SAVOUR AI

CAPSTONE GROUP 12

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SAVOUR AI

❖ Mission statement

To use artificial intelligence to enable informed food choices for consumers. Savour AI aims to close the gap between cultures and geographies, through food, and to contribute to good health and sustenance. Also to reduce global food wastage.

❖ Goals

Savour AI's immediate, short-term and long-term goals involved the following below.

Immediate goals (3 - 6 months)

- Constant solution building and product beta release focusing on top 8 allergies
- Develop high accuracy product (>85% accuracy)
- Target USA and UK Market
- Develop a robust Marketing Strategy
- Strategize a business growth plan

Short-term goals (12–18 months)

- Enhance solution to cover health impact assessment for chronic diseases
- On-board minimum of 1000 users
- Enhance platform performance through user feedback and software updates
- Expand to India and the rest of Asian countries
- Research to expand to other food-related AI solutions

Long-term goals (>48 months)

- Explore and integrate with platforms under Travel and Tourism, Food delivery, Health and Fitness.

❖ Industry

In its immediate and short-term goals, Savour AI will be targeting the Foodservice industry and most importantly, the Restaurant industry which is a subset of the same. In 2019 alone, the global Foodservice industry was worth ~3.52 Trillion USD and was also registering a compound annual growth rate (CAGR) of 3.6% (link). Moreover, the organized segment of the foodservice industry (standalone and chain restaurants) which holds a 35% market share, witnessed a CAGR of 13% during 2015-16 to 2018-19 (link).

Eating out has become a common phenomenon and higher spending capacity has been seen with working Millennials, who happen to be tech-savvy, independent and career-driven individuals (link).

In its long-term goals, Savour AI's target industry is located at the intersection of Travel, Tourism and Hospitality, and Health and Fitness (Wellness). The Travel, Tourism and Hospitality industry consists of Accommodation, Business Travel, Leisure Travel and Restaurants. Together these accounted to an economic impact of 6.5 trillion U.S. dollars worldwide (link) in 2012. In 2018, the global health and fitness club industry generated estimated revenues of 94 billion U.S. dollars. The global fitness and health club industry generates more than 80 billion U.S. dollars in revenue per year and it is on pace to reach its goal of 230 million health club members worldwide by 2030.

The overall market trends in the industries are increasing. The global Travel, Tourism and Hospitality saw an economic impact increase of 2.758 trillion U.S. dollars between 2012 and 2019 (link). Similarly, the global Health and Fitness industry saw an increase of 10 billion dollars between 2014 and 2018 (link). With the exponential growth in travel and social media, the trend for the above industries is moving upward.

The product operates at the intersection of multiple industries namely Travel, Tourism and Hospitality, and Health and Fitness (Wellness) and it delivers values directly to the end consumer.

SOLUTION AT A GLANCE

❖ The Product

Savour AI is a mobile-first application that allows a user to take a picture of an item from a restaurant menu or image of the food ordered and provides the user an indication of all possible ingredients used in the food item. When an image is not available, the application can search the item using the name of the dish as listed on a menu. The application will also be able to provide recommendations to its users about the general rating for that food item.

Savour AI will cover all the world cuisines in a step-by-step-release phased manner. Currently, other competitors in this field only provide nutrient information. Savour AI stands out as it will be able to provide the impact of a dish's consumption on chronic diseases and allergy inducing characteristics as well.

The ability to predict the health impact of a food item which is a combination of various ingredients in various proportions is critical and thus ML and AI are at the heart of the application.

❖ Benefits

Savour AI will become a one-stop application for an individual to determine a dish, its ingredients, recipe process, possible allergens and possible health outcomes.
The benefits include the following:

- Quicker way of determining a food item, especially when language can be a barrier while on travel.
- Allows for positive experiences (ordering the right item than spending on an unpreferred one).
- Quicker way of determining immediate allergy information and health outcomes.
- Tailor recipes for the same food item for a variety of diet schemes (for example, chicken fettuccine recipe suggestion will change across non-vegetarian and low-carb diets).
- Customize food item recommendations based on recent searches (in future goals, will suggest nearest restaurants offering the same or similar food item).

