BTE 471 Group Project

Tasty AI Solutions

Team Name: Insight Innovators

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Milestone 1: Case, problem, Solution Formalization

1. **Introduction**
    a. Introduce the case/problem and the type of problem.
    b. What is the problem they currently face?
    c. What is the expected solution or outcome?
    d. In other words, when your model implementation is done, what is the desired result for the organization?

Tasty.co, owned by Buzzfeed, is a social media company that focuses on food content creation. They specialize in short, user-friendly, instructional recipe videos that they produce and upload weekly. Customers watch Tasty's videos to find new recipes and to try making new foods.

Customers struggle to find meals they can make with only the ingredients they have at home. A trip to the grocery store isn't always timely or realistic, and this can lead to frustration as it forces customers to decide between making that trip to the grocery store to purchase additional ingredients and cook the meal they want, or avoid the cooking altogether and resort to ordering takeout. Importantly, this dilemma contributes to the enormous food waste problem in the US, where Americans create 119 billion pounds of food waste each year (Feeding America).

The solution is to provide customers with a platform that they can use to upload their ingredients and receive easy, suitable recipes as a result. The returned recipes will use the ingredients that customers have at home, preventing these foods from going to waste and allowing customers the satisfaction of trying new foods without having to buy more ingredients.

This product will increase user engagement with Tasty's app and online platform. Customers will be spending more time interacting with the company's content by using this product, and then following the resulting recipes and watching the coordinating recipe videos. This boosts revenue, which the company primarily receives through sponsored video content (Manjoo).

Because the product aims to eliminate food waste, it allows Tasty to pursue a new focus in sustainability, which coheres with their company values of Innovation and Open-Mindedness while attracting the support of their target audience, gen Z and millennials, who are known for having a dedication to sustainability (Tasty).

2. **Value to the Organization**
    a. If any, what are the firm's AI capabilities?
        i. Botatouille chatbot for cooking help

Tasty, a Buzzfeed brand, recently launched "Botatouille" - a mobile chatbot that allows users to communicate about recipes and kitchen support in real-time based on Tasty's collection of recipes and editorial staff expertise. The technology combines ChatGPT technology with some of Buzzfeed's in-house machine learning systems, and the company is looking forward to

improving the technology to adapt to customer feedback. Buzzfeed as a whole is committed to using AI to “personalize” and “enhance” content, including within the Tasty brand (Moreno).

b. What are their future needs?
    i. https://www.buzzfeed.com/buzzfeedpress/our-way-forward-strategy
    ii. Fight for revenues and manage costs, while building the best platform for creators and being the leader in AI content creation

According to the CEO of Buzzfeed Jonah Peretti, the path forward for the company looks like fighting for revenues while managing costs, all while building the best platform for creators and leading the market in AI content creation (Moreno). Buzzfeed is committed to improving and growing their brands specifically using ChatGPT and other technology in the realm of AI, for the goal of providing the best services for creators and the best content for all of their followers. Buzzfeed is intent on moving AI content from the Research and Development stage to core business operations, using it for brainstorming, increasing efficiency of brands/services, and creating personalized content for users.

c. What type of AI do they require?

For the chatbot that Tasty currently uses, they require Sub-Symbolic Natural Language Processing. For our innovative AI solution, we require a knowledge of symbolic AI and Prolog.

d. How will using this model add value to the organization?

Tasty will open up to new consumer microsegments, including, but not limited to environmentally-conscious customers, budget-conscious consumers and college students with limited access to kitchen equipment and a variety of food items. Along with the users, the existing customers will be more engaged on the Tasty app and/or website, since this feature will provide something that its competitors do not have. This will also help the company to gain loyal customers. The company will also be in the attention of Gen-Z who are deeply interested in utilizing advanced AI.

e. In other words, what is the importance and potential impact of using this model for the organization as a whole?

This mode will make the company more AI and advanced technology driven, which will result in an increase in their efficiency. It will also set them under the spotlight in the industry with an innovation in the market and contribute to the company’s success as a whole. Our model is expected to be the major tool to increase connection with customers and user engagement.

Milestone 2: Coding phase

a) **Knowledge base**

Describe the origin of the knowledge and the logic behind its representation.

The recipes will come from Tasty's collection of recipes on their website. The knowledge base is designed by assigning lists of ingredients to recipes, so that Prolog can work recursively through each recipe until it finds one(s) that use the ingredients provided by the user. Each team member will provide the code for 5 recipes to include in the program. https://tasty.co/

Sample Recipe code (???):

Idk if this acc will work but seems maybe good

ingredient(Item).

recipe([shortened recipe name]) :- ingredient(ItemA), ingredient(B), ingredient(C).

