UNIVERSITY OF FLORIDA

The Foundation for The Gator Nation.

The Business Plan of

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EXECUTIVE SUMMARY

- Opportunity Statement
    - The opportunity comes now not before or later in the future because of the following reasons:
        - Customers are beginning to demand a better, more comprehensive search experience, while most of existing engines are based on text search. The image-based search engine, which is very useful in helping people accurately identify products of their interest, is still not yet widely employed in the industry.
        - The advancement in technologies of image retrieval. In the recent decade, the computer vision technologies have experienced a big improvement, which makes large-scale image retrieval become possible. Especially, the employment of deep learning technologies makes the information retrieval much more accurate than before.
    - The major forces creating the opportunities include:
        - The e-commerce industry has been growing dramatically and more and more people are making use of the convenience e-commerce.
        - The recent technological breakthrough in image search and discovery has created new opportunities for image based search engines.
        - The combination of image and text search provides much better accuracy.
- Business Concept and Product or Service
    - We provide a novel product search engine based on visual search technologies. The unique features of this search engine include:
        - Enabling users to search visually similar products.
        - Combining text and image information for enhanced search experience.
    - With our service, we can solve several problems:
        - Can now search by image in addition to text.
        - Improve the search accuracy by combining image information with text.
- Description of the Target Market
    - Nowadays, as our technologies become more and more sophisticated, the number of people involving the online shopping is increasing exponentially. For example, the Amazon.com sells more than 400 items each second on average currently! Thus, the potential market is very huge.
    - We are targeting at people whose ages are between 18 and 34 who are more willing to try new technologies. The people in this age group are usually students and young employees.
- Competitive Advantage
    - We are the first company that applies the combination of visual and textual search technologies to e-commerce industry.
    - Our company has low startup costs, and the operational costs will increase only if we are having more customers.
    - GatorSearch operates in new area of e-commerce product search, and thus we expect to gain millions or even billions of users in a short period of time. After our approach becomes more popular, it is unavoidably that new competitors show up. Fortunately,

search engine has high level of entry. These entry barriers include a large group of users, and matured search system as well as good connection with other retailers.

- Essence of Marketing Approach
  - In order to win this market, the most important things we need to do well include
    - A good information retrieval system provides accurate search results. We already have a working prototype for that purpose which we expect to launch it by August 2015. And in the future, we will continue our efforts to improve this system.
    - A good advertising strategy to let more people to use our system.
  - The key methods
    - Implement the state-of-the-art algorithms for information retrieval to continuously improve our system.
    - Advertise our system through social media such as Facebook and Twitter.
- Technology and Operational Issues
  - Technology employed
    - Information retrieval
    - Image recognition
    - Deep learning
  - The uniqueness of our approach, compared to existing e-commerce platforms, is that we employ image retrieval technologies to improve the online shopping experience.
- The Team
  - This company operates in the technology area, which requires a lot of expertise in the field of computer science.
  - Our team has four members, three of which come from the department of computer science, and two of which are Ph.D. students in computer science. All computer students have strong backgrounds in data science related fields. Thus, we are capable of running this company.
- Financial Highlights
  - The breakeven can be achieved when the number of users reaches around 4 million.
  - The initial cost can be as low as $1000, as we use cloud deployments for our infrastructure.
  - Our services are quite novel and have strong application prospects, and we expect to gain millions of users in a short period. Specifically, when the number of users reach 4 million, we achieve the breakeven point, and the number of users reach 6 million, our profit is expected to reach 180,000 dollars, and this number continues to grow as we gain more and more users.
- Financing Needs and How the Entrepreneur or Team Proposes to Raise
  - As an initial startup, we need an initial funding of $54,500 for the first year.
  - We plan to raise money from these sources:
    - Friends and family savings
    - Venture capital

I. THE INDUSTRY

A. Define Industry, Its Size and Growth Rate

1. NAICS & SIC codes

GatorSearch LLC operates in the Internet & Web Search industry. Its NAICS code is 519130 which encompasses establishments primarily engaged in publishing and/or broadcasting content on the Internet exclusively or operating Websites that use a search engine to generate and maintain extensive databases of Internet addresses and content in an easily searchable format (and known as Web search portals). The SIC code of GatorSearch is 7370.

2. Industry Size/Life Cycle/Growth Rate

We all know that a picture is worth a thousand words and we at GatorSearch believe that a picture coupled with words is a revolutionary idea that can return fast and accurate search results. New research released by eMarketer reveals that since 2012, the traditional desktop ad spending in the US is declining while mobile ad spending is growing by 80% year over year. By the end of the year 2012, there were an estimated 4.8 billion mobile phone camera users and a majority of them are connected to Internet. Mobile phone cameras provide us with pictures, a detailed way of representing information. Our goal is to make use of pictures to deliver fast and accurate search results for retail products. We are building a search engine, GatorSearch that delivers search results combining text and image inputs.

GatorSearch operates in the Internet search industry which is dominated by Google which owns 67.6 percent of the U.S search engine market. Bing remains at a distant second at 18.7 percent. (*ComScore, 2014*). Google's advertising revenue in 2014 amounts to 59.06 billion US dollars and it is 97% of the total income of Google. The industry is in development stage and is shifting its focus towards mobile devices. A majority of people are using mobile apps which are specialized means of finding information. Accurate results and easier ways to represent the search information, the two key features provided by mobile applications result in this trend. Rival search providers, especially app-focused ones, are gaining a greater share of mobile search-ad dollars from Google. This is a potential opportunity for players who can provide a better representation of search information and provide accurate search results to make way into the market share of Google and also to attract new customers.

GatorSearch can be termed as a supplier to the e-commerce sites by generating traffic to these sites and also an ecommerce platform for sellers with limited online presence to sell their products. Online shoppers in the United States will spend $327 billion in 2016, up 45% from $226 billion this year and 62% from $202 billion in 2011 (*Forrester Research Inc. 2015*). In 2016, e-retail will account for 9% of total

retail sales, up from 7% in both 2012 and 2011(*U.S. Online Retail Forecast, 2011*) to 2016. That represents a compound annual growth rate of 10.1% over the five-year forecast period. The worldwide expansion of the Internet alongside the evolution and availability of computer, mobile and tablet devices will no doubt contribute to this growth. Clothing and accessories business amounts to 13% of the total e-commerce business. The gross merchandise volume of eBay on clothing and accessories amounts to 8.99 Billion US dollars for the year 2013 *(Statista, 2013)*. Large unstructured data on the e-commerce sites is detrimental to their SEO (Search Engine Optimization) efforts. There is huge potential for GatorSearch to provide accurate directed traffic helping the e-commerce platforms deal with unstructured data. GatorSearch operates to bridge the gap between buyers and e-commerce sites redirecting them to the closest match product by enriching the search experience through image and text based search.

B. Industry Structure and Trends

Google created a form of advertising in pay-per-click, context-relevant ads. This alone made Google a whopping $43 billion in 2013 and we try to emulate the pay-per-click model with a better per click revenue as compared to Google. Innovation and differentiation are the key components that drive the search engine industry. Threat of new entrants in this industry is moderate as brand names are very important in the industry which, makes the entry of new players difficult. Advanced technology is required to thrive in this industry to deliver reliable results over search.

A recent publication (Research Journal of Finance and Accounting, ISSN 2222-1697) suggests that relative to technology industry as a whole, Google has a poorer return on equity due to its low net profit margin which indicates operational inefficiencies that impact the net profit margin. The industry has a high asset turnover ratio of 54%. These indicate that operational efficiencies play key role in determining success in this industry. GatorSearch is a focused on the area of search engine business and targets retail products which is an advantage as it does not have to absorb the costs associated with managing diverse business activities like Google.

