. After that, all the local grocery stores can use the same system that is prepared by the central unit. By sharing data to the central unit creates a sense of invasion of privacy for the local grocery stores. Being in this competitive world no one wants to share its customer's data as the other vendors can take benefit from it.

Research Diary

Federated Learning is a distributed machine learning approach that enables model training on a large corpus of decentralized data. Federated learning enables the training of a model from data that are distributed across multiple nodes/devices while keeping the data private. We can use federated learning for the local grocery store to train its inventory management system without sharing their data among vendors. This way local grocery stores can never have a sense of invasion of privacy. Federated Learning is the approach where all the nodes have their own data and instead of sharing the data to the server, all nodes train the model locally on their own machine and then share the model to the server. After receiving the trained model from all the local grocery stores, the server will aggregate all the models at the server and share the same to all the stores to use. The major problem with the centralized system is the single point of failure if the server fails the whole system fails.
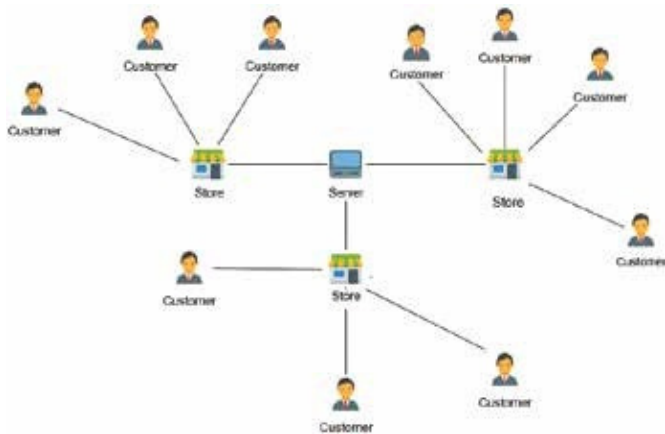

Figure 1. Server Based Inventory Management System

To overcome a situation like this we can come up with a federated learning system that doesn't include any server. All the nodes are connected to other nodes in the peer to peer communication or by other network topology. In decentralized FL all the local grocery stores rather than sharing the model to the centralized server will share the model to all other grocery stores. A store after receiving the data from other stores can aggregate the model and use it.
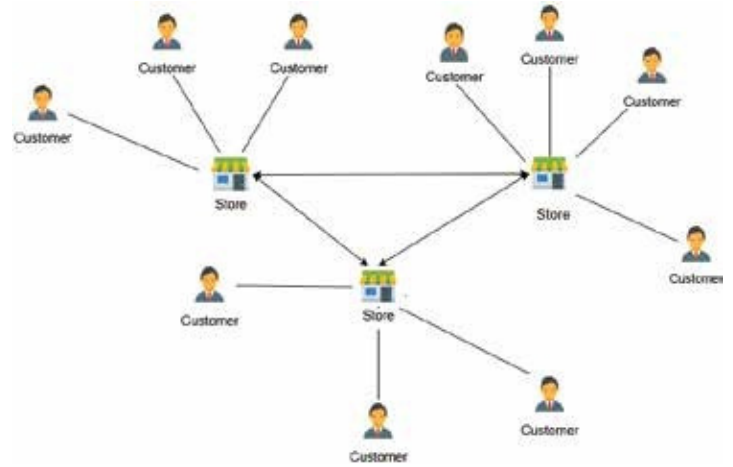

Figure 2. Server-less Inventory Management System

Basically, Our main aim is to streamline the supply chain management of local grocers post lockdown and help them keep up with the demands of customers by predicting every user's shopping list and by providing suggestions. We aim to help customers by making ordering groceries extremely convenient just by accessing a common portal and place their orders.

Dr. Sathya Peri
Associate Professor,
Department of Computer Science and Engineering

Dr. Vineeth N Balasubramanian
Associate Professor,
Department of Computer Science and Engineering