Ingredient List (add to this list with any new ingredients that your recipe has) – Make everything lowercase

ingredient(bell_pepper)
ingredient(onion)
ingredient(carrot)
ingredient(peas)
ingredient(tomato)
ingredient(corn)
ingredient(asparagus)
ingredient(scallion)
ingredient(spinach)
ingredient(potato)

ingredient(lemon_juice)
ingredient (lemon)
ingredient(lime)
ingredient(taco_seasoning)
ingredient(salt)
ingredient(garlic)
ingredient(chili_powder)
ingredient(turmeric)
ingredient(cumin)

ingredient(cayenne_pepper)
ingredient(ginger)
ingredient(cinnamon)
ingredient(oregano)
ingredient(parsley)
ingredient(black_pepper)
ingredient(cilantro)
ingredient(basil)
ingredient(red_pepper_flakes)
ingredient(curry_powder)
ingredient(paprika)
ingredient(sesame_seeds)

ingredient(ground_beef)
ingredient(chicken_breast)
ingredient(whole_chicken)
ingredient(salmon)
ingredient(shrimp)
ingredient(ground_turkey)
ingredient(steak)
Ingredient(bacon)

ingredient(black_beans)
ingredient(rice_noodles)
ingredient(rice)
ingredient(pasta)
ingredient(nori)
ingredient(spaghetti)

ingredient(heavy_cream)
ingredient(milk)
ingredient(coconut_milk)
ingredient(butter)
ingredient(mexican_cheese)
ingredient(parmesan_cheese)
ingredient(cheddar_cheese)
ingredient(mozzarella_cheese)
ingredient(egg)

ingredient(olive_oil)
ingredient(vegetable_oil)
ingredient(sesame_oil)
ingredient(salsa)
ingredient(tomato_sauce)

ingredient(flour)
ingredient(honey)
ingredient(marinara)
ingredient(soy_sauce)
ingredient(brown_sugar)

Kayla -

1. Fajita Parchment-Baked Chicken
2. Veggie Garlic Noodles Recipe
3. One-Pot Taco Soup
4. Easy Butter Chicken
5. Easy Chicken Alfredo Penne

Mikhala -

Cacio e Pepe,

Stir Fry,

black bean soup

tortellini bake

Onigirazu

pesto stuffed peppers

Caitlin -

Simple veggie curry

Lemon garlic shrimp pasta

Turkey Taco Bowls

Nazrin -

1. Steak & Potato Hash
2. Spaghetti carbonara

3. Lemon Garlic Chicken

Code

```
% Define recipes and their required ingredients
recipe('Fajita Parchment-Baked Chicken', [chicken, bell_pepper, onion, taco_seasoning, oil]).
recipe('One-Pot Taco Soup', [beef, onion, beans, tomato, tomato_sauce, taco_seasoning]).
recipe('Easy Chicken Alfredo Penne', [butter, chicken, basil, pasta, garlic, flour, milk]).
recipe('Cacio e Pepe', [pasta, oil, butter, cheese]).
recipe('Chicken Stir Fry', [soy_sauce, chicken, oil, sesame_oil]).
recipe('5-ingredient Black Bean Soup', [beans, tomato, cilantro, garlic, cumin]).
recipe('Easy Cheesy Tortellini Bake', [pasta, marinara, cheese, parsley]).
recipe('Onigirazu', [nori, rice, sesame_seeds, salmon]).
recipe('Steak & Potato Hash', [steak, potato, oil, bell_pepper, onion, garlic]).
recipe('Lemon Garlic Chicken', [lemon, garlic, chicken]).
recipe('caprese_sandwich', [bread, tomato, cheese, oil]).

% Define a predicate to check if you have all the ingredients for a recipe
has_ingredients(Ingredients, RequiredIngredients) :-
    subset(RequiredIngredients, Ingredients).
% Define a predicate to find recipes based on available ingredients
find_recipe(Ingredients, Recipe) :-
    recipe(Recipe, RequiredIngredients),
    has_ingredients(Ingredients, RequiredIngredients).

% Check if a recipe is "mashed potato" and print additional ingredients
```