The focus is shifting towards search in mobile apps which provide a better search information representation to return closest results. The amount paid by advertisers per click is decreasing which indicates that the advertisers are looking for better search engines that provide traffic with higher rate of purchase. This is great opportunity for search engines to provide a service that directs hits with higher chance of buying to capture market share.

On the other hand for the ecommerce industry is poised for a long term growth. The competitive rivalry in the industry is from medium to high with a low barrier of entry. The threat of substitute products is low as the Internet commerce is poised for a high growth in the coming years and there is more and more business to come in the coming years.

Search engine which is one of the suppliers of e-commerce industry hold significant bargaining power. GatorSearch is one search engine that combines text and image inputs effectively to combat the problem of unstructured data of the e-commerce industry.

C. Competition and Competitive advantages

In the search engine space Google, Bing and Yahoo are the biggest competitors to GatorSearch. In the visual search space Google Goggles, Amazon A9, and IQ Engines' oMoby, CamFind, Slyce are the competitors. Google Shopping is the closest competitor for GatorSearch in terms of the service offered. The Figure I-1 illustrates the relationship between our company and the competitors.

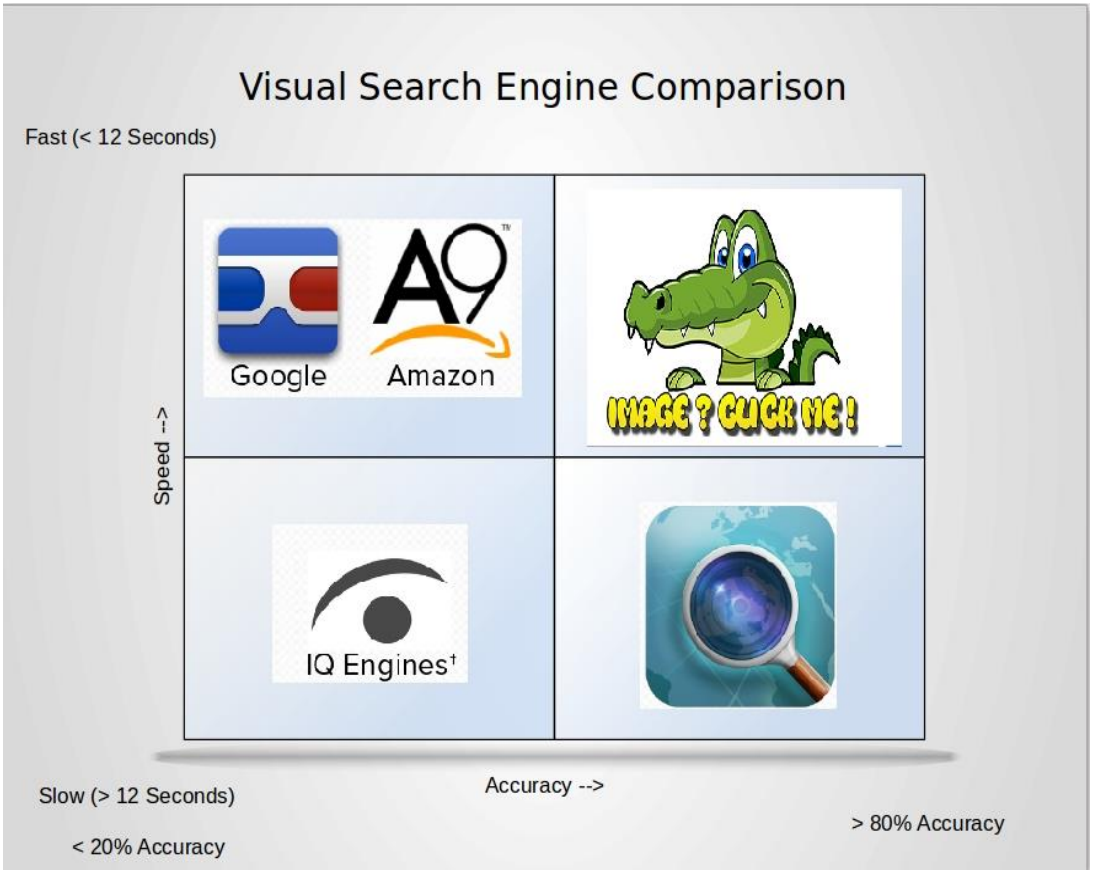

Figure I-1. The comparison of visual search engine

Google Shopping offers a search for products across multiple retailers, though the process can be tedious, identifying a particular product when no accurate text representation of the product is available. Currently customers have to search through multiple ecommerce sites directly and run through lists of thousands of products before they find the close match of their choice. By using pictures to search, we eliminate the inaccurate text representation of the image. GatorSearch offers search using pictures along with text which is a unique feature that is not provided by Google Shopping. Further Google Image search offers only image based search and does not combine the text which is very powerful in returning search results when both are combined. The accuracy

of Google image search is very low (about 45%). We at GatorSearch aim to provide much higher accuracy compared to competitors which can be achieved through the multi modal search.

Mobile app alternatives like CamFind, Slyce provide a good means of search using an image though there are potential disadvantages of these methods as they use a text based representation of the image again for searching. This results in loss of valuable information available in an image when converted to text and thereby limiting the search operation. This results in slow and inaccurate searches though they do a fairly good job in processing the image and identifying the object in the image. Google goggles, Amazon A9 and IQ Engines are rather slow delivering their results. (Figure 1.C.1). GatorSearch in comparison to CamFind, Slyce delivers faster and accurate results and is focused on retail products search.

CamFind uses crowdsourcing to identify images and uses human annotators in creation of datasets. This approach is not scalable as the number of images can grow by many times with the availability of more and more information through cameras on multiple devices. GatorSearch has no human intervention in the delivery of results and it applies deep learning techniques to identify features in images and comparing them along with the text information which is an advantage compared to applications like CamFind. Further they provide only a search based on image whereas GatorSearch provides text only, image only and text + image which is a unique feature which makes it a better search application/engine. Human intervention also raises the issue of privacy whereas in GatorSearch user images are private and searches are not stored or cached in the system. The users can search with confidence on GatorSearch.

GatorSearch enhances the experience of the customer, saves time of the customer and also helps in arriving at a faster decision. This feature greatly improves the chance of buying the product and results in high turnover for the online retailer sites. The per click amount paid by the advertisers is decreasing, which indicates that retailers are looking for search engines that direct customers to the closest match and result in higher chance of buying decision by the customer.

The on-line retail minutes on mobile and tablet devices have been rising and the share of PC retail minutes is decreasing which is an important factor that can make GatorSearch play a key role in the future of search engines/applications. The search experience on Smartphones and mobile devices can be improved greatly using GatorSearch. There is huge potential for gaining market share in terms of ad revenue and contracts with e-commerce retailers.

II. THE COMPANY, CONCEPT AND PRODUCT(S) OR SERVICE(S)

A. The Company and the Concept

We came up with an idea to search products using images, which leverages cutting edge research result in image search to improve online shopping experience. We decided to deliver our innovative commodity search as a service and build a visual search engine, GatorSearch. Our company GatorSearch LLC, will be headquartered at Gainesville. Currently we are a team of four engineers. We are now in development phase and we have developed a prototype of GatorSearch engine which now indexes eight million products from Amazon and is available online.

The main service provided by GatorSearch LLC is a product search engine combining technologies of image and text information retrieval. The core mission of GatorSearch is to provide a robust, accurate product search service and leverage the advantage of image search to improve customer's purchasing experience. The two key features of our search engine include 1) text+image search and 2) cross-topic search, the concepts of which will be elaborated as follows.

