AI ROBOTS IN SMALL GROCERY BUSINESS - ANAND KHANNA

1. Problem Statement

AI Product/Service Prototyping for Small Businesses. (Solo Project)
- Identify small business sectors where AI can be applied and come up with sellable AI product/service ideas
- Come up with **abstract product framework/model.**
- Prepare a **detailed report** on how you will implement it

2. Market/Customer/Business Need Assessment

- Business Need – This helps in cost cutting as the money used in hiring man power, reduces breaks of employees for food and water, moreover there is no fatigue as compared to regular working employees. Other benefits include no sick leaves or personal leaves (CL and etc).
- Customer Need – The customers do not have time, nobody waits for 5 mins at a grocery shop just to know whether there is a packet of washing powder still available or not. The customer tries to save their time and getting to know about the inventory real quick helps in saving their time and build trust towards the shop.

3. Target Specifications and Characterization (your customer characteristic)

- Customers short on time.
- Customers looking for a variety of products at one time.
- Customers looking for a particular product only.

4. External Search (online information sources/references/links)

https://itrexgroup.com/blog/supermarkets-of-the-future-deploying-ai-in-grocery-store/#

5. Bench marking alternate products (comparison with existing products/services)

Kroger, an American retail company. When consumers activate the store's mobile app while inside, sensors detect them and send a personalized selection of items together with the prices via their preferred communication channel (e.g., video, voice, text).
Comparison – The app can offer marketing emails considering not only consumers' taste but also their past shopping behaviour. Predicting which items every shopper is likely to run out of based on their previous purchases and suggests these items as well.

6. Applicable Patents (Patent of Tech/Software/Framework etc you are going to use in your Product/Service idea)

1. Robot design
2. App ML Model (software)

7. Applicable Regulations (government and environmental regulations imposed by countries)

1. **Human unemployment:** Using industrial robots shall result in retrenchment of workmen,12 mostly those who are employed in performing repetitive tasks. Retrenchment is defined as termination of workman's services for any reason whatsoever, except termination due to disciplinary action, retirement, non-renewal of employment duration and continued ill-health.
2. **Liability for damages:** Default in robotic software and hardware can lead to unwanted results, causing certain level of damage, and raising questions on civil as well as criminal liability.
3. The robot shall not harm a human, or by inaction allow a human to come to harm. The robot shall obey any instruction given to it by a human, and the robot shall avoid actions or situations that could cause it to come to harm itself.

8. Applicable Constraints (need for space, budget, expertise)

Space -
1. A supermarket like area and properly maintained inventory for the robot to access.
2. A ramp for the robot to bring the article asked by the customer.

Budget -
1. The setup for the robot, ramp and the tablet for ordering.
2. App deployment costs.

Expertise -
1. The salesman should be able to use the tablet.
2. Giving commands to the robot for inventory.

9. Business Opportunity

This will increase customers as to explore the new technology and also give an increase in repeated customers due to the app thar provides reminders and insights. It also reduces time required to complete the transactions.
Dynamic pricing The dynamic pricing concept revolves around using machine learning and artificial intelligence in shopping to determine the best pricing strategy for different products. For this, algorithms analyze data from different sources, such as historical sales, competitor prices, stock levels, and special occasions. One of the tactics of dynamic pricing is cross selling a discounted item (e.g., buns) with a complimentary product (hot dogs) at a full price. This strategy helps reduce food waste by lowering the prices of goods nearing their expiration date.

