Revolutionizing Restaurant Management with AI-powered Solutions

Presented By: DyneVision team

Introduction

Our project is designed to revolutionize the way restaurants manage their menus, promotions, and customer interactions. By leveraging automation and advanced AI integration, we aim to streamline processes, optimize restaurant performance, and improve overall customer satisfaction, creating a seamless and efficient experience for both restaurant owners and their patrons.

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Automated Menu Feature

Our automated menu solution streamlines the process of uploading restaurant menus. Just snap a picture, and our AI extracts all the necessary information, saving time and effort for restaurant owners.

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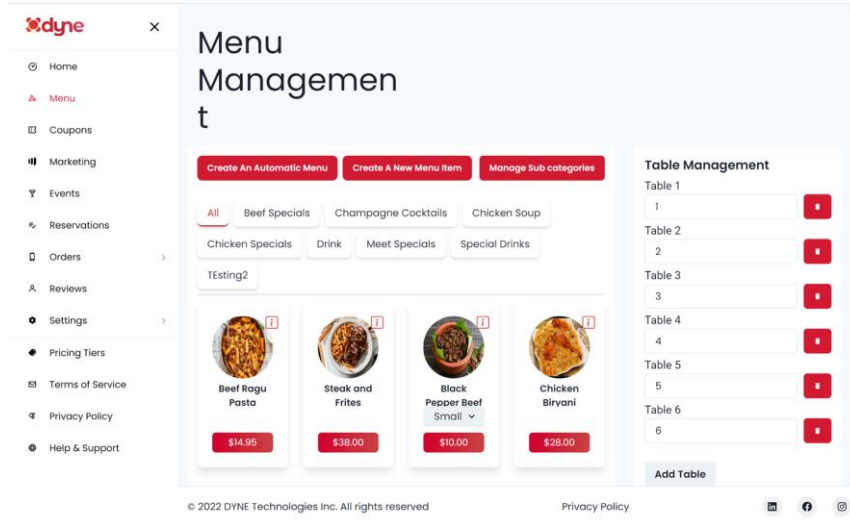
Implementation of Automated Menu
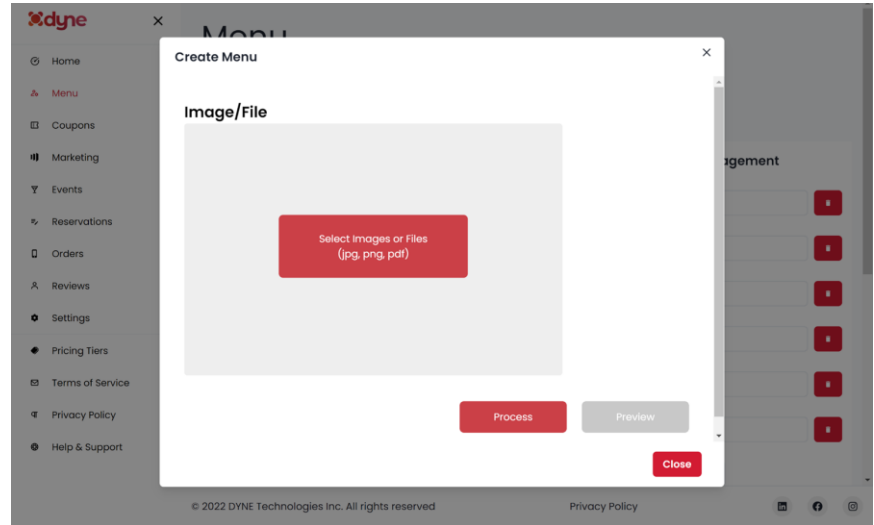

