RECIPE GENERATOR

Made For You

APAN 5400 - Final Project

By: Jisu Baek, Marcus Loke,
Maya Bayram, Omar Nesnas,
Patrick Alvermann

Background

1. **Nutrition is an essential aspect of our lives, but the process of finding nutritious food can be daunting**
    a. **Increasing food allergies**
        i. According to a survey in 2019, 21% of US people are facing food allergies or intolerances
        ii. Food allergy and intolerance products market grows at a CAGR of 5.2% - market size is expected to hit $32 Billion by 2027
        iii. People with allergies or dietary restrictions are in need of easy ways to make the foods they love
    b. **Demands for personalized food and dietary solutions**
        i. 72% of people are interested in changing their current nutritional plans
        ii. Personalized nutrition market size in 2020 is $8.2 Billion and expected to reach $16.4 Billion by 2025 (CAGR 15.0%)
2. **Increased home-dining demands post-COVID**
    a. 92% of families plan to continue eating at home
    b. Increasing needs to make the foods they love
3. **We strive to alleviate the inertia and fear of cooking by making it convenient**

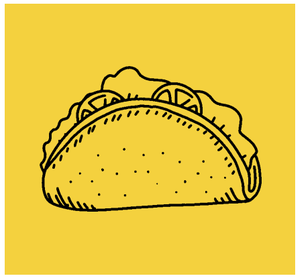
Definition of Business

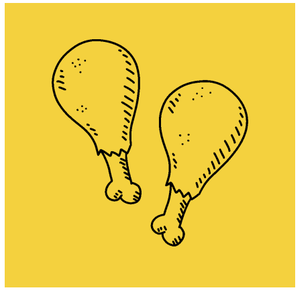
Features of our Recipe Generator to meet the above objectives:

- Search for recipes across the web
- Return recipes based on what users have available in their kitchen
- Further filter the data to only recommend recipes that meets most of the ingredient requirements (i.e., majority of what the user has in the kitchen)

Recipe Generator

Data Source





- Recipes will be queried through RapidAPI: (https://rapidapi.com/spoonacular/api/recipe-food-nutrition/)
- The API allows us to access over 365,000 recipes and 86,000 food products
- The queries are returned in JSON format
- We registered for a basic plan that allows 50 requests and 500 results a day for free. If more is needed, we can register for a paid plan that suits our requirements
- For deployment, we need to purchase the mega plan, which allows 100,000 results per day for $999/month

(Python) Requests Copy Code

```
import requests

url = "https://spoonacular-recipe-food-nutrition-v1.p.rapidapi.com/recipes/findByIngredients"

querystring = {"ingredients":"apples,flour,sugar","number":"5","ignorePantry":"true","ranking":"1"}

headers = {
    'x-rapidapi-host': "spoonacular-recipe-food-nutrition-v1.p.rapidapi.com",
    'x-rapidapi-key': "85e24d6ad3msh2bfead0e7b0f0f7p19ba4fjsnef67b74a1d08"
    }

response = requests.request("GET", url, headers=headers, params=querystring)

print(response.text)
```


```
[ 5 items
  0 : { 6 items
    "id" : 641803
    "title" : "Easy & Delish! ~ Apple Crumble"
    "image" :
    "https://spoonacular.com/recipeImages/Easy---Delish--Apple-
    Crumble-641803.jpg"
    "usedIngredientCount" : 3
    "missedIngredientCount" : 4
    "likes" : 1
  }
```

Implemented Technologies & Rationale

Frontend
Python Flask

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REST API

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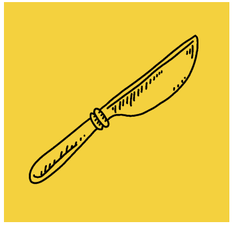
Backend
MongoDB

Frontend Python Flask

- Flask is a small and lightweight Python web framework that provides tools and features for creating web applications in Python. We can build an application quickly using only a single Python file. Flask is also extensible and doesn't force a particular directory structure (scalable)