❖ Core Features

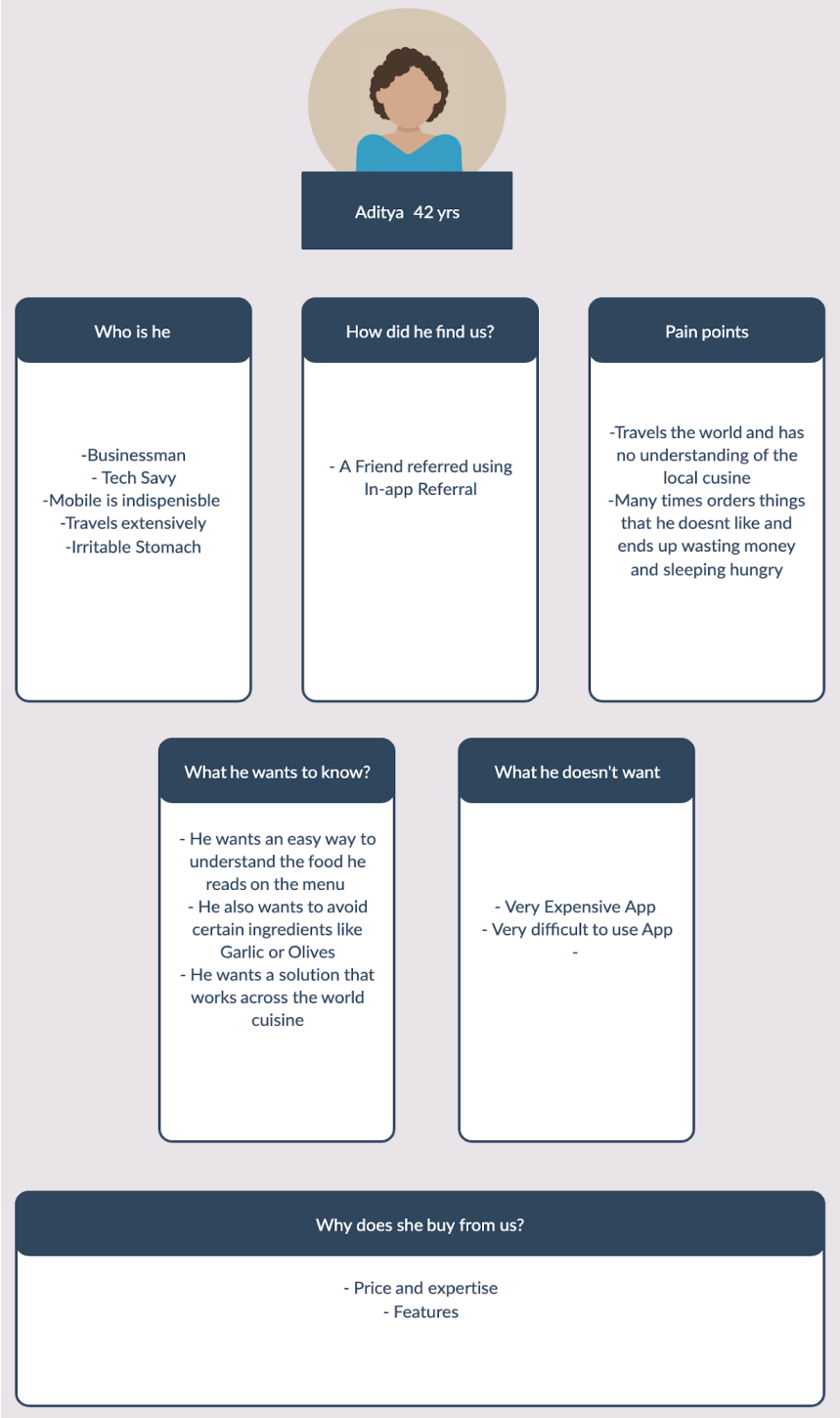
Savour AI application's core features include the following:

- Primary App Language: English
- Password-protected Profile as app contains confidential information
- Custom User Profile which includes information such as Age, Sex, Weight, Height, Ingredient preference, Ingredient distaste, Habits (Cigarettes, Alcohol etc.), Allergen and Medical history details (cholesterol, diabetes etc.)
- Food Image Capture capability with possible food items images suggested, along with their recipes, ingredients, allergen match and medical concern highlights
- Text Image Capture capability with possible food items images suggested, along with their recipes, ingredients, allergen match and medical concern highlights
- Search option with text entry; possible food items images suggested, along with their recipes, ingredients, allergen match and medical concern highlights
- History of previously searched images, text and food items.
- Push Notifications
- Help

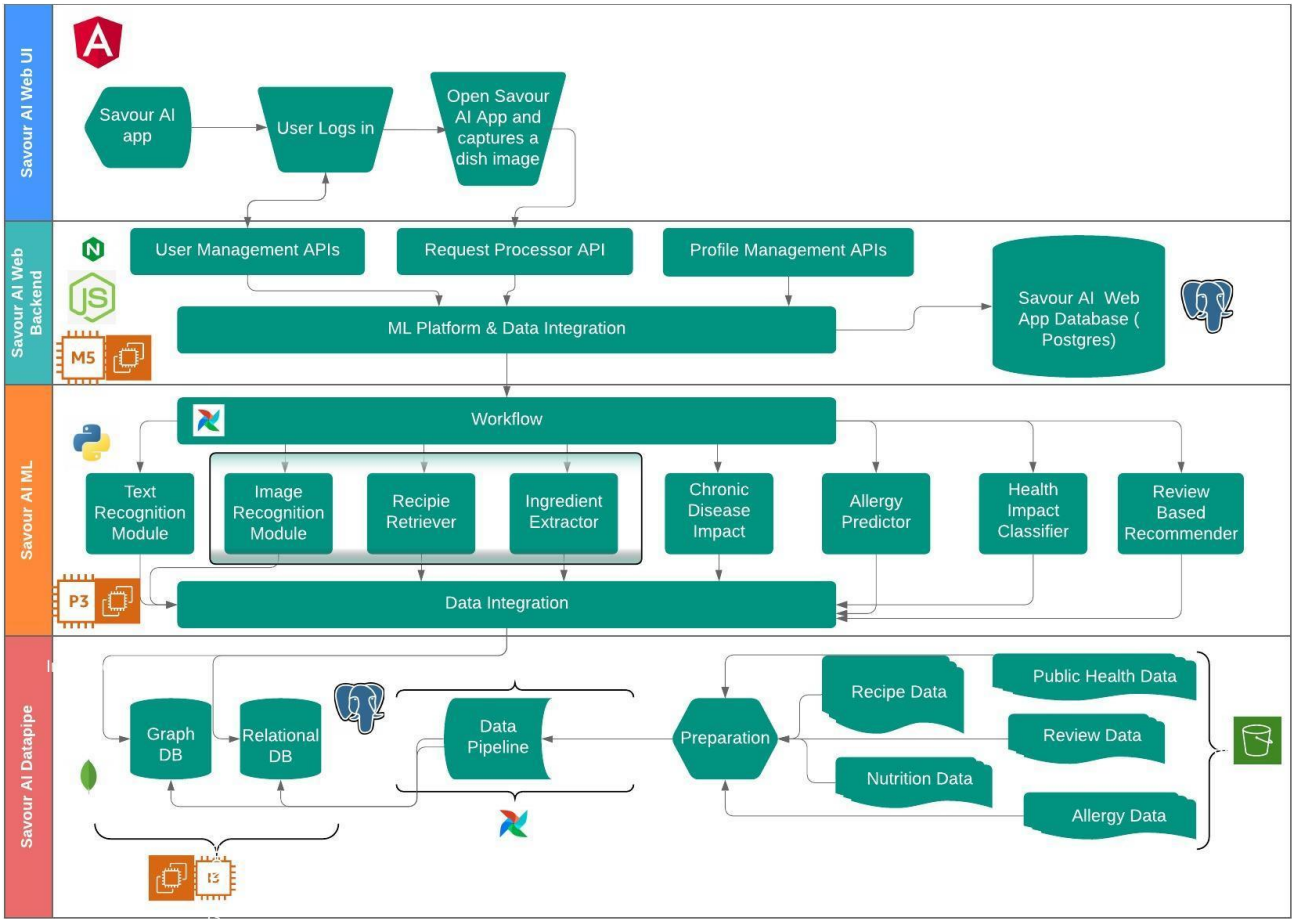
❖ Primary User Profile

The following images highlights an example of the profile of a primary user of the Savour AI application.