Fig 1. Menu Dashboard

Fig 2. Create Menu Popup
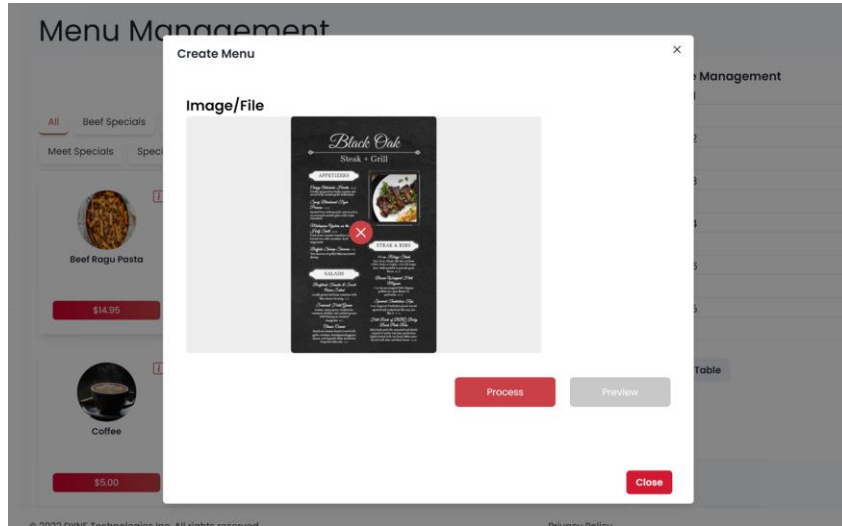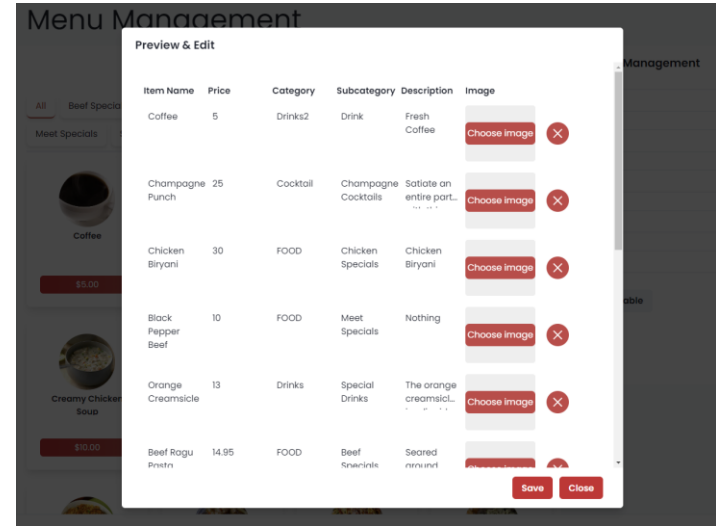
Implementation of Automated Menu

Fig 3. Menu Upload

Fig 4. Preview/Edit Popup

Computer Vision: docTR

```
from doctr.datasets import FUNSD
train_set = FUNSD(train=True, download=True)
img, target = train_set[0]
```

- The solution targets OCR of restaurant menu images using docTR, powered by TensorFlow 2 & PyTorch, with a two-stage approach: text detection and text recognition.
- The output is sent to a JSON file and pre-processed into a Python Dataclass, holding relevant information and two IDs for deep learning purposes.


```
1    jsonRes = result.export()
```

Deep Learning and NLP using BERT

After preprocessing the textual data, it is sent to a Multiclass text classification model built and fined tuned from BERT to output whether the line is 'food' or 'drink', then send to another model to label it as and is a 'sub-category', 'dish', or 'description'.

0	beer & wine
0	Appetizer
0	Seafood Specialties
0	Vegetarian Specialities
0	Rice Specialty
0	Side Orders
0	Naan (Bread)
0	Chicken Specialities
0	Lamb Specialties
0	Seafood Specialties
0	Steak cuts
0	seafood
0	salads and soups
0	sides
0	mains
0	Starters & Sides
1	Spinach Salad
1	Caprese Salad

```
[ ]  tokenizer = BertTokenizer.from_pretrained('bert-base-uncased')

 ▶   token = tokenizer.encode_plus(
         df['Text'].iloc[0],
         max_length=256,
         truncation=True,
         padding='max_length',
         add_special_tokens=True,
         return_tensors='tf'
     )
```

Integration and Deployment to Azure

The created DL models were then tested and recreated in the same environment as the Azure ML Environment, then the model was deployed as an endpoint.

Consumption types

| C# | Python | R |

```python
import urllib.request
import json
import os
import ssl

def allowSelfSignedHttps(allowed):
    # bypass the server certificate verification on client side
    if allowed and not os.environ.get('PYTHONHTTPSVERIFY', '') and getattr(ssl, '_create_unverified_context', None):
        ssl._create_default_https_context = ssl._create_unverified_context

allowSelfSignedHttps(True) # this line is needed if you use self-signed certificate in your scoring service.

# Request data goes here
# The example below assumes JSON formatting which may be updated
# depending on the format your endpoint expects.
# More information can be found here:
# https://docs.microsoft.com/azure/machine-learning/how-to-deploy-advanced-entry-script
data = {}

body = str.encode(json.dumps(data))

url = 'https://getfooddrink.canadacentral.inference.ml.azure.com/score'
# Replace this with the primary/secondary key or AMLToken for the endpoint
api_key = ''
if not api_key:
    raise Exception("A key should be provided to invoke the endpoint")
```

Deployment summary

Live traffic allocation
✅ getsubcatddl (100%)