REST API

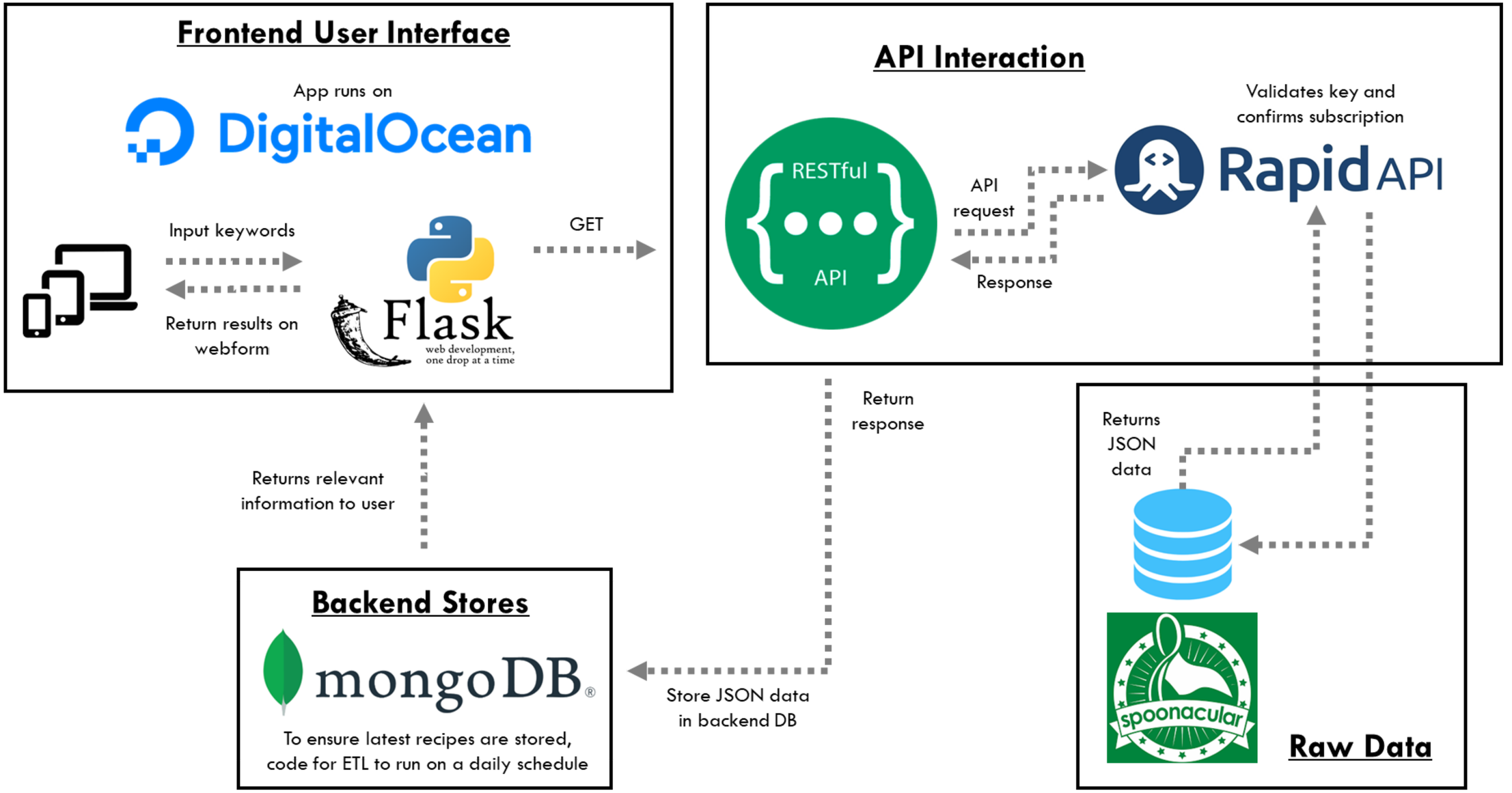
- REST API allows us to interact with the food and recipes database by simply doing HTTP requests. It also allows us to get inputs from users to filter and return relevant results

Backend MongoDB

- We want a consistent DB because it is important to return relevant and latest information to the user. We also want a DB that can handle network breakdowns even if it means compromising on the availability of certain parts of the data. MongoDB is a document-oriented DB for the job.

