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DISPERSE SLOT SYSTEM FOR STREAMLINED DISTRIBUTION IN CIVIL SUPPLIES DEPARTMENT A PROJECT REPORT

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Abstract: Public distribution system is a government-sponsored chain of shops entrusted with the work of distributing basic food and non-food commodities to the needy sections of the society at very cheap prices. Wheat, rice, kerosene, sugar, etc. are a few major commodities distributed by the public distribution system. Fair Price Shop does not open every day, nor do they keep regular hours. Even on the days that the Fair Price Shop is open, ration card holders have to stand in long queues. As social distancing was not followed at several fair price shops during the first phase of public distribution, the Civil Supplies Department has issued paper token to the beneficiaries, mentioning the date for them to avail food grains and relief fund. The proposed project aims to modernize the Public Distribution System (PDS) in India, specifically addressing challenges faced by Fair Price Shops. This not only saves time for beneficiaries but also aligns with social distancing measures crucial for public health .Additionally, the system allows for two re-slot allocations, providing flexibility for those who miss their initial collection slot. This not only streamlines the process but also allows individuals to view product details online, saving time and enhancing accessibility. By implementing a virtual queuing system through the Q Learning algorithm, the approach seeks to replace traditional physical queues with organized slot allocations. Ration cardholders would receive SMS notifications specifying the date and time for product collection, reducing the need for individuals to stand in long queues or frequent the Fair Price Shop every day. This not only saves time for beneficiaries but also aligns with social distancing measures crucial for public health .Additionally, the system allows for two re-slot allocations, providing flexibility for those who miss their initial collection slot. This not only streamlines the process but also allows individuals to view product details online, saving time and enhancing accessibility.

Keywords: Virtual Sign-up, Online Channels, Mobile Apps, QR Code, Traditional Channels, Virtual Waiting/Queues, Multi-channel Remote, Queuing Information Updates, Traditional Queue Management Components, Counter Plates, Digital Signage Screens.

I. INTRODUCTION

Public distribution system is a government-sponsored chain of shops entrusted with the work of distributing basic food and non-food commodities to the needy sections of the society at very cheap prices. Wheat, rice, kerosene, sugar, etc. are a few major commodities distributed by the public distribution system. The goal of the Public Distribution System in Tamil Nadu is to ensure food security to all citizens, particularly poor people, by making available essential commodities of good quality at affordable prices every month, through fair price shops which are easily accessible. Public Distribution System (PDS) has evolved as a system of management of scarcity through distribution of food grains at affordable prices. Over the years, PDS has become an important part of Government's Policy for management of food economy in the country. and translation services. With its ability to automate feature extraction and work with high-dimensional data, deep learning continues to drive advancements in artificial intelligence, solving complex problems that were once difficult or even impossible for traditional machine learning methods. This project not only addresses immediate challenges in the distribution process but also sets a precedent for leveraging technology to enhance efficiency and adaptability in government initiatives.



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II. LITERATURE SURVEY

Dynamic Job shop Scheduling Algorithm Based on Deep Q Network

Author: Yejian Zhao, Yanhong Wang, Yuanyuan Tan, Jun Zhang, And Hongxia Yu Year: September 3, 2021,

Objective: This article guide each machine to complete production and processing tasks autonomously, thereby enhancing the production efficiency of the entire workshop.

Methodology: This article proposes scheduling approach still has some shortcomings. Other unpredictable interference factors that may appear in the actual production process should be considered in the future. It is also likely possible improve the function of the DQN algorithm to output Q-values of each action equal to the number of candidate actions for each machine at each scheduling moment. An action selection strategy may be used to select an action to act on each machine as well.

Advantages:

• The proposed scheduling algorithm based on DQN has better performance and universality than a single dispatching rule or traditional Q learning algorithm.

• Unlike rule-based or heuristic approaches, DQNs can learn optimal or near-optimal policies from experience, improving over time.

Disadvantages:

- The task-scheduling process must be consistent.
- Before the end of the previous scheduling task cycle, new jobs are not allowed to enter the shop.

Based Smart Rationing System

Author: R.Santhana Krishnan; A.Sangeetha; AshokKumar; K.Lakshmi Narayanan Year: 31march 2021

Objective: This process eradicates forged ration card users and prevents them from participating in any further transgression. Picking the goods and quantity by the means of android application.

Methodology: This article proposes iot based smart ration card system is an automated scheme, which uses fingerprint validation process. In order to provide security and accuracy to this scheme, minutiae extraction-based algorithm is used in fingerprint validation process. This process eradicates forged ration card users and prevents them from participating in any further transgression. Picking the goods and quantity by theme an of android application, the system becomes smarter and robust. By means of implementing this system, one can evade the misconducts since there is no manual process involved in it and the system also stores all details in a database.

Advantages:

• This system also helps in maintaining the transaction details in a separate \Box Data base in order to prevent any transgression.