Text+Image search. One of the most compelling features of GatorSearch is that it supports the combination of text and image search, in addition to the text-only (e.g. Google shopping) or image-only (e.g. CamFind) search. The advantage of this new technique is that search accuracy is much higher than text-only or image-only search engines, as demonstrated in Figure II-1. In this demo, suppose a customer wants to purchase a pair of Nike shoes, and the customer also provides a picture along with text to describe the shoes he wants (as given in the *query inputs* in Figure II-1). Then, we run this query on Google shopping (http://www.google.com/shopping) using text "Nike Shoes" (the Google shopping doesn't support search by image), and present the top 3 results in Figure II-1. For comparison, we also run the query on CamFind (available in iPhone apps store) by uploading the picture (the CamFind doesn't support search by text), and present the top 3 results. Finally, we run the same query using both text and image on our GatorSearch system, and present top 3 results. From the results in Figure II-1, we can see that the results returned by our system is much more close to the products that the customer wants to purchase. These visually similar results provide customers more interesting options, and thus more likely the customer will make a deal.

Cross-Topic search. In addition to enhanced search accuracy, the GatorSearch provides a novel and interesting application for product search -- the cross-topic search. Consider the situation that a customer wants to purchase a bag with specific patterns (e.g. stripe or grid), then the GatorSearch provides an elegant way to solve this problem. As illustrated in Figure II-2, the customer uses "bag" as text keyword and a cap with stripe patterns as image keyword to search on the GatorSearch system, then the results returned by the system is quite interesting: it returns bags with patterns visually similar to the image provided by the user. With the cross-topic search technique, the GatorSearch can offer new ways to search fashion products enhancing the user search experience.

Query Inputs	 Nike Shoes		
Google	 Nike Air Flight Falcon Basketball Shoe Men's	 Men's Nike 8" SFB Field Military Boots	 Nike Shox Deliver - Boys' Grade School Shoe
CamFind	 Nike Roshe One - Men's	 Nike Air Max 2015 - Women's	 Nike Air Max 2015 - Men's
GatorSearch	 Nike Air Max Defy Run Navy/Volt Mens Running Shoes	 Nike Men's Relentless 2 Running Shoe	 Nike Wild Trail Women's Running Shoes 11.5 B - Medium

Figure II-1. The comparison of our search results against our top competitors. This example uses “Nike Shoes” as text keyword, and a picture of the Nike shoes of interest as image keyword. We show the top 3 results from Google shopping, CamFind, and our GatorSearch.

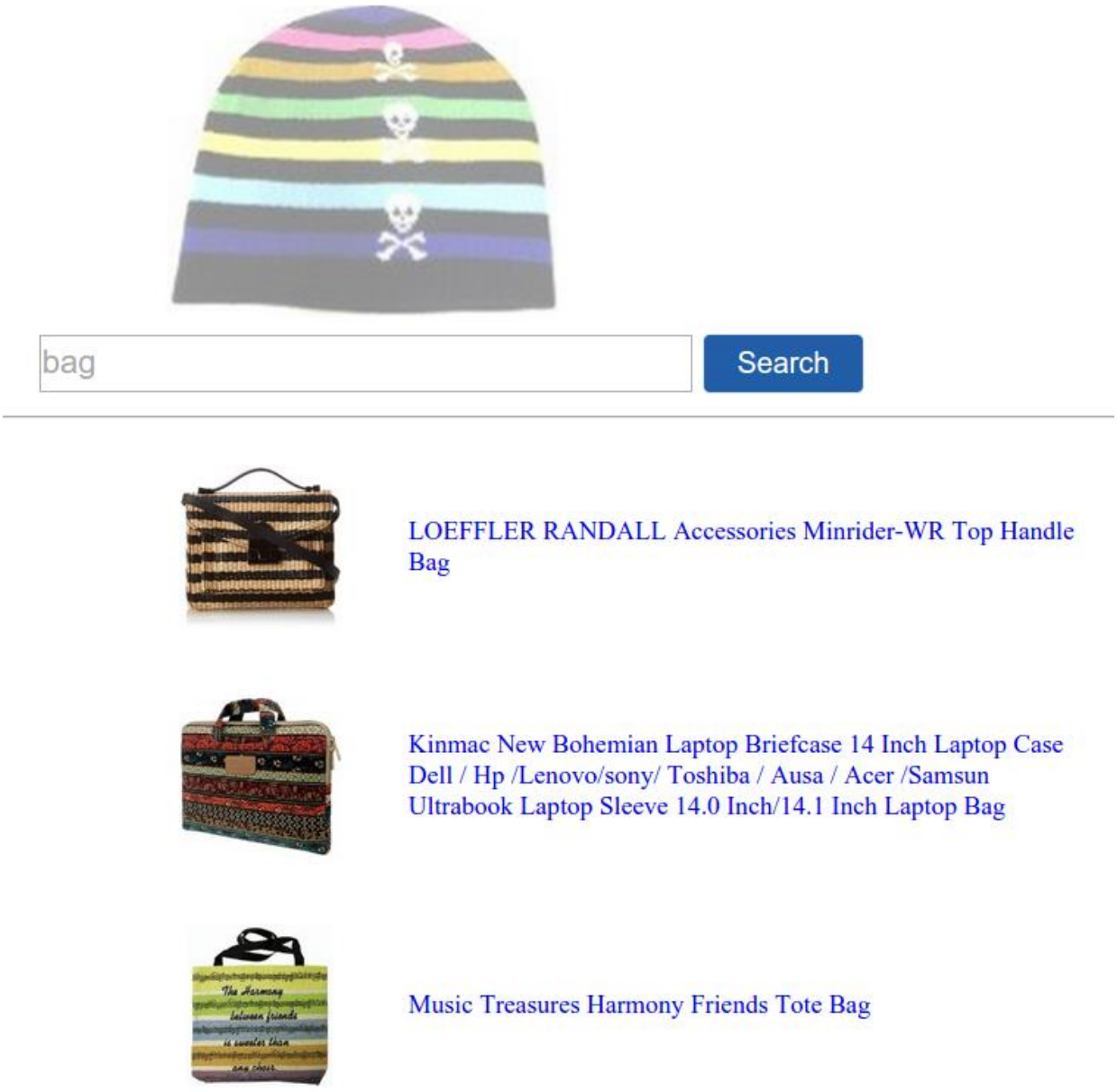

Figure II-2. A screenshot of our online search engine for the demonstration of our new concept of “Cross-Topic Search”. In this example, we use “bag” as text keyword, and a hat with stripe patterns as image keyword. The top 3 returned results are quite interesting: they are all bags with visually similar stripe patterns.

B. The Service

Our product GatorSearch is an image search engine which helps customers to search commodities by both text and images during online shopping. Therefore, it enhances current keywords based search on online shopping website like Amazon. When users go shopping online, usually they search their target commodities by providing several keywords, which has already been supported by shopping website. However, simple keywords based search is not sufficient in the scenario where users expect certain visual appearance of the commodity. For example, a customer looks for a skirt with certain

textile, color and fashion style, which can be hardly described by keywords. Our GatorSearch platform gets rid of the disadvantage of purely text search and helps customers find the target commodity based on the image of products, therefore it lowers the time cost of customers during online shopping. Our GatorSearch service is simple and easy to use: customers of GatorSearch simply take a photo using their smart phones wherever they see interesting stuffs and want to check if it is sold online. Then customers are directed by GatorSearch to the shopping website from which they can purchase the commodity they are looking for.

Our GatorSearch service creates value to customers as well as to online retailers. First, GatorSearch improves shopping experience and makes it easier for customers to find their desired products. Second, it directs high value traffic to online retailer giants which we hope to be 20% of their transactions. Last but not least, our GatorSearch in the future will corporate with local retailer to make their products available on the Internet, which becomes a new selling channel for local retailers.

