TASK P - 1.1

Case study of AI Solution

Sale prediction using AI in restaurant industry

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1. **What is the domain and specific application you have selected? (e.g., domain: Healthcare, application: COVID-19 detection using CT imaging. Please provide the application other than this example.).**

The domain selected is **restaurants** and application are **sale prediction**.

Artificial intelligence has many applications in restaurant business and AI systems are still under development and revolutionising the way food industry works.

2. **Why is it important to have AI solutions in this domain? Provide the reason and justification (minimum 100 words).**

AI solutions for sale prediction in restaurant business is important for several reasons:

- o **Inventory management:** If the business has an accurate sales prediction, then business can maintained optimum level of inventory in stock . There will be less wastage of perishable goods and also stock of non-perishable inventory items will be managed optimally.
- o **Reduction in production cost:** As discussed above as well, sales prediction will reduce food wastage as the restaurants will not be over pre preparing the menu items and thus saving the wastage in the business.
- o **Menu Optimization:** Restaurants will be able to predict which of their menu items are favourites among its customers and will be able to make changes to its menu and also plan for the menu accordingly.
- o **Labour Optimization:** Sale prediction will help restaurants to hire and call best number of staff at best hours. So that restaurants are able to serve customer demand and avoid over staffing.
- o **Cost/Financial Management:** Once restaurants have accurate prediction of sale, restaurants will be able to manage finances better as it will know how much stock and staff is required in advance. This will lead to profit maximization.
- o **Customer Satisfaction:** All the above factors will contribute to customer satisfaction as the services offered will be quick. Chances of a restaurant running out of menu items will be very less.

3. **What is the difference between traditional applications and AI based applications in this domain? (Minimum 100 words)**

Traditionally sale prediction in restaurants in done by collecting data and then statistically deriving predictions manually. This gives us a prediction based on previous sales data but it does not take into account other external factors also it is very labours to derive these predictions.

AI based applications can take in more features that effect sale prediction especially external factors such as weather data, events, customer preferences and number of their visits, location of restaurant and population living in the area. AI systems can handle large volumes of data and can give us real time predictions. They can easily adapt to new data. They can also adapt over time and become more accurate and effective as they are provided with more data.

Thus because of above qualities of AI applications give more personalised predictions and experience to the user than any traditional applications with better accuracy and making manual labour required much lesser.

4. What are the challenges and Strength of AI in that domain? Please refer to 1.5 Strength and challenge of AI models in the unit site and provide answer based on the strength and challenges discussed there. 10 items for strength and challenges are discussed, and you only need to discuss 6 out of 10 of them (Minimum 200 words).

Challenges:

- Considerable data and compute power: A considerable volume of data will be required to make such accurate predictions and to develop an AI model high level of computing and advanced data management capabilities are required. Restaurant may have to invest in infrastructure for this or use services of external provider.
- Data often changes: Data used at the start, when the model is first developed may change over time, example: demography, event dates. These external factors if fed to model incorrectly will impact the predictions made by ML model and thus give us incorrect results.

Strengths:

- Speed, power, efficiency and intelligence: AI models are quick to deliver predictions. Like customising a digital menu as per individual customers preferences, thus giving a personalised experience. Human intervention is removed in most parts. As AI systems are able to process a large amount of data they can give us better insights and are very powerful that would humanly very difficult.
- Pervasive: ML models can be applied to a variety of data sources through cloud data providers. These models can benefit to many users as it adapts to new data sets easily without much human intervention and can predict for any other data sets provided by the user.
- Capacity to achieve business goals: AI models add unique functionalities that is difficult to do with traditional application. An AI model is able to learn to enhance the process. Thus, predicting much accurately the sales of a restaurant in upcoming months.
- Non specific and unexpected situations: If restaurants are faced with data that they are uncertain of how to use to predict sale, AI algorithms can help discover meaningful insights. Also, same applies if there is new data that that restaurant has started to collect, AI will help discovering new patterns and give better results quickly.