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print_additional_ingredients('Fajita Parchment-Baked Chicken') :-
    writeln("Additional ingredients: salsa, cheese").
print_additional_ingredients('One-Pot Taco Soup') :-
    writeln("Additional ingredients: corn, cheese").
print_additional_ingredients('Easy Chicken Alfredo Penne') :-
    writeln("Additional ingredients: oregano, parsley, cheese").
print_additional_ingredients('Chicken Stir Fry') :-
    writeln("Additional ingredients: honey, scallion, asparagus").
print_additional_ingredients('5-ingredient Black Bean Soup') :-
    writeln("Additional ingredients: cumin, garlic").
print_additional_ingredients('Easy Cheesy Tortellini Bake') :-
    writeln("Additional ingredients: N/A").
print_additional_ingredients('Onigirazu') :-
    writeln("Additional ingredients: N/A").
print_additional_ingredients('Steak & Potato Hash') :-
    writeln("Additional ingredients: paprika").
print_additional_ingredients('Spaghetti Carbonara') :-
    writeln("Additional ingredients: bacon, parsley").
print_additional_ingredients('Lemon Garlic Chicken') :-
    writeln("Additional ingredients: N/A").
print_additional_ingredients(_).

% Recursively find and display all matching recipes while avoiding duplicates
```

```
find_and_display_recipes(_, []).

find_and_display_recipes(Ingredients, [Recipe|Rest]) :-
    find_recipe(Ingredients, Recipe),
    write("Recipe: "), write(Recipe), nl,
    print_additional_ingredients(Recipe),
    find_and_display_recipes(Ingredients, Rest),
    \+ member(Recipe, Rest).


% Query for recipes based on the provided ingredients
query_recipes(Ingredients) :-
    findall(Recipe, find_recipe(Ingredients, Recipe), Recipes),
    find_and_display_recipes(Ingredients, Recipes).
```

b) **Errors**

What are typical errors you encounter while testing your prototype? What does the available literature say on the topic?

Errors of inconsistencies in the listing of recipes are common. For example, one recipe may refer to something as “black pepper” and another as just “pepper”. We may also see issues with specification of certain items, for example listing “pasta” versus “linguine”. These issues will keep our knowledge base from performing and hinder/slow our prototype. We have worked hard to triple check each recipe and ingredient listed for consistency.

A similar issue is outlined in this paper published by universities in Spain conducting a market-basket analysis.

c) **Generative AI**

Were any of the many available GenAI tools (ChatGPT, Google Bard, HuggingChat, Copilot, etc.) helpful in assisting you in completing parts of your code? Assess the impact it(they) had on your programming experience. To clarify, the professor is NOT against using these tools if you

know how to improve, modify, and interpret the code generated and are fair at referencing what was generated vs. what was your own creation.

Yes, ChatGPT assisted us in a couple of ways. The first way it was used was to repeat the code style for multiple recipes. For example, we hand wrote the code for the first recipe, then prompted GPT4 to repeat this same process and style for a new recipe, and provided it with the list of ingredients for the new recipe. We would then double check for accuracy.

The next way we used this tool was to check our ingredient list in the knowledge base with the ingredients referenced in our code. As mentioned in the errors section, we faced issues with inconsistencies, and we also faced having multiples within the ingredients list when different recipes used the same item. GPT4 helped to scan the list, compare it to the ingredients called in the code, and point out any discrepancies.

Milestone 3: **Documentation and Results**

a) **Visualization**

Create diagrams with a clear understanding of how your code functions.

b) **Organizational Impact**

Given your final prototype, how could the model and results be used to impact the organization?

The final prototype is poised to make a substantial organizational impact. It will drive increased user engagement across Tasty's app and online platform, enticing customers to spend more time immersed in the company's content while searching for recipes and following recipe videos, ultimately resulting in heightened revenue from sponsored video content. Moreover, the product's emphasis on curbing food waste seamlessly aligns with Tasty's core values of Innovation and Open-Mindedness, resonating with their target audience of sustainability-minded gen Z and millennials.

This endeavor will open doors to new consumer microsegments, encompassing eco-conscious individuals, budget-savvy consumers, and college students with limited kitchen resources. Setting Tasty apart from competitors, it fosters enhanced user engagement and bolsters customer loyalty. Through the integration of advanced AI, Tasty positions itself as a pioneer in cutting-edge technology, elevating operational efficiency, and cementing its status as a trailblazer in the industry. In essence, our model stands as a pivotal tool in fortifying customer connections and user engagement, contributing significantly to the overall prosperity of Tasty.

IV. **Sources/Appendixes** (Anything extra not covered before)

References

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