C. Entry and Growth Strategy

As an entry strategy, we will release our GatorSearch mobile application to mobile users within six months. We take several strategies to grow our business. Since we are a technology driven company, we will keep improving our search result and invest in our hardware infrastructure to guarantee search performance; furthermore, GatorSearch will corporate with local retailers in different cities and collect products from more online website to attract more users. Within five years, we will have billions of products indexed on GatorSearch platform, we expect to have millions of users and our business will be extended to major big cities all over US, and eighty percent of local retailers in these cities will become our partners.

When the number of users grows to millions, we plan to provide additional service to local retailers, we will cooperate with delivery service like UPS and DHL, to ease the process of shipment so that the transactions happen on GatorSearch can be quickly executed which brings convenience to local retailer and increase customer satisfaction. Secondly, we will launch recommendation and advertising service. Based on customers' rating and shopping history, GatorSearch will recommend to customers the products from local retailers who want to advertise their products on GatorSearch. As a result, local retailer will become our partners, so that we have a tremendous distributed inventory to compete with online retailer giant.

As to the barrier to enter the market, our GatorSearch platform leverages cutting edge technology, which can't be easily implemented by our competitors. We identify ourselves as an innovative company and keep investment in technology research, which makes it

difficult for our competitor to copy our business. We enter the market early and accumulate users, when we get millions of users, the number of the users will be attractive to local retailers and a great factor for retailers to stay on GatorSearch platform. On the other hand we build a long term partnership with local retailers and serve as a sales channel for local retailers. These two factors prevent local retailers from shifting to our competitors.

III. MARKET ANALYSIS

A. Defining Relevant Market and Customer Overview

GatorSearch focuses on the U.S. and abroad online business. The relevant market is online product search. The market is defined by the number of products available, the number of daily users, and the traffic we create for existing online retailers.

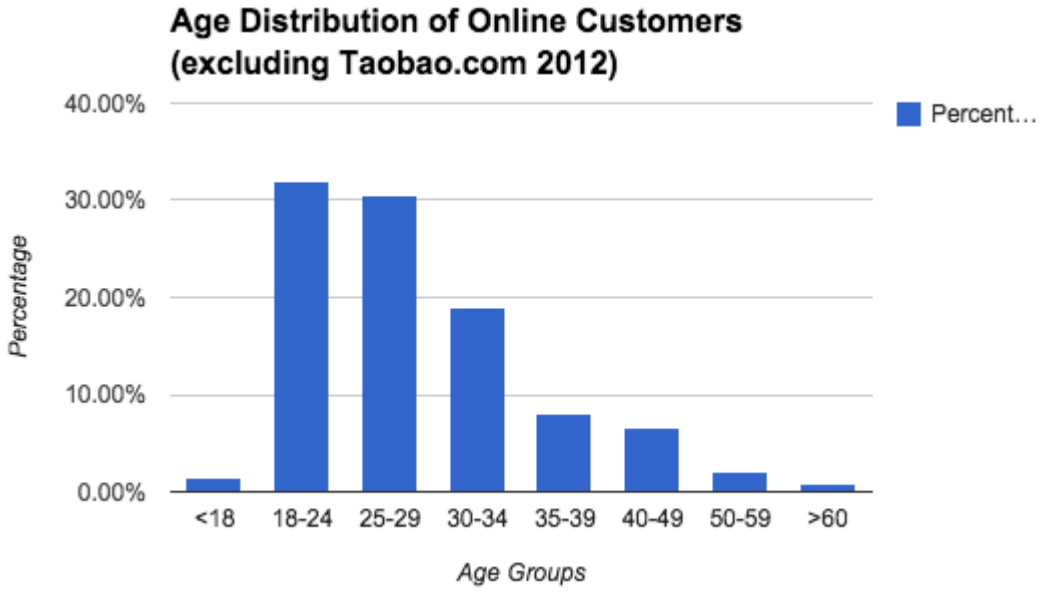

Figure III-1. The monthly online shoppers grouped by age

Considering the gender demographics of our target customers, we believe that men and women are expected to be equal in number. According to the Business Insider, men drive nearly as much shopping online in the U.S. as women, so the gender is not a concern. However when it comes to a certain category of products, gender is a very important parameter. At the moment, anyone who is interested in online shopping and accessible to Internet is our potential user. However, those consumers aged 18 to 29 (Figure III-1) remain the key age demographic for online commerce, spending more money and time online than any other age group, especially considering that this group customers are more likely to adapt a new technology in searching.

GatorSearch works as a visual searching engine, providing searching service for customers based on their images and textual descriptions. By matching images with

products online efficiently, we help users to find targets and direct those users to currently existing major online retailers, like Amazon and Macy's. Based on the ranking of the searching result and traffic produced, we ask for service fees from those online retailers, the fee which depends on the amount of traffic directed by the GatorSearch engine and happens in a way that is similar to how google charges fees from Amazon, eBay, etc. based on the advertisement approaches like number of clicks and permanent placement on the first page of search results.

On the customer side, facing to a fact that text-based searching engines are dominant at the contemporary era, will customers like to use image searching engine. If they do, how can we attract a large amount of users and maintaining those users is another issue.

For the advertisers, before they finally agree to pay us service fees, GatorSearch team has to show the traffic created which requires a relatively large group of active daily users.

B. Market Size and Trends

The market size in our business is dynamic and evaluated accordingly to the growth rate and the number of daily users. GatorSearch is expecting to reach 1 billion products covering food, jewelry, clothes, furniture and electronics before the business launching. We expect to have 10,000 searches a day in the first 6 months, and reach 0.1 million searches per day in a course of one year. Within 5 years, GatorSearch will exceed 1 billion daily searches. On the revenue side, GatorSearch seek to reach $ 1 million within 4 years (Figure III-2).

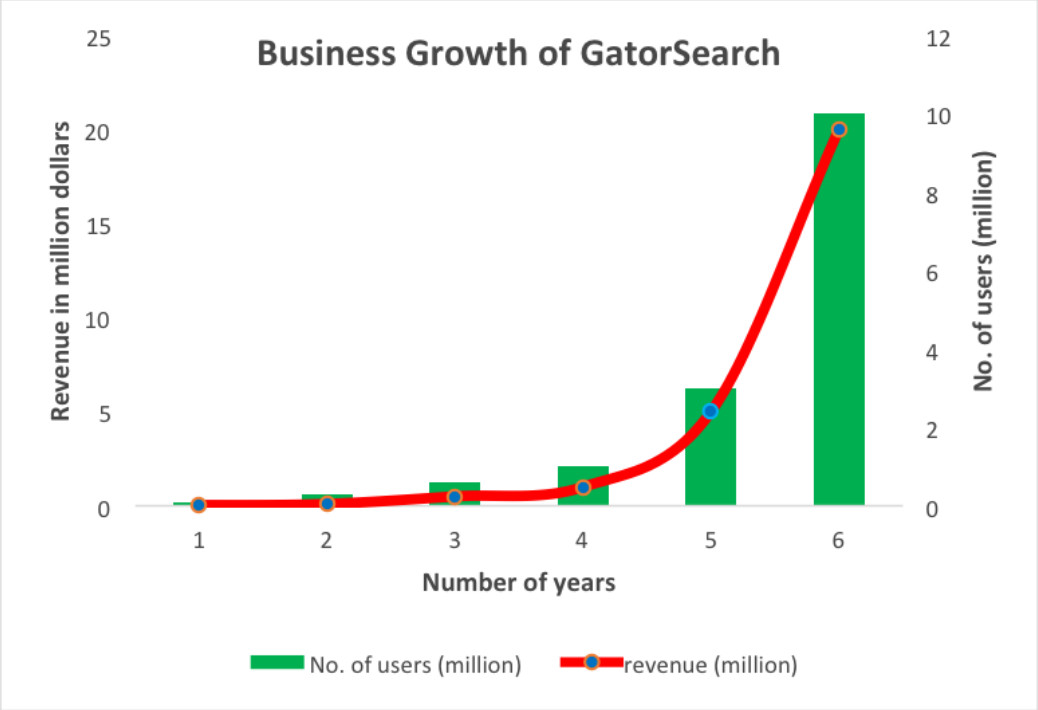

Figure III-2. The business growth of GatorSearch

Such estimation is referring to the growth rate of Google which started in 1999, which exceeded $1 billion revenue by 2004. The pre-assumption on our business size is that we will successfully get funds from venture capitals, and scale up facility accordingly to solve the demands on the cloud services required by a large amount of users, and return search results efficiently.

