

Forecasting Manpower Demand during Covid-19 Pandemic using Artificial Intelligence Predictive Analytics Tools

- **Need for this project**

The COVID-19 pandemic has disrupted our lives and the economy in a big way. The industry is operating in high uncertainty, and the industry managers have to make tough decisions with respect to human resources planning. The industry needs accurate manpower demand forecasting, which is the process of estimating the future quantity and quality of people required. An accurate manpower demand forecast helps to facilitate an in-time training of the personnel, which is a long-term investment for the organization.

Traditionally, the basis for manpower demand in any organization has been the annual budget and its long-term corporate plan. However, due to the impact of pandemic on the economy, the manpower demand cannot be estimated using traditional models. The forecasts for manpower demand must consider several dynamic factors, such as competition (both domestic and international), the fast-changing economic climate, the changes in technologies, and the social environment. With the emerging technologies and the Internet of Things (IoT), it is possible to capture huge amounts of data, which could be used for human resources forecasting.

In this project, we will develop artificial intelligence (AI) models to make accurate demand forecasts for manpower in every sector of the economy, using job posting data supplied by the Ministry of Labour, Training and Skills Development for workforce in Windsor-Essex region. We will develop multi-layer feed-forward artificial neural network (ANN) models for demand forecasting of the workforce in the region. The ANN models do not require specific assumptions on the underlying data generating process, and are highly accurate and very useful for forecasting, when the theoretical model or the underlying relationship is not known.

- **Expected outcomes**

The forecasts obtained from the ANN models will provide timely forewarning information of likely shortfalls of the workforce, so that the policy makers and industry managers can adjust training requirements both in post-secondary educational institutions, and in the industry to ensure adequate and proper supply of skills, and mitigate the damaging effects of the shortages.

- **Specific industries, sectors, or businesses that will benefit**

The results of our project will provide access to very vital information to the affected businesses in the Windsor-Essex region, which include: travel-related businesses, restaurants and entertainment sector, tourism-related businesses, and the manufacturing sector that rely

on global supply chains so that they can plan their training resources with minimum disruption to their activity. The results of the ANN models will also help the post-secondary educational institutions to plan and modify their program offerings so that the industry is ensured of an adequate and proper supply of skills needed.

- **Partners who will be involved in this project**

We require large amounts of jobs related data, and data about employment trends, employee's turnover, the productivity of employees, and growth and expansion of the organization. These data will be obtained in collaboration with the Ministry of Labour, Training, and Skills Development. We will also establish contact with a number of businesses in order to validate the results of our model.

- **Project Theme:** Support business and essential industries