Of the various target audiences, Savour AI will initially target people around the world travelling for business and pleasure. Also, the engine can give a recommendation of an 'unknown' dish using Collaborative Filtering techniques.



❖ Savour AI Platform Overview and Technology Stack



❖ AI Modules used in Savour AI application

Text Recognition: The AI Text recognition module assists with decoding the image captured from a menu card in a restaurant or even a screenshot from a food ordering platform, which can then be forwarded to the remaining steps in the workflow. This module would be developed using Python-Tesseract, which is a wrapper for Google's Tesseract-OCR Engine. The model will recognize and "read" the text embedded in images.

Image Recognition, Recipe Retriever and Ingredient Extractor: The AI Image recognition module assists in identifying the image of the dish and locating the recommended recipes for the same. This module will be using Recipe1M+ Dataset and Model, which is a new large-scale, structured corpus of over 1 million cooking recipes and 13 million food images. As the largest publicly available collection of recipe data, Recipe1M+ affords the ability to train high-capacity models on aligned, multimodal data. *Code Reference: Code on GitHub*

Chronic Disease Predictor: This AI module helps in identifying the overall health impact level of every ingredient on chronic ailments such as diabetes, hypertension and cardiac related diseases. This module will use ensemble techniques, i.e. stacking different multi-class classifier algorithms with classes being 'no risk', 'moderate risk' and 'high risk'. This module will be developed using Python.

Allergy Predictor: In the initial release phase, this module will also look at the top 8 allergy-inducing ingredients in recipes and match these against publicly available allergy data to identify the risk probability for an individual of certain age, origin, ethnicity, gender etc. This AI module will be developed in Python and will use regression algorithms. The algorithms would be chosen after data analysis. It will include a stacking of outputs to define a holistic allergy indicator for a given dish.

Health Impact Predictor: This will take input from both Chronic Disease Predictor and Allergy predictor and create a final output will suggest whether the complete dish is off limits for the user. This could be a simple developed rules engine.

Review Based Recommendation: This AI module will use collaborative filtering to provide recommendations, through scrapping and labeling of reviews from various food blogs.

❖ Importance of AI

While the quality of OCR (Optical Character Recognition) has steadily improved ever since it was created, the demands of modern enterprises have fast outstripped its growth (link). Moreover traditional OCR is dependent on the quality of scans, and the user's only option to increase the reliability of scans is to manually measure and monitor the results. AI not only removes this manual check requirement, it is also able to process content more thoroughly. Hence a better solution for Savour AI would be to use a hybrid

between OCR and an AI Deep Neural Network - Deep Learning OCR Models - where OCR can be used to extract text and AI can be used to ensure accuracy using live data.

Savour AI is also dependent on being able to classify and segment images for the application to deliver its core benefits. This is majorly possible through a Computer Vision technique called Image Recognition. The Computer Vision model functions to acquire images, pre-process the data, extract core features, detect or segment for objects of interest, run a high-level of image processing and develop decision-making.

TARGET CUSTOMER

Savour AI is a B2C product. The target customers are Millenial and Gen Z who own smartphones, are active social media users, have a disposable income, a keen interest in travel and motivation for a healthy lifestyle. This group accounts for approximately 63% of the global population (link).

MARKET SIZE

Within its immediate goals, Savour AI will be targeting the restaurant industry. As of 2019, the following is the restaurant industry size across continents:

- USA - 863 billion USD
- Europe - 580 billion USD
- Asia - 1.5 trillion USD
- Rest of the world ~$500 billion USD

USA, Europe, Asia and Australia's restaurant industry is expected to grow at a CAGR of 3.33%, 2.1%, 7% and 5% respectively. The industry is split into segments which include quick-service restaurants, casual dining restaurants, cafes, fine dining restaurants, and pubs, bars, clubs and lounges. The organized segment of the industry sees an upward growth due to rise in working population, nuclear families and disposable income. Rapid urbanization and consumerism pose as major growth factors as well (link).

The immediate reach is to connect with the Millennial and Gen-Z population, who frequently use social media (primarily Instagram, Facebook and Pinterest) and use search terms involving travel, food, health and fitness. As of 2020, the current age group comprising Millennial and Gen-Z population (ages 4 through 40) account for 54.65% of total population (link). The realistic spending group which is ages 15 through 40, account for 37.19% of the total population. Within this group, approximately 68% are active Internet users, with the majority of the active usage amongst the population in urban centers (link).

The current trends in the target market change with social media trends. Ninety percent of Gen-Z travel decisions are influenced by social media (link). According to Health and Fitness site, Glofox.com, at-home workouts, sustainable diets and intuitive eating are the top trends. As more data is being made available on health and fitness, definitions of fitness and exercise are progressively transforming. The target

market is always looking forward to new apps and technology that will drive this transformation (link). As for Travel, Tourism and Hospitality, Millennials and Gen-Z spend more and travel more than any other age group (link). These groups tend to focus on exploring the world and getting a "local" experience—and posting it all on Instagram (link).

In addition, we have highlighted analysis on the top trends in the food industry by Forbes.com (link) below:

> *"The biggest trend driving change in the food and beverage industry right now is transparency. Consumers want to know and understand what ingredients are going into their products."*
>
> *"Health and Wellness is a trend that has been the fundamental driver of change in food and beverages worldwide, and we not only expect this trend to continue, but also accelerate."*

Another trend analysis from Kalsec.com (link), highlights the fact that the consumers are looking for "Authentic Global Flavors".