• Enables real-time tracking of stock levels, distribution, and usage through sensors and cloud connectivity. **Disadvantages:**

- Require transaction record maintenance numerous difficulties are through is prevailing system.
- Automated systems reduce chances of calculation mistakes and record-keeping errors.

III. METHODOLOGY

This article proposes of queuing theory was to manage the phenomena of waiting using respective measures of performance such as average queue length "lq" average waiting time in queue "w q" and utilization factor " ρ ". Along with that, the arrival and service pattern of the customers from the observed data was compared with arrival and service distribution of the mathematical models which we are taking into concern.



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Advantages:

• This paper needed for the management to comprehend the circumstances better.

• This paper on a single server queuing model in which the arrival process is process and the service times follow an exponential distribution or a constant.

• Helps design better ticket counters and online systems to minimize waiting time for passengers. **Disadvantages:**

• The service rate doesn't follow a poison distribution, it was additionally having closeness to the normal distribution.

• Queuing models often rely on assumptions (e.g., Poisson arrivals, exponential service times) that may not always hold true in real-world rail systems.

• This paper on a single server queuing model in which the arrival process is process and the service times follow an exponential distribution a constant



FIGURE 1 : PDS

It is additional in nature and is not intended to make available the entire requirement of any of the commodities distributed under it to a household or a section of the society. PDS is operated under the joint responsibility of the Central and the State Governments.

The Central Government, through Food Corporation of India (FCI), has assumed the responsibility for procurement, storage, transportation and bulk allocation of food grains to the State Governments. The operational responsibility including allocation within State, identification of eligible families, issue of Ration Cards and supervision of the functioning of Fair Price Shops (FPSs) etc., rest with the State Governments

Deep Q-Learning Algorithm

As one of the main reinforcement learning algorithms, Q learning is a model-free. The goal of Q-learning is to find a policy that can maximize the reward. The Q-value is an important parameter in Q-learning. It is defined as the sum of rewards for executing the current related actions and those to be performed subsequently in accordance with a certain strategy.



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A given state s and action a correspond to a given Qvalue Q(s,a). Q-value is used in the learning process to select the action. If the subsequent actions are performed according to the optimal polices the corresponding Q-value is referred to as the optimal Q value Q*, where T (s, a, s') represents the transfer probability from state s to state s' via action a, r(s,a) represents the reward for executing action a from state s, $\gamma \in (0,1)$ is the discount factor, which indicates the degree of farsightedness. If the γ value is small, the system pays attention to only the recent actions. If γ is large the actions during a relatively long period of time are involved. An agent learning process can be viewed as selecting an action from a random state using a strategy. The value of Q(s,a) is updated according to deep learning.



FIGURE 2 : Deep Q-Learning

The input design for a web-based digital automatic virtual queue token generation using Deep Q Learning algorithms and notification system for Public Distribution System with Python Flask and MySQL would involve collecting various types of data to train the Deep Q Learning algorithm, generate virtual queue tokens and provide real-time inventory updates.

Here are the key inputs required for this system:

Historical demand data: The system would require historical data on the demand for products in each Ration Shop. This data will be used to train the Deep Q Learning algorithm to predict the number of tokens to be generated for a given time period.

Inventory data: The system would require real-time inventory data for each product in each Ration Shop. The Ration Shop Admin will be responsible for updating the inventory in the system whenever a new product is received, or when a product is sold.

Consumer registration data: The system would require data on the registered consumers, including their names, addresses, phone numbers, and email addresses. This data will be used to send notifications to consumers when a virtual queue token is generated and when their turn is due.



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FIGURE 3 : QLEES PDS



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Algorithm 1: Deep Q-Learning Algorithm

from flask import Flask, render_template, Response, redirect, request, session, abort, url_for import os import time import datetime import random from random import randint from flask import send_file import pandas as pd import matplotlib.pyplot as plt import numpy as np import mysql.connector import urllib.request ii+=1 data3.append(dat1) i+=1 print("No. of Customers:"+str(no_of_customer)) mycursor.execute("SELECT * FROM rq_stock where rid=%s",(rid,)) data4 = mycursor.fetchall() n_ stock=0 for rw in data4: tot=rw[5]

Add Ration Shop Employee

@app.route('/add_emp',methods=['POST','GE T']) def add_emp():

result="" act="" rid = request.args.get('rid') if request.method=='POST':

name=request.form['name'] rid=request.form['rid'] mobile=request.form['mobile'] email=request.form['email'] address=request.form['address'] now = datetime.datetime.now() rdate=now.strftime("%d-%m %Y") mycursor = mydb.cursor()

mycursor.execute("SELECT max(id)+1 FROM rq_employee") maxid = mycursor.fetchone()[0] if maxid is

None: maxid=1 eid="E"+str(maxid) pass1="1234" sql = "INSERT INTO rq_

val = (maxid, rid, eid, name, address, mobile, email, pass1, rdate, '1') print(sql) mycursor.execute(sql, val) mydb.commit() print(mycursor.rowcount, "record

IV. SYSTEM MODULES

Disperse Slot Web Application

The Disperse Slot Web Application, developed using Python, Flask, and MySQL, serves as a comprehensive platform for efficiently managing the distribution of rationed goods. The core module, implemented in Flask, establishes a robust structure for the entire application. This module encompasses functionalities such as time slot generation, token management, and a notification system. Python scripts handle the logic behind token creation, viewing, updating, and cancellation, while HTML templates define the user interface.