10. Concept Generation (process of coming up with Idea)

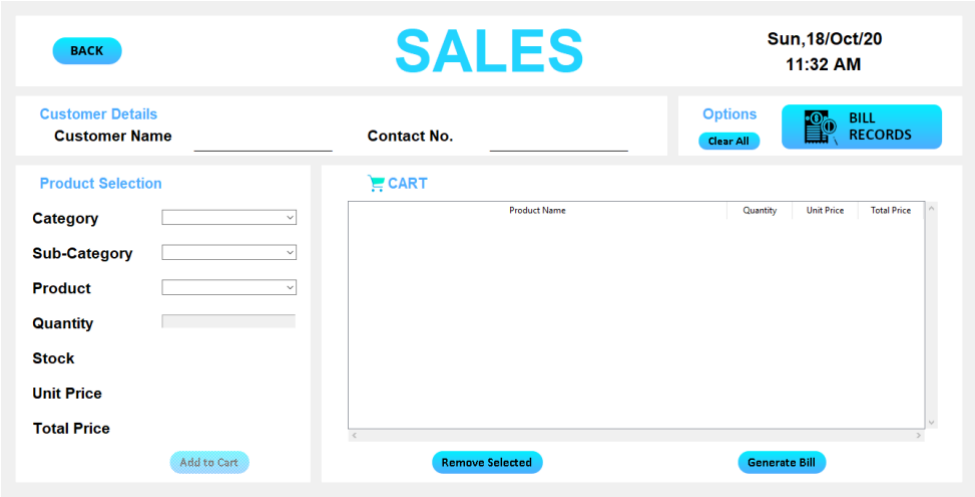
The idea occurred after continuously waiting at different shops just to know that the product I asked for was not available, this wasted my time aswell as other people's and the shopkeepers time. To prevent this I came up with the idea, this will lead to increase in sales for the shopkeeper as he/she will be able to deal with more customers. Watching the shopkeepers pay money to employees which results in lesser profits for them, as this would be a suitable one time investment.

11. Concept Development (Brief summary of Product/Service will be developed)

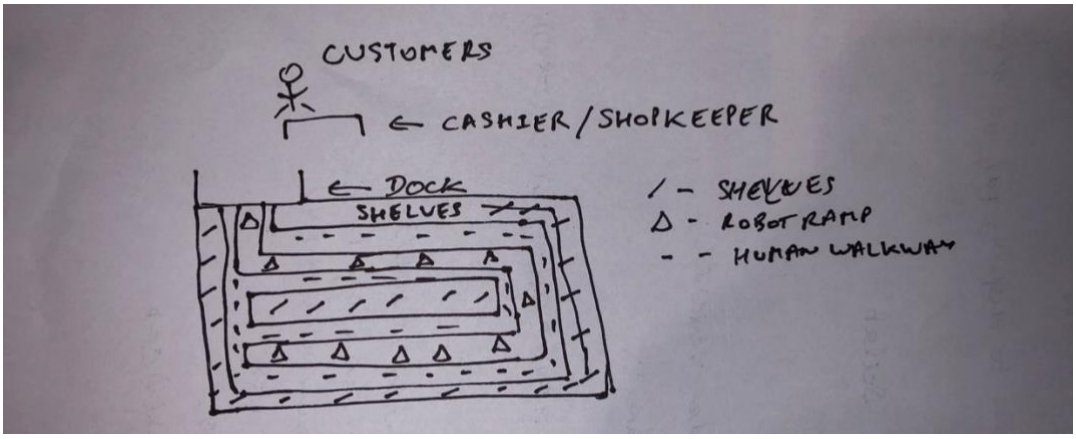
The AI robots use a robotic arm to go in the store and pick out the things that have been ordered/placed by the shopkeeper on the counter, the robot is already equipped with the data about where the item has been kept. The cashier puts the items in his tablet and the robot brings the desired products, the tablet includes the inventory and is edited on it's own as per orders. The above can be complimented with an application that the user get in a queue and type in or speak their order which is then completed by the robot to the cashier for billing, moreover the app suggests different products according to the user's previous purchasing habits.
Step 1 – Adding the inventory
Step 2 – Billing related

All of this to be trained to the machine which should scan the bar code and update the inventory on it's own.

For Sales it will look like



12. <u>Final Product Prototype (abstract) with Schematic Diagram</u>



13. Product details

- How does it work?

The Shopkeeper creates a bill for the person using the GUI and then the robot collects all of the same items from the inventory and gives it on the dock for the customer to pick up.x

- Data Sources - Algorithms, frameworks, software etc. needed
    1. Item cost price
    2. Inventory program (billing)
    3. Robot setup – ramp arms etc

- Team required to develop.
    1. Machine learning engineering
    2. Business analyst
    3. Software developer
    4. Cloud engineer
    5. Data Researcher

- What does it cost? Etc
    1. Only for hardware (robot, ramp)
    2. Creation of software