> *"As flavors from around the world are becoming familiar in different regions, consumers want authentic versions of these global flavors. This means they want to understand the story behind the food and/or flavor, which relates back to our prediction for storytelling. Consumers expect more from global cuisines at restaurants and in packaged products, meaning manufacturers have pushed for transparency and authenticity with more specific regional flavors in well-known cuisines."*

BARRIERS TO ENTRY

Savour AI is highly dependent on the data specifically image and text data on meals, recipes, ingredients, nutrition and allergens. Both compilation, modelling, training and storage of this data will require a high-upfront investment. Since the product is young, with existing competitors in the market, another major subset of funds need to be dedicated to brand recognition and marketing activities. Savour AI will need to focus on building capital through seed-funding and collaborate with data firms for software and/or hardware support.

RISKS, THREATS & OPPORTUNITIES

Savour AI is entering a highly competitive industry where there are many players in the food, health and fitness market, all vying for the user's attention. The product runs the risk of being pushed to the background, if it does not adapt to the ever-changing market preferences.
A legal threat may include image copyright infringement, especially if the image has been imported into the product's database from another source without permission, and the possibility of a misidentification of the product and its ingredients, which may lead to a medical emergency for the user.

Savour AI is primarily dependent on an individual's disposable income to travel and eat-out. A dwindling economy could pose a risk in the usage of the platform. Another threat we may face is taking into light a pandemic situation where tourism has been halted and so as restaurant service. These could lead to less usage of the product.

On a technology front, Savour AI collects user data and could be targeted by hackers and bots. Also, consistent upgrades in software platforms provided by Apple Store and Android would require continuous product updates, or else it will lead to a user defection from Savour AI's platform.

An opportunity with Savour AI relates to the growing tourism industry globally. The possibility of expanding the database across various countries and demographics is incredibly high. This can also be said with regards to the product's integration with Food Delivery and Fitness mobile application platforms. Savour AI can also be a boon for an immigrant population who will have to get accustomed to new cultures and food sensibilities.

While Savour AI's model is dependent on travel and tourism, Savour AI can also easily enter the home-lifestyle environment where individuals who want to try new recipes in their kitchen will be able to capitalise on the product's ability to deliver unique recipes, nutrition and allergen information right to their fingertips. At the same time, the platform will also be able to assist when ingredient restriction may exist with children's foods, individuals with life-threatening allergies and elderly dietary requirements.

❖ SWOT Analysis

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Product Offering	Product features re-engage users Test-and-learn approach Insightful data-driven research	Recipes are location specific - ingredients change across geography Less datasets available on India and Asian countries	Product innovation and new growth platforms Growing target market that is health conscious	Global Pandemic - lowers usage of product
Brand / Marketing	Customer-centric mindset	New in market - more marketing efforts needed Pricing strategy needs to work	Tourism industry expansion Current Generation enjoys eating out often World-wide usage	Unpreparedness for opening numbers could reduce reputation
Staff / HR	95% online operations - office space not required	Shortage of skilled ML/AI developers	Could provide new employment opportunities to skilled resources	

Finance	Several independent ways to generate revenue Breakeven can be achieved within few years with product adoption and customer satisfaction	Initial Capital required for start-up Fairly expensive initial setup costs Server intensive - costly data storage		
Operations / Management	Database growth is possible due to wide variety of food images and recipes on the internet Operations can be run 95% online	Requires continuous data modelling and training.. Faster processing required Intensive online operations can cripple the product working in case of issues (server issues/DB/new connectivity etc)	Operations can be run 95% online	
Market	Health-oriented generation Smartphone oriented	Dependence on Millenials and Gen Z. Dependence on Urban market Requires frequent change to update to market trends and social media trends.		Competitive Market - Imitable app function Unknown ongoing instability in market Social media trends continuously evolving Dependent on phone lighting / image capture technology

Can any of your strengths help with improving your weaknesses or combating your threats? If so, please describe how below.

Majority of the company's operations will run online. Hence expenses on office rent, maintenance and upkeep are negated. This allows for dedication of funds and primary purpose of raising funding towards data storage management and marketing activities. Also with the internet being a continuously growing hub of information, it has been easier to track and download recipe information across geographies. At the same time, the dictionary of food does not require much technical knowledge. This reduces the initial strain in hiring for technical expertise. An initial hire of undergraduate part-time students or recent graduates as interns who can browse the web to collect and compile data related to dishes and recipes can offset costs that will be required in hiring ML and AI experts. Another initial hire of media and marketing graduates as interns, can work towards setting up media profiles for Savour AI and also create a strategy to track trends in the industry.

With a step-by-step release phased approach, the initial R&D will be focussed on geographic based recipes, key to the target market. Through achieving customer satisfaction and higher approval ratings, the application could gain traction of higher seed-funding from existing investors, and potential new investments, so that the application can expand to future geographical-based releases.

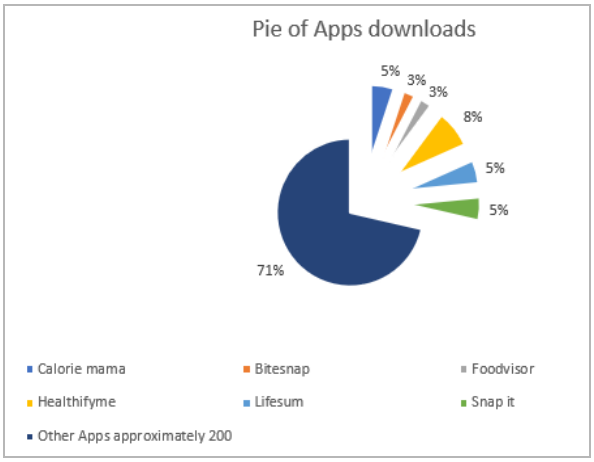
Based on the information above, what are your immediate goals/next steps?
Our immediate goal would be to hire interns for data research, collection, compilation on recipes, ingredients, nutrition information and possible allergens. Another set of interns would be hired to build the company's social media profile and track media trends. Costs will be identified for the following areas - data storage, ML & AI experts recruitment, front-end and back-end upkeep such as server maintenance and software updates.
Based on the information above, what are your long-term goals/next steps?
Savour AI's long term steps include: ● Increase recipe catalog based on geography ● Increase the list of languages that the user can search in ● Allowing the application to recommend certain dishes, based on user parameters ● Restaurant suggestions based on recent recipe searches ● Fusion-recipe suggestions ● Increase brand recognition on social media platforms ● Focus on a customer-oriented team that will track user concerns and feed them back to the application development team