Mirrored traffic allocation
--

Deployment getsubcatddl

Name
getsubcatddl

Live traffic
100%

Scoring script
score.py

Provisioning state
✅ Succeeded

Error details
--

SKU
Standard_DS2_v2

Egress public network access
Enabled ⓘ

Instance count
1

Scaling
Configure auto scaling 🔗

Environments

Curated environments   **Custom environments**

Custom environments are user defined environments created from a Docker image, a Docker build context, and a conda specification with Docker image. Learn more about custom environments 🔗

+ Create   ↻ Refresh   ▣ Archive   ▦ Edit columns   ↺ Reset view | ●━ Show latest version only   ○ Include archived

🔍 Search

Showing 1-2 of 2 environments

Name	Source	Version	Created ↓	Created by	Tags
customdl2:4	This workspace	4	Jan 25, 2023 10:22 AM	Takahiro	
customDLenv:5	This workspace	5	Jan 24, 2023 10:34 PM	Takahiro	

OpenAI   Integrated Features

Having explored the power of our automated menu solution, let's now delve into how our OpenAI integration enhances restaurant management even further, offering:

- advanced content generation
- performance insights
- text-to-command functionality
- and intelligent chatbot assistance.

Discover the benefits of combining menu automation with AI-driven features to create the ultimate dining experience.

AI-Powered Content Generation

- The project's integration with OpenAI elevates content creation for a variety of promotional materials.
- Advanced AI-driven solutions maximize customer attraction and retention by crafting personalized, captivating content.

Image generated from a "chicken sandwich prompt ->

Restaurant Best Practices & Recommendations

- AI-driven insights enable optimization of restaurant performance and data-driven decision-making.
- Analyzing real-time data from establishments and industry trends, the system provides actionable recommendations on various aspects of restaurant management.

Key Customer Insights
Suggested Actions

		Food Quality	Recommendations
A	85	Fresh / Nutritional	• Increase freshness of ingredients • Improve nutritional value.

		Service Quality	Recommendations
B	85	Fast / Cold	• Increase friendliness of service • Speed up order processing.

|		Ambience Quality	Recommendations
C	80	Atmosphere / Cleanliness	• Increase the atmosphere and decor • Lower the volume of the music.

Text-to-Command Functionality

- The innovative text-to-command feature offers seamless interaction with the web app.
- Users can easily navigate and manage a restaurant's digital presence through AI-executed actions, streamlining access to various features and settings.

Intelligent Chatbot Assistance

- Cutting-edge AI-powered chatbot enhances customer support and community engagement on both web app and mobile platforms.
- The chatbot provides instant, accurate assistance to users, leveraging natural language processing and machine learning for smooth, engaging user experiences
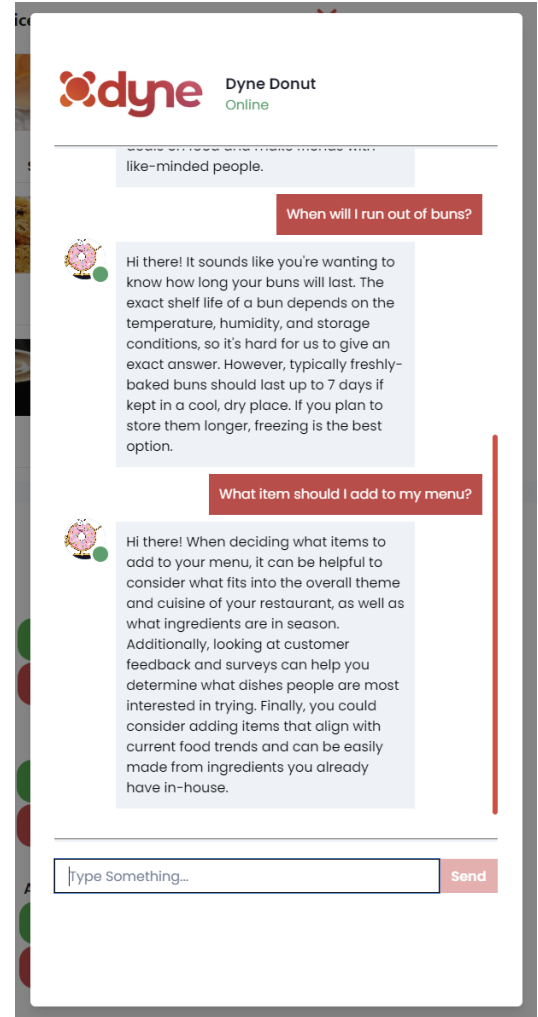
Impact & Innovation

DyneVision has successfully completed this capstone by:

Revolutionizing Restaurant Management

- AI-powered menu automation and customer engagement
- Simplified onboarding and data-driven insights

Embracing the Future
- Harnessing cutting-edge AI technologies
- Enhancing dining experiences and driving business growth