The revenue is mainly coming from the service fees produced due to advertisement through products recommendations based on users' searching histories, and products searching rankings, and daily special recommendations.

Outside the U.S., China, an expanding online empire, will explore over the next five years to $271 billion, thanks to considerable infrastructure improvements, increased Internet access for rural regions, and rising wealth. In addition, we also see a promising growth in India market. Along with the expanding of online business in U.S., China and India are also targeted at the end of 3rd year after gaining the trust from customers and reputation of GatorSearch in commodity search (Figure III-3).

GatorSearch business grows exponentially due the growth of daily users. Even though, test-based searching engines like Google, Bing, and Yahoo, dominate at the moment, once more customers are used to the image-based searching engine, more online shopping business is expected to gradually shirt to GatorSearch. Especially, after the first two years, more customers are more likely to use it, and the brand of GatorSearch is built. Furthermore, more exclusive interviews and reports on the social media are expected to happen. As a result, in the third year, GatorSearch is likely to achieve much a higher growth rate.

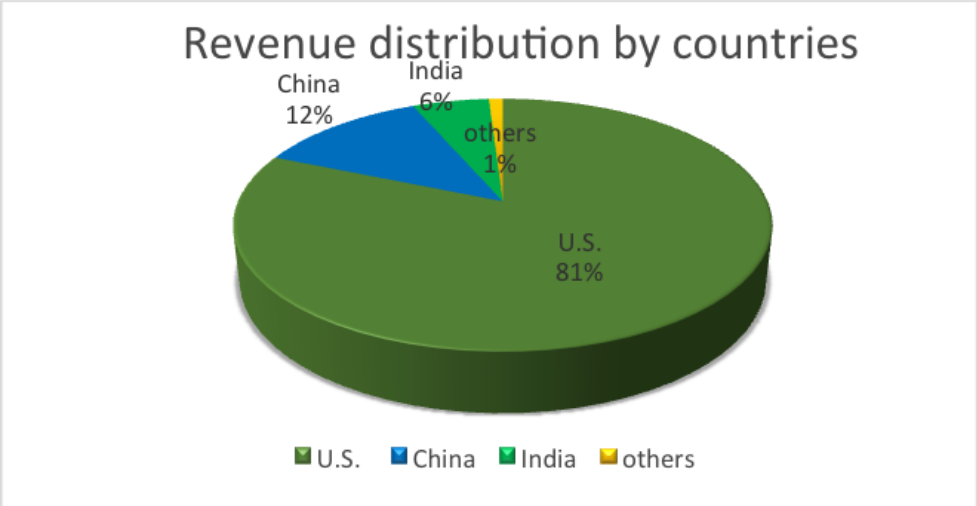

Figure III-3. The revenue distribution by countries

C. Buyer Behavior

Currently around 80% online shopping are happening on personal computers rather than smart phones. Smart phones will play essential roles in GatorSearch business. In 2012, the global smartphone audience surpassed the 1 billion mark. In 2014, the number was

projected to hit 1.75 billion. “Snap, Find and Shop” is a revolutionary way to service our customers at any time and any places.

Along with the growth of online business, Flurry reported that the time spent in shopping website has skyrocketed from December 2011 to December 2012 (Market Watch). The pure text-based searching is regarded as a time-consuming, and low-efficiency process at finding a product. Mobile consumers are impatient and spoiled for choice. All too often, retailer apps are being created with style over substance, with little thought put into what is going to make it fundamentally useful for users.

On the contrary, a user of GatorSearch is initially inspired by adorable photos, he/she goes searching for thirst, thus is very likely to make a purchase when the price of the searched product is reasonable. Such purchase decision made is more likely to be impulsive, and less affected by other members. A user who finds an interesting product when watching a movie or a TV show, reading a magazine, or around a street, snaps a picture and GatorSearch will provide corresponding information by touching the phone.

D. Market Segmentation and Targeting

The revenue of GatorSearch is mainly comes from U.S., China and India from advertisement services. The business segments cover retailers & general merchandise, home and garden, travel & tourism, vehicles, computer & consumer electronics (Figure III-4). However, among them, the greatest sale potential is on the retailers & general merchandise: Amazon, Alibaba, eBay, Sears, Macy’s and JCPenney are the major components. To our expectation, the most searched products will be clothes, jewelry, home and garden, dairy, and electronics.

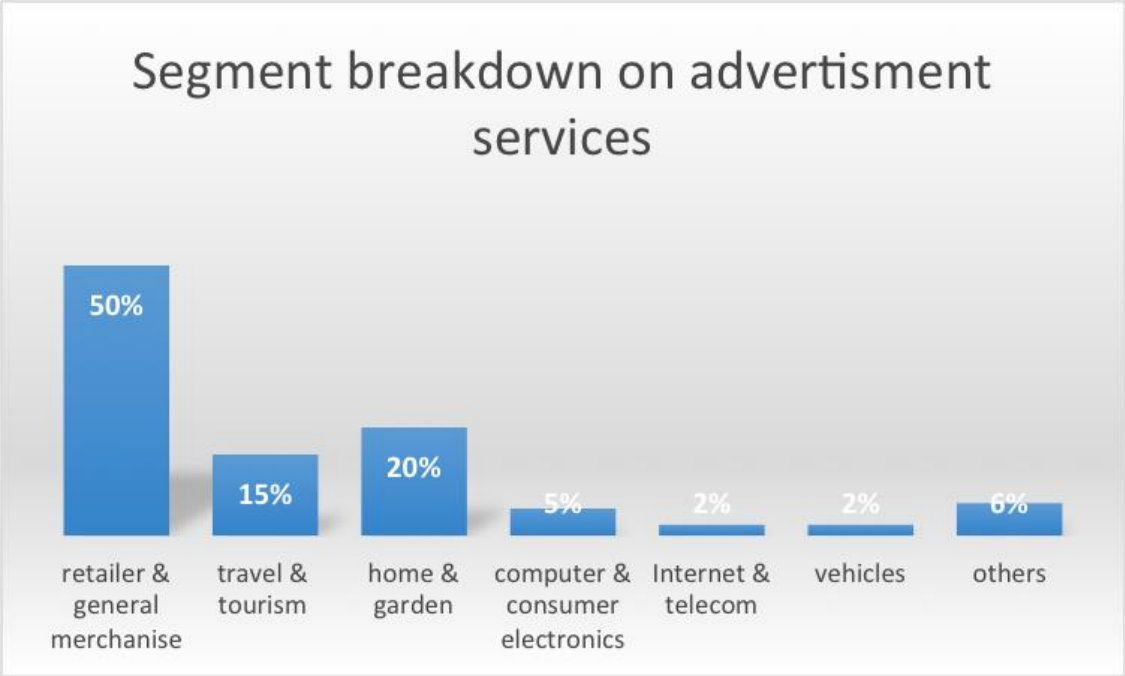

Figure III-4. The segment breakdown

E. Competition and Competitive Edges

In the visual research area, even it is not mature yet, and is relatively young when referred to the conventional text-based search service. Since sharing common customers like Amazon, Expediar, Marriott, we are directly competing with Google, Yahoo, Facebook, etc. on the advertisement related services. However, we rather than focus on test searching engine, we look at products in visual views to efficiently locate and present products. In addition, we also compete indirectly with some new startups like Slyce, CamFind on exploring the technology in visual identification. However, those startups haven't specialized themselves on commodities searches, and their focuses are too broad. As a result, they are struggling with search algorithms and technique developments.