COMPETITION ANALYSIS

The following are a list of competitors with similar features to Savour AI that currently exist in the market:

- Caloriemama
- Bitesnap
- Foodvisor
- Healthifyme
- Lifesum
- Snapit

Their current rate of mobile app downloads is shared in the pie-chart on the right.



❖ Competition Matrix of Top Competitors

The table below represents a Concept Jury Matrix. Under the 'Customer Impact' column, '5' indicates the highest impact on the customer and '1' indicates the lowest impact (or no impact at all). Also, points highlighted in orange, indicate the importance of that feature to the competitors' respective strengths or weaknesses.

App or product	Calorie Mama	Bitesnap	Foodvisior	Healthifyme	Lifesum	Snap it	Customer Impact
Tagline	Discover the future of digital health	the easiest way to track your diet,count calories and balance your macros	Foodvisor is a nutrition coach that will help you eat healthier and reach your goa	Weight loss begins with you and ends with HealthifyMe	Healthy living.Simplified	Now, tracking your food is as easy as snapping a picture	2
Plans	Trial Plan '$100/month 20K plan '$2000/month Custom plan	Free	$4.99/month	Rs.1299 for premiumm plan	$3.75/month	Free, Premium at $40/month	5
size of app	34MB	12MB	12MB	26MB	18MB	39MB	4
downloads	10M	0.5M	0.5M	16M+	10M+	10M+	4
Ratings	4.4	4.3	4.5	4.6	4.4	4.6	4
Year	2017	2018	2015	2012	2008	2019	2
Target markets	West America	Central America	European Union (France and Germany)	Asian and European	European	USA	3
Upcoming collaboration or current collaboration	Stanford university and university of california	No	No	1)MilkBasket for grocery ordering 2) Fitternity for Gym access 3) Swiggy	No	No	2
Upcoming products	Product on Heart dieses management	No	No	Healthifysense for mental illness	Product on food identifier	Product on food identifier and calorie counter	3
Sales methods	Internet App	Internet app	Internet App	Internet App	Internet app	Internet app	4
hardware requirments	smartphone	Smartphone	Smartphone	smartphone and smartwatch	Smartphone	Smartphone	5
Infrastructure requirments	None	None	None	None	None	None	2
Service and maintainance cost	as per plan	Free	As per plan	as per plan	As per plan	As per plan	5
USP of product	**1) Get full nutritional information for over 5000 unique food items in 7+ languages** 2)Log a food item with as few as 3 swipes	1) Good app to track calorie intake 2) Free 3) Less memory space required **4) Simple design**	**1) Your meal is added to your food diary** 2)Small app size 3)Handy picture recognition 4) Good graphics	1) Provide online coaching for fitness **2) Included YOGA in fitness plan** 3) Personalised training 4) Good food database	1) Provide online coaching for fitness 2) Personalised training 3) Food and calories identification 4) Less space required	1) Good graphics 2) Provide online coaching	4
weaknesses	1) Need to upgrade to premium to add food items 2) App does not work properly and utilises lot of internet data **3) camera starts automatic**	1) Food items required manual addition, data base is not sufficient 2) No option for editing meal **3) No metric system**	1) Limited food data base 2) Not free **3) No cross sync with other help apps and devices** **4) Lots of bugs**	1) Pestering to buy paid services **2) No proper guidance from trainers** 3) Consumes lot of space in mobile	**1) Limited food databas**e 2) Bugs in the app	1) Limited food database 2) Bugs in app **3)expensive**	4
Products and service they offer	1) Recognition of food and calories 2) Diet plan and exercise track	1) Recognition of food and calories 2) Diet plan and exercise track	1) Food recognition 2) Diet plan and exercise plan 3) Food diary	1) Food recognition 2) Diet plan and exercise plan 3) Yoga and Gym coaching	1) Food recognition 2) Diet plan 3) Receipe sharing	1) Food recognition 2) Diet plan 3) Receipe sharing 4) Weigt loss plan	5
Market specifications	Mostly US specific	Central America Specific	European Union (France and Germany)	Asian and some part of Europe	European and north america	America	3

Based on the analysis from the Competition Matrix, the following features will <u>also</u> need to be considered to separate Savour AI from the competition:

- Small mobile app size - 12 MB or less
- Extensive food database of Asian, American and European cuisines
- High accuracy in food identification
- Affordable pricing model, 'free version', followed by premiums beginning with under USD $5 per month or INR 250 per month
- Personalized service inclusion for premium users
- Integration of fitness platform especially Yoga

REQUIREMENTS - DATA & PEOPLE

❖ Data Requirements

There are six groups of primary data required for Savour AI:

- Food Ingredients
- Food Recipes
- Food Images
- Food Allergens
- Nutrition Data
- Public Health information

As a startup, Savour AI's application train and test models would use existing copyright free databases and APIs. The following are a list of existing databases and APIs that will be used to build the model.