Implemented Design

Recipe Generator



Data Governance

People and Organizational Bodies

We strive to ensure that data quality is maintained by defining responsibilities at each level of the team:

1. **Steering Committee** - Recipe Generator's advisory body that will ensure delivery of the project goals and success measures.
    a. Example: Providing advice on the budget, timelines and risks
2. **Governance Council** - A team who regulates and give strategic guidance for the overall care of data.
    a. Example: Guiding the use of DBaaS to allow for resource elasticity, faster deployments, rapid provisioning.
3. **Lead Data Stewards** - Functional group responsible for *what* is stored in Recipe Generator's data fields.
    a. Example: Ensuring credit is giving to the original recipe sources in our web application.
4. **Lead Data Custodians** - Functional group responsible for the technical environments and database structure of Recipe Generator.
    a. Example: Ensuring a dedicated application encryption layer.

Data Policies

The five categories where we will have policies in place so that internal accountability and external transparency is maintained:

1. **Privacy**: We will create a legal data privacy document that lives on our website and details how personal data may be used.
2. **Access:** We want to preserve the confidentiality and availability of our data resources. This policy will improve the ability of our team to properly manage data in compliance with Federal and State laws and regulations.
3. **Usage:** We will be public about which aspects of user data is private and which we are able to use and control.
4. **Integrity:** To maintain reliable, trustworthy data we will put the following checks in place:
    a. Validate input
    b. Validate data
    c. Remove duplicate data
    d. Backup data
    e. Instill data access controls
    f. Keep an audit history
5. **Licenses:** All packages produced will be licensed under the Apache License, Version 2.0, unless otherwise explicitly stated.

Recipe Generator

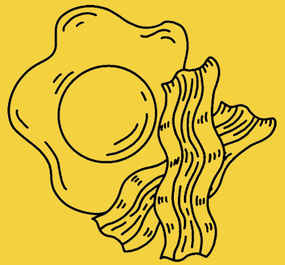
Cost Implications

S/N	Item	Cost	Details
1	Developing Flask API using Python Flask	$5,000	• Estimated as 1 man-month worth of effort for app development and UI/UX designer • Non-recurrent expenditure
2	Hosting app on DigitalOcean for about 50K unique users	$95/month	• App to run on DigitalOcean server
3	MongoDB cloud (DB-as-a-service)	$57/month	• DB to run on a different server • Dedicated MongoDB cloud storage
4	RapidAPI subscription	$999/month	• 100,000 results/day • 200,000 “tinyrequests”/day • 30,000 requests/day
5	Maintenance of infrastructure	$1000/month	• Estimate cost for data stewards
6	Tracking of success metrics	$1000/month	• Estimate for part-time business analysts

Non-recurrent expenditure: $5,000

Recurrent expenditure: $3,151/mo

Criteria for Success



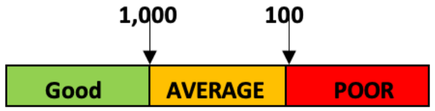
Traffic

Number of visits on the app

Traffic for startups

1) Number of Visit per day

- Unique Visit ≥ 1,000: Good
- 100 ≤ Unique Visit < 1,000: Average
- Unique Visit < 100: Poor



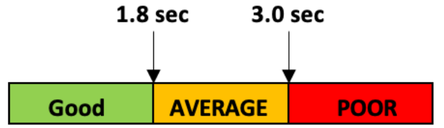
Performance

Page loading time

1) First Contentful Paint(FCP)
2) Largest Contentful Paint(LCP)

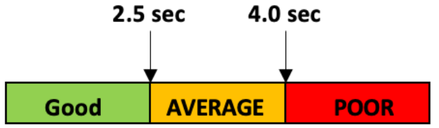
1) FCP

- FCP time < 1.8 sec: Good
- 1.8sec ≤ FCP time < 3.0 sec: Average
- FCP time ≥ 3.0 sec: Poor



2) LCP

- LCP time < 2.5 sec: Good
- 2.5sec ≤ LCP time < 4 sec: Average
- LCP time ≥ 4.0 sec: Poor