As a high tech company, GatorSearch is a low operation cost company, and most spends are on the payments on cloud data maintain, employment and workshop. In addition, with more visual wearable devices released like Goggles, visual search will even become more and more popular in the coming years, and further increase the market share of GatorSearch.

F. Ongoing Market Evaluation

As we mentioned before, the market share of GatorSearch is dynamic, and totally based on the number of daily users which is affected by the performance of GatorSearch in view of the searching accuracy and speed, delivery efficiency, commodities' categories and advertisement services. The charges on advertisement services will be adjusted based on the number of users. To boost GatorSearch business, we are continuing looking at the improvement on the search algorithms and facility upgrade, and try to build a hub for the visual world. Initially, we are focusing on the product searching service; eventually, we will try to expand GatorSearch to involve in the visual identification for wearable devices.

IV. THE ECONOMICS OF THE BUSINESS

A. Revenue Sources and Gross and Operating Margins

As a web service provider, our major revenue drivers come from three sources:

- **Advertisement.** Our search engine connects potential buyers to the product sellers. The advertisement helps sellers to better reach their buyers, and thus makes more profits. We have two sources of income by making advertisement: 1) For local retailers, we do advertisement for them by posting their products on our website, so that more potential buyers can reach their products; 2) For online retailers, we do advertisement for them by doing product recommendations.
- **Income by driving customer traffics to online retailers.** We provide a platform to drive buyers to web sellers such as Amazon.com and Newegg.com, thus we can charge these sellers based on the amount of customer traffics we have created for them.

The advertisement makes up around 80% of our income, and customer traffics should make up the rest 20%. The amount income depends on the amount of visitors to our website.

B. Fixed and Variable Costs

Table IV-1. Fixed and Variable Costs

Types	Cost Category	Cost (in dollars)	Percentage
Fixed	Computer hardwares (startup)	50,000	33.3%
	Company Building	100,000	66.6%
Variable	Computer hardwares (growth)	1,000 per 1M users	10%
	Employee Salary	10,000 per 1M users	90%

For variable cost, the unit of analysis is number of users. For example, when we have more users, then our cost will go up accordingly, since we need to upgrade our computer hardwares to support more users, and may need to hire more employees to maintain these services.

C. Operating Leverage and its Implications

Our cost structure is not predominantly fixed, which means it has a low startup cost, and hence low risk venture. As the company grows (e.g. having more users), the cost is growing accordingly. When we have more users of our web services, then the initial small amount of computers are not enough. In this case we need to add more server computers, which means increase the cost. These costs only happen when we have more users, the cost of which can be compensated by extra income brought by increased number of users.

D. Startup Costs

The startup costs are shown in the Table IV-2.

Table IV-2. Startup costs

Cost Category	Cost (in dollars)	Percentage
Computer hardwares	50,000	91.7%
Room rental fees	3,500	6.4%
Travel fees	1,000	1.9%

E. Overall Economic Model

As a web services provider, our startup cost is relatively lower. The operating cost is quite flexible, which depends on the number of users we have: the more user means more cost, but these costs can be compensated by extra income brought by increased number of users.

Thus, we have low startup cost of around 54,500 as shown in Table IV-2. And, as our company grows larger, we can make more profits, and thus can again invest part of the profits to upgrade our system.

In sum, our model is very attractive, in the sense that: 1) it has low startup cost; 2) it has low risk, since the operating cost increases only when the profits increase.

F. Breakeven Chart and Calculation

The breakeven chart is illustrated as follows in Figure IV-1. As illustrated, the breakeven point is reached when the number of users reaches around 3.8 million.

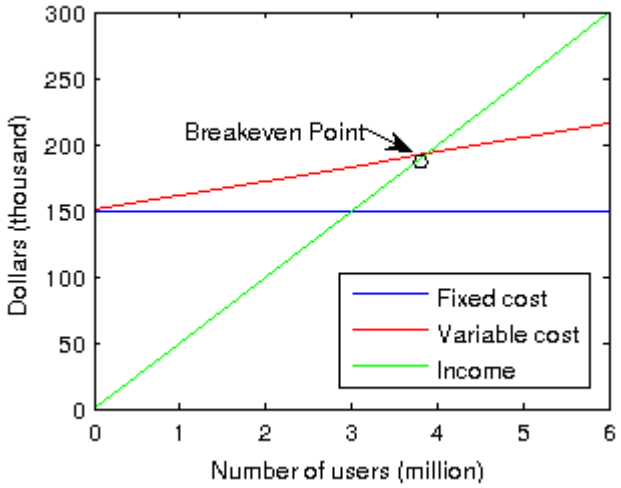

Figure IV-1. The breakeven chart

G. Profit Durability

The profit depends mostly on advertisement according to section IV.A, and the advertisement revenue is again depending on the number of users of our web service. Our profit stream is quite solid once we have established a large group of users, because the only possible reason that can harm our profit stream is that new competitors of similar functionalities come up. However, our company is a high-tech company and thus it is very difficult for other companies to copy our functionalities. In addition, when we have owned a large group of users, our profit stream is stable if we can consistently provide satisfactory services and new features.

V. THE MARKETING PLAN

A. Overall Marketing Strategy

GatorSearch treats visual searching engine as the second stage after the text-based searching. Initially, GatorSearch focuses on online commodity searching, which is an essential for the application and further development of visual identification technology. As one of the pioneers in this area, GatorSearch provides precise searching results, and

shortens the time customers spent in searching products. “Snap, Find and Shop” is a revolutionary and convenient way to service our customers at any time and any place. Rather than struggling in the descriptions using lengthy texts, GatorSearch can combine images with texts to efficiently locate exact or similar products online. Since a picture is worth a thousand words, and describes products appropriately, such technique is less dependent on the ability at literate description of a customer. In addition, customers start using GatorSearch when he/she is inspired by a picture. In such case, he/she is more likely to buy such product. Thus, GatorSearch is able to target customers efficiently according to their preferences and searching histories.

Figure V-1. The GatorSearch applications

Since GatorSearch is available to anyone in any region or country, as long as the user is accessible to Internet to reach GatorSearch’s website or apps (Figure V-1). The business of GatorSearch is International. Even this is the nature of Internet, U.S. is the main market especially at the beginning of this business because of the company location of GatorSearch. For the format of business, GatorSearch mainly provide searching for users, rank products according to the matching scores, and charges fees from online retailers appropriately adjusted according to traffic directed.

B. Pricing

In order to promote more sales, according to the searching history, GatorSearch recommends products to its users with appealing prices that are available online, or GatorSearch recommends products that are required by retailers for special sale promotions. Besides, GatorSearch recommends products that are required by users according to the descriptions and constraints. However, since GatorSearch is mainly focusing on products searching, and does not offer prices for products, all we have to do is to list products’ links to a user based on the price information and matching results. However, if the several searching results have very similar matching scores, the retailers paying us service fees will be listed in front of other products.

According to Fast Net News, the price $3.5/megabit is charged for traffic flow and such price is gradually decreasing due to the decrease in costs of routers and switches. This

pricing mechanism is very beneficial to GatorSearch because transferring images produces more traffic when compared to conventional text-based searching.

C. The Selling Cycle

Here is short description on the scenarios that users will find GatorSearch to be appealing. While a shopper is out and about, she may snap a picture of a product with her cell phone from a sign, a storefront, or even the arm of a neighbor in line at the market. She needn't know the maker or model of the item in question, as the GatorSearch will zoom directly to products available for purchases online that match its description.

In addition, when a user is watching a gossip TV show, a movie, news, or even reading a magazine (Figure V-2), she/he can just snap a picture representing one or several products, GatorSearch is able to locate exact or similar products. Simply by pointing to the phone, GatorSearch allows customers to know more about the products and matched recommendations. Several more touches, the transaction is complete.