Ingredients	Recipes	Images	Allergens	Nutrition	Public Health Information
FooDB	Recipe 1M+**	CROCUFID	ALLERGEN ONLINE	EDAMAM*	Zenodo
INFOODS	Esha Research	food.pics	AllerBase	Food and Nutrient Database for Dietary Studies	
EDAMAM*	Airtable Recipe Database	Food-5K	Informall Allergenic Food Database	Australian Food Composition Database	
Esha Research	The Cookbook	Food-11	SDAP - Structural Database of Allergenic Proteins		
	EDAMAM*	Food 101	EDAMAM*		
		Food-475			

*EDAMAM has a complimentary package for startups
**Recipe 1M+ - paid license

Besides the above mentioned some information about food and chronic diseases will need to be newly scrapped from various health and nutrition websites.

❖ People Requirements

Term	Role	No.	Role Description
Immediate for app build	Project Manager	1 S	Manages the development of the project from creation to prototyping to testing to deployment.
	Bioinformatician	1 M	Connect dots between ingredients and allergen.
	Data Engineer	1 M (Contract)	Collect, store and prepare big data. Manage data warehouse(s).
	Data Scientist	1 M / S	Transform big data into a more usable format. Communicate and collaborate with both IT and business. Search for order and patterns in data and spot trends that can help a business's bottom line.
	Data / Business Analyst	1 J / M	Provide insights into market trends. Assist with product development, pricing and new product launches as well as develop new business opportunities. Analyze competitor and customer insights. Analyze sales forecasts and relevant financials.
	IT Architect	1 M	Design and maintain computer networks. Use computer design software to model and test network plans prior to implementation. Simulate adding new hubs, changing routers or making other modifications to existing networks.
	UX Designer	1 J / M (Contract)	Develop app's user interface and map user experience. Develop visual design and user interaction design.
	Full Stack Developers	2 M	Design user interactions on app, develop servers, databases and code for mobile app functionality.
	QA Engineer & Scrum Master	1 S	Test and ensure the best quality of the final product. Work in close cooperation with the engineering team, Check app against the initial functional and non-functional requirements and fix bugs before the app is released.
Immediate post app beta release	Account Manager / Customer Service Manager	1 M 1 J	Provide customer service. Create customer satisfaction goals. Lead and motivate the customer service team. Develop loyalty programs.
	Product Marketing Manager	1 J / M	Develop brand strategy, including the setting of style guides, brand guidelines, brand vision and value proposition for short as well as long term. Plan and execute all communications and media actions on all channels, including online and social media. Create and manage promotional collateral to establish and maintain product branding Manage the budget for advertising and promotional items
Long-Term	Sales Manager	2 J / M	Manage Service call sales for mobile app
	Human Resources and Administration	1 M	Manage Human Resources requirement and company administration requirements.

*J - Junior, M - Mid-Level, S - Senior

PRODUCT DEVELOPMENT ROADMAP

❖ MVP (Minimum Viable Product)

The product development roadmap will follow Agile - Scrum Methodology and it will use Kanban Boards for tracking. Every Sprint will be approximately two weeks long, except for Sprint 0, which will be dedicated towards executing the groundwork to begin the product development. Backlog creation and refinement with product features will also be created during Sprint 0.

Phase ↓/ Sprint →	Sprint 0	Sprint 1	Sprint 2	Sprint 3	Sprint 4	Sprint 5	Sprint 6	Sprint 7
Preparatory phase - Infrastructure Requirements, Software installation etc								
Data Collection and Cleaning		US		Europe & ROA				
User Experience Design		Application UX						
Application Architecture & Design		Hybrid Web Application						
Application Front End Development			Hybrid Web Application				Testing Support	Cut Over Support
Application Back End Development			Hybrid Web Application				Testing Support	Cut Over Support
CI/CD Set up								
ML Database Design & Data Pipeline			ML Platform DB					
ML Platform Architecture & Development			ML Platform Architecture & Dev				Testing Support	
QA				Automated Functional Testing				Cut Over Support
Production Cut - Over								Go Live

❖ Epics and Stories

Epics	Stories	Remarks
Food Allergy & Disease Data Collection & Interpretation	Data collection and amalgamation using different techniques and different sources	Refer Data
	Data Cleansing & Analysis	
	Data Insights	
User Management	User Registration using oAuth2 via Gmail. Facebook, Instagram, Twitter, Pinterest	
	Use Log in	
	Forgot Password	
	User Profile Creation and Update	
Image Input	Image Upload or Capture	
	Image Categorization (OCR)	Menu Text or Dish Image
	Extracting Keywords for recipe Search (NLP)	

Recipe Retrieval	Recipe Retrieval using Cosine Similarity	Recipe 1M+
	Ingredient Extraction using NLP	
	API Creation	
Free Text Search	NLP to understand intent and kick off right workflow	Wrapper for Recipe 1M+
Allergy ML Database Creation	Graph DB Design to connect Food Item, Allergens, Affected Population , geography etc	
Health impact Prediction	Regression to predict the possible health impact	Data needed
	SVM Classifier to decide whether a food is permissible or not depending on the health impact predicted for various ingredients	Data needed
	Sentiment analysis & Recommendation of the food item based on reviews	Data needed

EXPANSION PLAN

The first few sprints in Savour AI's product development roadmap will be dedicated towards collecting sufficient data for the Indian subcontinent and for the rest of Asia. Savour AI will then continue to explore and integrate with existing Travel and Tourism, Food Delivery and, Health and Fitness platforms in the mobile application industry. From a brand management and marketing perspective, funds will be dedicated to increase exposure of Savour AI on the web and social media platforms, and additionally, focus will be placed on a customer-oriented team that will track user concerns and feed them back to the application development team.

❖ Known Concerns

While devising the expansion plan, Savour AI is aware of hurdles it may face. These include:

- Cold start in recommendations.
- Inadequate data for certain geographies.
- Impact of the quantity of ingredients used in a recipe, as this is not considered in the AI training model. Savour AI recognizes that a complex model will need to be developed to keep into account independent quantities of ingredients used in a recipe and its combined ability to induce allergies at a specific threat level.
- Pandemics such as Covid-19 that could account for infrequent travel possibilities.