Engagement

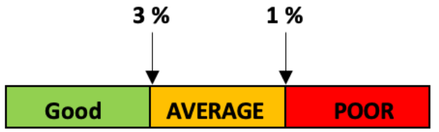
Average rate of visitors who become subscribers

- Subscriber conversion rate:

$$\frac{\#\ of\ new\ subscribers}{total\ unique\ Visitors}$$

1) Subscriber conversion rate

- Conversion rate ≥ 2%: Good
- 1% ≤ Conversion rate < 2%: Average
- Conversion rate < 1%: Poor



Satisfaction

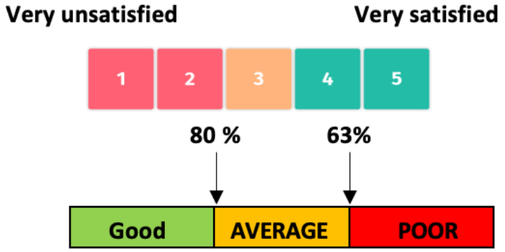
Customer Satisfaction Score(CSAT)

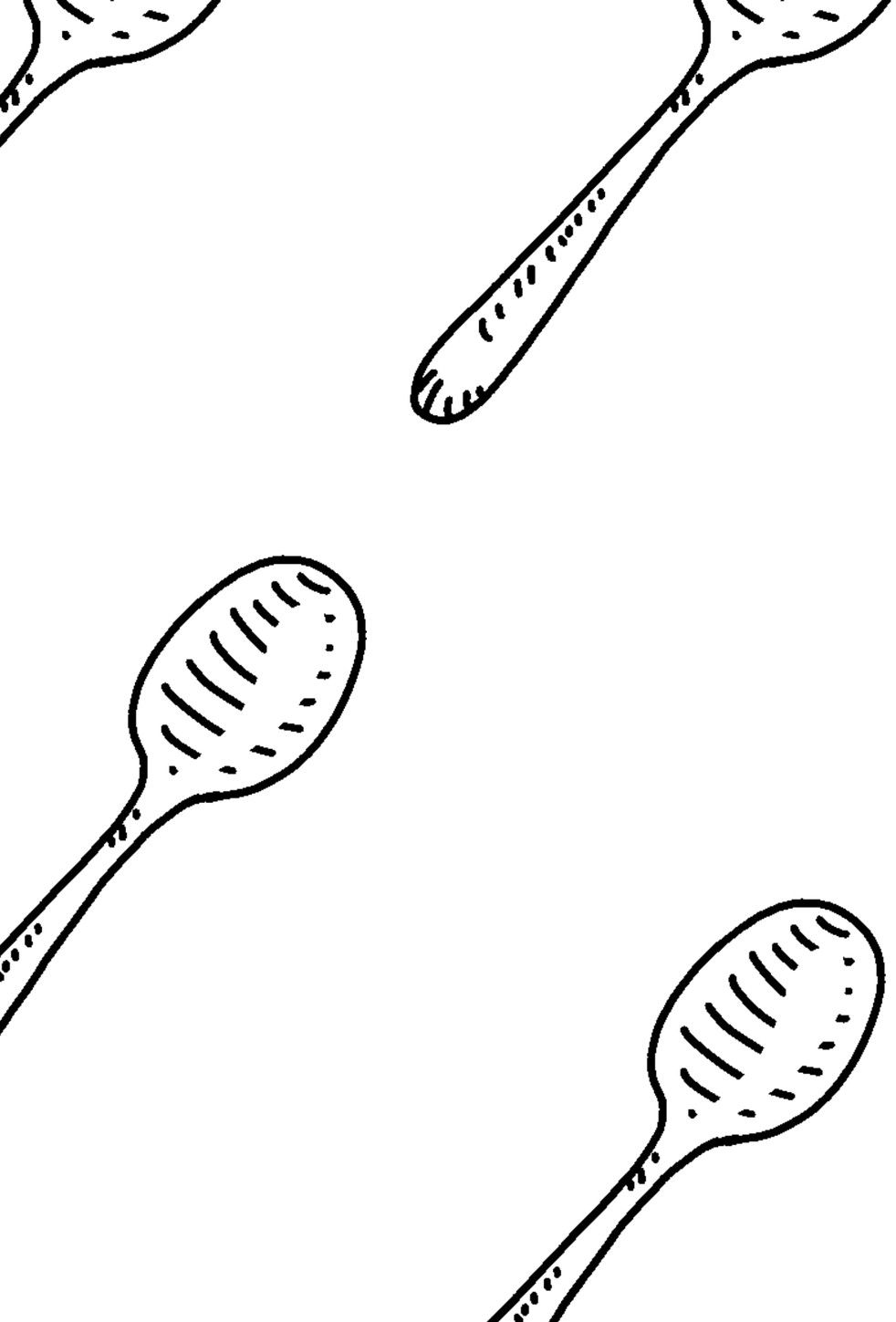
- CSAT for search engine

$$\frac{Total\ response\ scores\ Given}{Total\ possible\ Response\ scores}$$

1) Customer satisfaction score:

- CSAT ≥ 80%: Good
- 63% ≤ CSAT < 80%: Average
- CSAT < 63%: Poor





Future Recommendations

- We have been searching for recipes by ingredients only. Next, we can expand the feature to include searching for recipes by allergies and nutrients. RapidAPI supports such searches, but at the expense of added cost.

- Develop a feature to automatically analyze success/performance metrics so that we can have continuous improvement.

- To release under Apache License 2.0 after successful POC/MVP and safety of the entire architecture.

References

- Food Allergies & Intolerances in the United States 2019. (n.d.). Statista. Retrieved October 25, 2021, from https://www-statista-com.ezproxy.cul.columbia.edu/forecasts/1093511/food-allergies-and-or-food-intolerances-in-the-us
- Changing nutrition in the United States 2019. (n.d.). Statista. Retrieved October 27, 2021, from https://www-statista-com.ezproxy.cul.columbia.edu/forecasts/1093580/intention-to-change-own-nutrition-in-the-us
- David. (n.d.). Recipe - Food - Nutrition API documentation (spoonacular). RapidAPI. Retrieved December 2021, from https://rapidapi.com/spoonacular/api/recipe-food-nutrition/.