For a foreign customer, language is no more an obstacle in finding a product and he/she will never have to struggle with the text descriptions, since GatorSearch will help foreign customers to find satisfying searching results and navigates her/him to complete the transaction based on their interested images.

Figure V-2. The demonstration of shopping by image search

D. Sales Tactics and Advertising

GatorSearch provides products' images searching, and recommends products based on customers' searching histories. Certainly, customer can inhibit or start the recommendation services at their preferences. Being friendly, and comfortable in searching are essential.

Figure V-3. The GatorSearch advertising

As a startup, we encourage customers to write their searching experiences and share through Internet. GatorSearch evaluates the number of views and quality of the article. If the article is presenting a real story and has a relatively high impact, they will be awarded as senior users who are able to shop products at a discounts no matter what the original price is. In addition, we are broadcasting GatorSearch through writing and updating blogs, and social media pages (Figure V-3) in Facebook, Twitter, etc. This is a zero-cost advertising strategy. To improve the influence, we will make use of media like Bloomberg, ABC new to promote our product through exclusive interviews to discuss the usages of GatorSearch, and operation methods.

In addition, we welcome online retailers to embed our technology in their website so that if users who would like to search directly on their websites, are still able to apply image searching. In this way, the website will be charged by the number of searches.

E. Publicity

As we mentioned before, GatorSearch will be known as a pioneer in visual searching, and it will be widely reported when we accumulated a large amount of users. At the beginning, GatorSearch promotes it through users' experiences sharing, and blog writing. Further, we publicize it through exclusive interviews. In addition, we will keep upload videos that stream the scenarios on YouTube when a user is using GatorSearch.

VI. DESIGN AND DEVELOPMENT PLAN

A. Development Status

GatorSearch LLC is in the development process with an initial working model. Currently the database has around 8 million products from Amazon. We have a live running system ready which already provides the intended features. A screenshot of the functional GatorSearch website is shown in Figure VI-1.

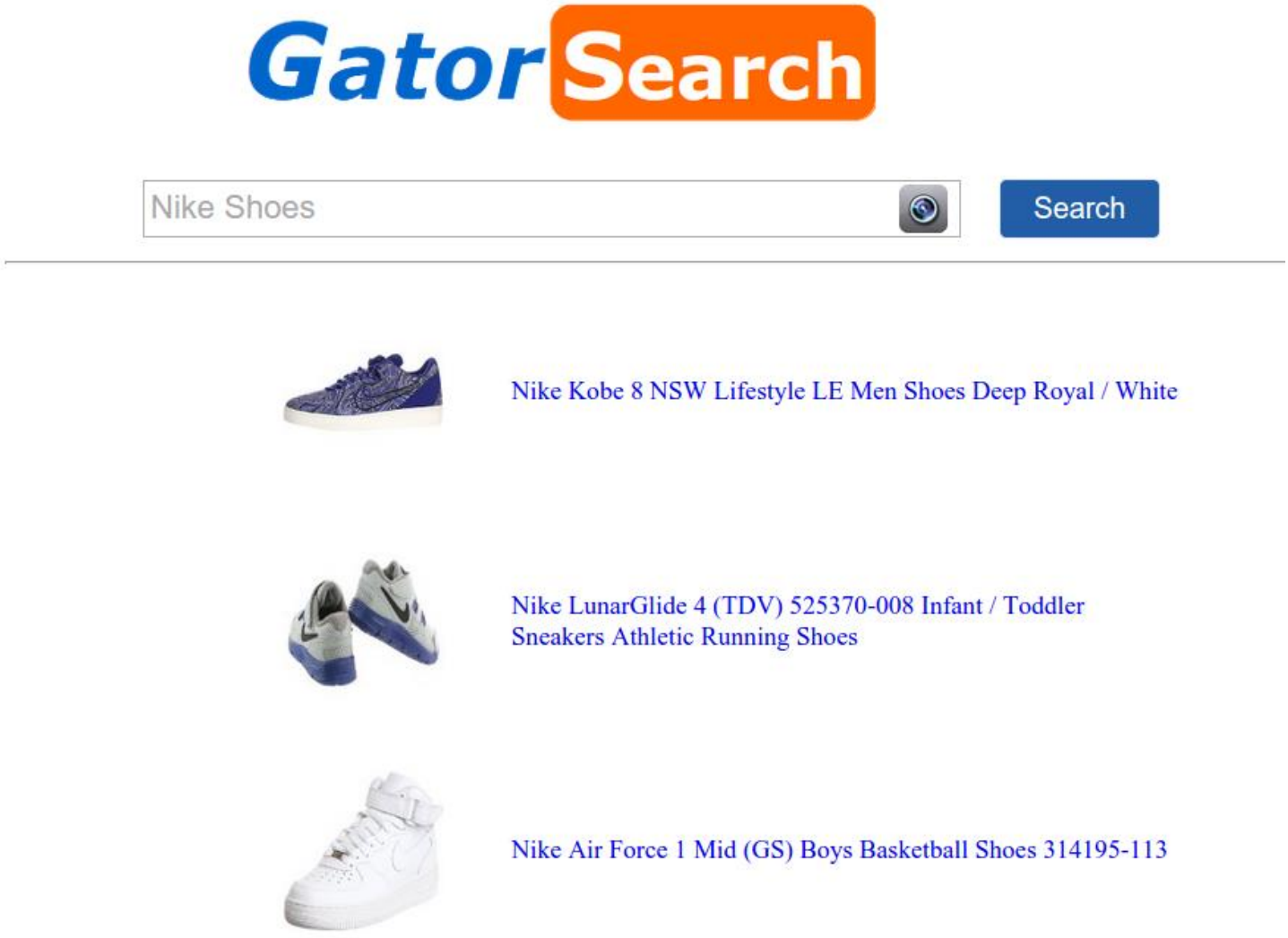

Figure VI-1. The demonstration of user interface of GatorSearch

The Core Research & Architecture (CR&A) team of GatorSearch is working on implementation of Deep Learning algorithms and also in developing new algorithms for delivering faster search results. The team works on designing the best architectures for implementing the developed search algorithms.

The Core Search Platform (CSP) team is responsible for implementing the search algorithms developed by the research team. Currently the development team is working on identifying the best suitable technologies for implementation of search algorithms and designing the build and deployment procedures.

The User Experience (UX) team deals with the design and development of mobile and site front end features. UX team is currently working on various design schemes for the browser and mobile platforms to provide a crisp and clear UI and enhancing the customer experience.

The Infrastructure and Data (I&D) team works on development of scalable infrastructure for delivering search results and maintaining the infrastructure. The data team works in managing the data crawls from various retailers and design and development of database schema and implementation of faster retrieval schemes for data.

We are planning to implement an agile development model in all the teams with each team working on the build and deployment of the components so that each component has a build and deployment process that closely integrates with the development model and offers flexibility for architects. The plan is the CR&A team to develop and test algorithms for search by the end of May 2015 so that the CSP team can start working on implementation of the algorithms by August 2015. Further we follow a continuous Research and Development process to develop the search accuracy and speed. The UX and I&D team continue to work on their respective areas in parallel and these teams are expected to work on a continuous operational basis.

B. Technical Difficulties and Risks

The primary challenge in the development of GatorSearch is in developing algorithms for delivering faster search results. The research team is continuously working on the developing algorithms and is expected to produce results by the end of June 2015. The potential risks involved is the failure on the part of the research team to produce search algorithms that can provide better results than the existing algorithms. The research team has spent enough time in the study of literature available in the areas of multimodal search, deep learning and is confident of producing a faster search scheme. The initial results of the algorithms are phenomenal and we are confident of producing results.