❖ Possible Opportunities

- Savour AI can also easily enter the home-lifestyle environment where individuals who want to try new recipes in their kitchen will be able to capitalise on the product's ability to deliver unique

recipes, nutrition and allergen information right to their fingertips. At the same time, the platform will also be able to assist when ingredient restriction may exist with children's foods, individuals with life-threatening allergies and elderly dietary requirements.
- Active App will act as a means to collect more data.

BUSINESS MODEL

With the proposed business model, Savour AI is set to deliver ROI gains of 45.73% by Year 4 and then 218.24% by Year 5. This strong delivery is accounted for by its revenue monetization models mentioned below.

❖ Projected Expenses

In the initial stages, the business will run primarily in a Work-From-Home setting, incorporated in Chennai, Tamil Nadu. Doing so will reduce significant costs such as office rent, maintenance and supplies. The company will invest in high performance computers and accessories for its core production and deployment staff. The expenses are divided in the following sections:
- Web & Mobile - Platform, Development, Maintenance
- Office
- People
- Governance
- Marketing

Savour AI's cumulative yearly expense projections over 5 years can be viewed as follows (amounts mentioned are in Indian Rupees INR):

Expense Category	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Web & Mobile - Platform, Development, Maintenance	50,580	1,00,620	1,55,660	1,56,980	1,57,300	**6,21,140**
Office & Equipment	10,93,000	1,33,000	93,000	93,000	93,000	**15,05,000**
People	85,80,000	1,01,60,000	1,06,80,000	1,05,40,000	1,07,00,000	**5,06,60,000**
Governance	1,03,000	51,000	51,000	51,000	51,000	**3,07,000**
Marketing	0	9,08,000	7,08,000	7,48,000	7,48,000	**31,12,000**
TOTAL EXPENSES	**98,26,580**	**1,13,52,620**	**1,16,87,660**	**1,15,88,980**	**1,17,49,300**	**5,62,05,140**
CUMULATIVE EXPENSES	**98,26,580**	**2,11,79,200**	**3,28,66,860**	**4,44,55,840**	**5,62,05,140**	

The following is a detailed table of projected expenses over 5 years:

Expense Category	Year 1	Year 2	Year 3	Year 4	Year 5
WEB & MOBILE - PLATFORM, DEVELOPMENT, MAINTENANCE					
Company Emails	14,880	18,600	22,320	22,320	22,320
Company Website Domain - Savour.ai	7,500	7,600	7,700	7,800	7,900
Company Website Hosting	1,500	1,700	1,900	2,100	2,300
Company Website Privacy	200	220	240	260	280
Android / iOs App Registrations	5,000				
App and Developer Licenses	10,000	10,000	10,000	10,000	10,000
AWS S3, AWS EC2, NGINX + Security Firewall	11,500	62,500	1,13,500	1,14,500	1,14,500
OFFICE & EQUIPMENT					
Office / Mailbox Registration + Maintenance	60,000	60,000	60,000	60,000	60,000
Computer / Desktops (with accessories)	10,00,000	50,000	10,000	10,000	10,000
Conference Support	18,000	18,000	18,000	18,000	18,000
Miscellaneous Supplies	15,000	5,000	5,000	5,000	5,000
PEOPLE					
Project Manager	14,40,000	14,60,000	14,80,000	15,00,000	15,20,000
Bioinformatician	4,80,000	4,90,000	5,00,000	2,00,000	2,00,000
Data Engineer	8,40,000	8,50,000	8,60,000	8,70,000	8,80,000
Data Scientist	8,40,000	8,50,000	8,60,000	8,70,000	8,80,000
Data / Business Analyst	3,60,000	3,70,000	3,80,000	3,90,000	4,00,000
App Designer / UX Architect	3,00,000	3,10,000	3,20,000	3,30,000	3,40,000
IT Architect	4,80,000	4,90,000	5,00,000	5,10,000	5,20,000
Full Stack Developer 1	9,60,000	9,70,000	9,80,000	9,90,000	10,00,000
Full Stack Developer 2	9,60,000	9,70,000	9,80,000	9,90,000	10,00,000
QA Engineer & Scrum Master	9,60,000	9,70,000	9,80,000	9,90,000	10,00,000
Account Manager / Customer Service Manager	6,60,000	6,70,000	6,80,000	6,90,000	7,00,000
Account Manager / Customer Service Manager		1,90,000	2,00,000	2,10,000	2,20,000
Product Marketing Manager	3,00,000	7,30,000	7,40,000	7,50,000	7,60,000
Sales Manager		4,20,000	4,30,000	4,40,000	4,50,000
Sales Manager		4,20,000	4,30,000	4,40,000	4,50,000
Human Resources and Administration			3,60,000	3,70,000	3,80,000
GOVERNANCE					
Company Registration / Incorporation	16,000				
GST Registration	6,000				
Profession Tax Registration	0				
Trademark Filing	10,000				
IP Protection	20,000				
Accountant services - Filing, Registration, Migration	1,000	1,000	1,000	1,000	1,000
Legal Counsel	10,000	10,000	10,000	10,000	10,000

Audit Fees and Income Tax Filing	40,000	40,000	40,000	40,000	40,000
MARKETING					
Google Ads		3,60,000	3,60,000	3,60,000	3,60,000
Social Media Ads		2,40,000	2,40,000	2,40,000	2,40,000
Promotional Video		2,00,000			
Trade Show / Apps Showcase		60,000	60,000	1,00,000	1,00,000
Emailer Campaigns		18,000	18,000	18,000	18,000
Blog Marketing		30,000	30,000	30,000	30,000

❖ Proposed Revenue Model

The revenue models for Savour AI consist of the following monetization strategies:

- Premium Model Subscription - Silver
- Premium Model Subscription - Gold
- Turn-Off Add Model
- In-app advertising - Promoted Food Blog Sites
- In-app advertising - Promoted Restaurants
- In-app advertising - Promoted Consultants
- Sponsorship
- Data Monetization

In the long term, Savour AI will also consider other revenue models such as Service sales, Transactional revenue, Third-Party App Integrations and Data Licensing.