- Dyouri, Abdelhadi. "How to Create Your First Web Application Using Flask and Python 3." DigitalOcean, DigitalOcean, 18 Aug. 2021, https://www.digitalocean.com/community/tutorials/how-to-create-your-first-web-application-using-flask-and-python-3
- Personalized Nutrition Market Growth | Analysis, Trends & Forecasts | MarketsandMarkets. (n.d.). Retrieved October 25, 2021, from https://www.marketsandmarkets.com/Market-Reports/personalized-nutrition-market-249208030.html
- Study: Most U.S. consumers to stick with eating at home post-pandemic. (2021, May 13). Supermarket News. https://www.supermarketnews.com/consumer-trends/study-most-us-consumers-stick-eating-home-post-pandemic
- Successful Website Statistics. (n.d.). Retrieved December 7, 2021, from https://www.mediacollege.com/internet/statistics/successful-sites.html
- Improve Largest Contentful Paint (LCP) on Your Website With Ease. (2021, September 9). CSS-Tricks. https://css-tricks.com/improve-largest-contentful-paint-lcp-on-your-website-with-ease/
- How Fast Should My Website Load? | Average Page Load Time. (n.d.). Retrieved December 7, 2021, from https://www.bluecorona.com/blog/how-fast-should-website-be/
- What is a Good Conversion Rate and How to Improve It. (2020, August 10). Adoric Blog. https://adoric.com/blog/what-is-a-good-conversion-rate-2020/
- Page Views Per Session. (n.d.). Retrieved December 7, 2021, from https://www.klipfolio.com/metrics/marketing/page-views-per-session
- How to Attract Enough Visitors to Your Website to Earn a Living. (n.d.). Fizzle. Retrieved December 7, 2021, from https://fizzle.co/attract-enough-visitors-to-your-website-to-earn-a-living/
- What Is a Good CSAT Score? (2021, January 29). MonkeyLearn Blog. https://monkeylearn.com/blog/what-is-a-good-csat-score/
- Benchmarks By Industry. (n.d.). Retrieved December 7, 2021, from https://www.theacsi.org/index.php?option=com_content&view=article&id=148&Itemid=213

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