Time Slot with OTP Generator

This module is designed to streamline the process of allocating time slots for consumers, ensuring an organized and efficient queue management system. In this module, the disperse slot generator generates the time slot for each and every consumer with token ID. Disperse- Token will generate a token ID that helps to keep track of the queue from anywhere in the world using internet. In Disperse-Token We have a feature such as provide a token, view a token status, update a token, cancel a token, delete a token and many more. With these features we can easily manage the online queue system in any suitable domain without any hassle. The tokens will have a specific day and time when the ration cardholders can collect their share. Consumers notify by sms and email they can collect them from their ration shops on the specified day and time, including the extra rice and relief fund announced as part of COVID-19 relief measures.

It uses the following parameters to generate time slot for card holders.

- Start Date/End Date: Select the first and last date for your time slots with the same criteria being entered.
- Conflict Handling: Choose one of the following:
- Abort (Cancel the operation and not add/edit any slots)
- Skip (Leave conflicting slots unchanged)
- Update (Update/Overwrite conflicting slots to match)
- Slot Duration: Choose how long each time slots should be.
- Slot Type: allotted, Preferred Time and unallotted.



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V. RESULT ANALYSIS

The ongoing development of the Public Distribution System (PDS) entails the integration of several key features aimed at optimizing service delivery and user experience. This section explores the forthcoming enhancements, focusing on the introduction of online payment options, the deployment of a dedicated mobile application, and the implementation of a realtime analytics dashboard.

Online Payment Options for Subsidized Goods

- Facilitates electronic payments for subsidized goods.
- Reduces risks associated with cash handling.
- Enhances transaction efficiency and security.

Dedicated Mobile Application

- Provides immediate access to essential system functionalities.
- Eliminates the need for physical visits to distribution centers.
- Streamlines user interaction and entitlement management.

Real-Time Analytics Dashboard

- Offers invaluable insights into system performance and user behavior
- Utilizes data visualization and trend analysis techniques.
- Monitors key metrics in real-time.



Fig 1: Info Page



Fig 3: Ration Shop Generation

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		,	
Ration Shop Information	Ration Shop Name		
Ration Shop Address - No.	Building Name	Street	
Area	City		
Pincode	Ration Shop Ph.Number	ADD	

Fig 4: Create New Ration Shop

RATION SHOP		Home	Logout
	SHOP INFORMATION		
			Company
			200
Ration Shop II	nfo		
Ration Shop ID	: R1		
Ration Shop Name	: RR		
Address	: 11, RR , 1st		
Area	: RT Nagar		
City	: Trichy		
Pincode	: 620101		
Phone Number	: 0431-2321232		
No. of Card	: 50		
	Add Card / Card Details		
	Ration Shop		

Fig 5: View Info Details

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RATION SHOP		Home	Product	Stock Required	Log
	Deliv	ver Stocks			
Ration Shop R1 - RR	Y Rice	Product	Maximum	Quantity for Each Cus	tomer
Quantity		Select here		SUBMIT	
2000	Kg		× .		
		Ration Shop			
	Fig 6:	Deliver Stocks			
RATION SHOP		Hom	e Entry	Request Report	Log
			1		1
	17/6				and they are
	Send	Notification			
Sending					
SMS					



VI. CONCLUSION

Physically queueing is a reality on many industries that provide services or sell goods. Waiting in a queue can be stressful and exhausting for the clients because of the enforced idle time, and may lead to decreased customer satisfaction. In conclusion, the modernization of the public distribution system represents a significant step towards improving efficiency, transparency, and user experience. Through the integration of online payment options, a dedicated mobile application, and a real-time analytics dashboard, the system aims to streamline transactions, enhance accessibility, and empower administrators with valuable insights. These enhancements not only align with digital trends but also cater to the evolving needs of beneficiaries and stakeholders. Moving forward, continued efforts in innovation and refinement will further strengthen the system's impact, ensuring equitable access to essential commodities for all. Presented QLess using Deep Q-Learning based web application that allows FPS admin to create a virtual queue, and notify the citizen. Disperse Slot System for ration centre website is developed to overcome the uncertainties in ration centres. This system will avoid the corruption in ration system to a larger extent by providing transparency to users at each level. This system will be helpful



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to save time and efforts of standing in long waiting queues, the application will also be helpful for organizations to serve better to the customers without making them wait in queues this in turn can boost profit and increase the quality of Service. This system can be successfully implemented in environment where crowd management is difficult and thus help in the elimination of physical lines and waiting time all over the country in service-based institutions and organizations.

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