The following indicates Savour AI's beta release strategy for its Premium Model Subscriptions:

		Features															
Subscription Model	**Description**	**Registration**	**Basic Profile**	**Profile Addition: Allergen History**	**Profile Addition: Medical History**	**Profile Addition: Diet Plan**	**Push Notifications**	**Image Search**	**Text Search**	**Search with Filters (ingredients, allergens, diet plans etc)**	**Search History**	**Recipe Recommendations**	**Restaurant Recommendations**	**Consultations (Dietician / Nutritionist / General Physician)**	**Origin Country Access**	**Abroad Country Access**	**Service Call Support**
Freemium	2 months only	Y	Y	Y	Y	Y	Y	Y (upto 10 per month)	Y	Y (upto 5 per month)					Y	Y (upto 5 per month)	
Savour Silver	INR 150 per month / INR 1500 per year (Yearly INR 300 discount)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y (upto 3 per search)	Y (upto 3 per search)		Y	Y (upto 15 per month)	Y
Savour Gold	INR 250 per month / INR 2700 per year (Yearly INR 300 discount)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

❖ Projected Revenue

Savour AI's revenue projections are listed in the table below. We have also captured the estimated active user download and model subscription. The assumption takes into account that 4% of the app's user base would opt for the monthly Savour Silver subscription and 1% of the app's user base would opt for the Savour Gold subscription. For in-app advertising, the revenue has been calculated at INR 75 per CPM.

Revenue Category	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Premium Model Subscription - Silver	-	6,00,000	30,00,000	3,00,00,000	6,00,00,000	**9,36,00,000**
Premium Model Subscription - Gold	-	2,70,000	13,50,000	1,35,00,000	2,70,00,000	**4,21,20,000**
Turn-Off Ad Model	-	30,000	1,50,000	15,00,000	30,00,000	**46,80,000**
In-app advertising - Promoted Food Blog Sites	-	7,875	39,375	3,93,750	7,87,500	**12,28,500**
In-app advertising - Promoted Restaurants	-	7,875	39,375	3,93,750	7,87,500	**12,28,500**
In-app advertising - Promoted Consultants	-	75	375	3,750	7,500	**11,700**
Sponsorship	-		15,00,000	15,00,000	15,00,000	**45,00,000**
Data Monetization	-			1,05,00,000	2,10,00,000	**3,15,00,000**
TOTAL REVENUE	**0**	**9,15,825**	**60,79,125**	**5,77,91,250**	**11,40,82,500**	**17,88,68,700**
CUMULATIVE REVENUE	**0**	**9,15,825**	**69,94,950**	**6,47,86,200**	**17,88,68,700**	**17,88,68,700**

The following table indicates the active user estimation on the app per year:

User Category	Year 1	Year 2	Year 3	Year 4	Year 5
Freemium	-	10,000	50,000	5,00,000	10,00,000
Silver	-	400	2,000	20,000	40,000
Gold	-	100	500	5,000	10,000
Ad-Free	-	50	250	2,500	5,000

❖ Return-on-Investment (ROI)

The following table indicates the return on investment calculated using the cumulative expenses and net cash flow:

Category	Year 1	Year 2	Year 3	Year 4	Year 5
TOTAL EXPENSES	98,26,580	1,13,52,620	1,16,87,660	1,15,88,980	1,17,49,300
CUMULATIVE EXPENSES	98,26,580	2,11,79,200	3,28,66,860	4,44,55,840	5,62,05,140
TOTAL REVENUE	0	9,15,825	60,79,125	5,77,91,250	11,40,82,500
CUMULATIVE REVENUE	0	9,15,825	69,94,950	6,47,86,200	17,88,68,700
NET CASH FLOW	**-98,26,580**	**-2,02,63,375**	**-2,58,71,910**	**2,03,30,360**	**12,26,63,560**
ROI	**-100.00%**	**-95.68%**	**-78.72%**	**45.73%**	**218.24%**

GO-TO-MARKET STRATEGY

Savour AI will only be successful in the market, with a pre-planned and well-defined Go-To-Market Strategy. The immediate strategy involves the following:

- Identifying the 'personas'

- Users - Individuals who use the product regularly; Target Millenial and Gen-Z in the USA and US Market (short-term), following Asian Market
- Influencers - Since our target marketing is on social media channels, Savour AI will work with popular personalities in the food domain to push out its messaging.

- Support application partners - Savour AI will work towards partnering with online industry operators in Travel and Tourism (MakeMyTrip, GoIbibo, TripAdvisor, etc.), Food Delivery (Zomato, Swiggy, etc), Grocery Delivery (Big Basket, Grofers , Amazon etc.) and Health-related platforms to push product messaging.

- Developing key messaging

- 'Enjoy the taste of eating right.'
- 'Your mobile food translator'
- 'Your passport to good food'
- 'Recipes suitable for every occasion'
- 'Eat healthy. Be happy'
- 'A whole new way to plan your meals'
- 'Know your food at your fingertips'
- 'Creating healthier lives.'
- 'Why risk it?'
- 'To eat is a necessity, but to eat intelligently is an art.'

- Testing the messaging

Once Savour AI's beta model has been released, the team will test out its advertising on its list of social media channels, target audience and its messaging. Initially, advertising will be issued on Instagram, Facebook and Pinterest due to their highly visual aspects

- Optimizing ads and SEO

Based on the results of our message testing on various social media, the team will focus on analyzing the ads with high conversion rates through cost-per-clicks. The ads will be optimized to gain a high reach by evaluating the audience sub-segments that were initially inputted. Audience sub-segments could include users who have active social media profiles and who can be segmented into funnels such as fitness, food and travel.
In addition, the tag words gaining high conversion rates can also be used to update our app's SEO.

- Developing sales strategy:

Savour AI has initially focussed on The Self-Service Sales model to help achieve its business goals. This model purely depends on the strength of the marketing content, messaging and traffic driven to the app as the customer purchases premium subscriptions on their own.

Savour-AI long-term strategies include:

- Building Brand Awareness
- Sales through renewals and upselling
- Third-party app integrations