C. Product Improvements and New Products

GatorSearch is a technology company with its core foundations in research. The research team continues to work on developing faster search schemes and the development team works on implementing the latest technology to generate faster search results. We plan to provide our search API for developers to use our search in other applications. Further we plan to introduce an ecommerce platform for retailers to directly sell products in our site with a host of new features coupled with a better search engine. We plan to introduce product recommendation and rating for fashion products so that customers can search for matching fashion products based on popularity using users ratings.

D. Proprietary Issues

We plan to apply for patents on the multi modal image + text search scheme for products and the search algorithms developed within 1-2 years of operation so that we can fund the patent costs estimated to be around $25000.We plan to register GatorSearch Logo and GatorSearch trademark in the United States after 1 year of operation.

E. Costs

GatorSearch operates in a very low cost model leveraging cloud infrastructure. The infrastructure maintenance costs are very low compared to other players as we plan to

operate using cloud services so that we can scale the operations as per the size of searches. We plan to develop a scalable model so that we can scale horizontally across servers during periods of peak load. Our design team is working on building such a model that can significantly reduce costs and make use of the cloud model effectively.

VII. OPERATIONS PLAN

A. Operating Model and Cycle

In our company, there are two major operation processes: buyer process and seller process, as illustrated in Figure VII-1. In the buyer process, the input is the items that he/she wants to purchase, and the output is a set of links generated by our system. In the seller process, the process involves the advertisement service requested by sellers and advertisement provided by our company. We make profit from the first process by continuously providing good search results to the buyer so that more and more users want to use our system. From the second process we make actual income -- through advertising fees.

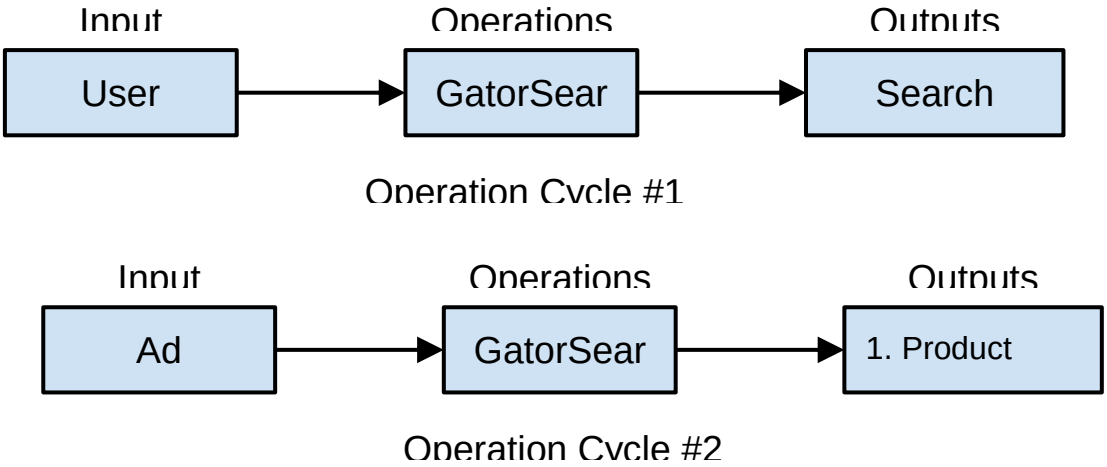

Figure VII-1. The operation cycles of GatorSearch LLC

The bottleneck of our company occurs most likely in computing operation in cycle #1. As more and more users are using our system, we will eventually reach the computing bottleneck where the existing servers are unable to serve the increasing number of queries. To address this issue, we have two solutions. The first solution is to continuously optimize our computing algorithm to support more parallel queries. The second solution is to upgrade our servers by purchasing more machines.

The quality issues of the GatorSearch mainly include the response time of search. The quality problems occur when we have a peak in the number of concurrent users, where query delay has to be increased. In this case, to ensure good query delay, we may employ the cloud computing platforms from Amazon or Google to process part of the overwhelming queries. Since the cloud computing is using “pay as you go” pricing mechanism, we just need to use their services whenever is necessary.

B. Operations Strategy

The basic operations of our company involve three phases: 1) data collection; 2) data analysis; and 3) query evaluation. In the data collection phase, we collect product information from both major online retailers like Amazon.com and small-size retailers. In this sense, they are our "supplier", since the latter operations are relying on the availability of data source. In the second phase, we need to do data analysis, which requires some level of human labors. For example, we need employees specializing in data analysis to design good query algorithms for us. In the final major phase, it involves proving search service to users. In this phase, we need a large collection of computers to support high volume of user queries.

The resources of the company (e.g. computer hardwares, employees) have been changing dynamically. During this process, decision has to be made about when to purchase new computer hardwares, and how many employees from which majors should be employed. The details have to be explored during the operation, since there is no fixed rule for this problem. But generally speaking, as we have more users, we need more resources.

C. Geographic Location

Since the GatorSearch LLC is a web-based service provider, we don't have specific geographic location requirements. However, we prefer locations that have low rental fees so that we can host our servers with minimum cost.

Many famous web-based service providers like Google use the garages initially as their "headquarters", because these sites are usually cheaper in terms of rental fees. For the GatorSearch LLC, we may also consider this option when the company is in startup stage. After we grow stronger, when rental fees are no longer an issue, we are able to afford more expensive sites. Then, we may choose locations like CA as our headquarters, since we can interact better with other companies in CA, and the availability of IT employees is also better.

D. Facilities, Equipment and Improvements

Initially, as a web-based service provider, we don't need any offices to operate daily business, we do not hire any employee in the initial stage. We will use cloud infrastructure to hold our online service so that it saves us the rent fee to hold physical computing facilities.

After we have built up a large group of users, we then need to upgrade our facilities to further facilitate the operations. The physical sites have to be added include: 1) offices for employees, 2) Ad office to do business with sellers, and 3) Meeting office that all

employees get together for plan discussion. At this stage, we will probably purchase a building for this purpose.

E. Capacity Levels and Inventory Management

Without sacrificing the efficiency in product searching, GatorSearch is able to offer millions of search in a day. After the property updating, it supports billions of daily searches. Rather than working on inventory management, GatorSearch keeps updating new products available online by scrawling commodities listed in the main online retailers like Amazon, Alibaba, etc. The new products will be added to our currently existing database.

The anticipated level of requirements for resources depends on both the volume of user queries and number of indexed products in our database. Currently, we have collection around 8 million of products from the Amazon.com. To accommodate this data, we need three machines with each machine having 24GB memory. The requirement for machines grows linearly as the number of products increase. In addition to machines requirement, we also need at least two or three employees initially for maintaining the servers.

F. Logistics

As we introduced in the previous sections, GatorSearch is mainly working as a image-based, and text-supported searching engine. It allows users to search products efficiently online based on their interested pictures, text descriptions, or a combination of them. Thus, GatorSearch neither directly involve in building the warehouse for storing commodities, nor directly produce products. However, GatorSeach would like to dedicate its services to customers by instantly modifying feedback regarding on the performance of retailers shipment efficiency, and availabilities of products. These situation might change after the growing of its business, especially when GatorSearch starts building database for local retailers. Then, GatorSearch will work closely with local retailers on the shipment and the product return.

G. Legal Issues Affecting Operations

The products available are from the main online retailers. The majority of the products on sales are have been under supervision. However, when launching businesses in different countries, GatorSeach will take the relationships with local governments into considerations, and restrict our products within a legal region. Products concerning human health and safety, usually have different registrations and licensing requirements in different countries. To offer legal services, GatorSearch will check the regulations with the State Administration of Quality Supervision Departments. In addition, there are other potential issues in international business like labor law, foreign exchange regulations, etc. When seeking to merge international businesses, GatorSearch in general, will plan and prepare carefully, and work closely with local successful partners. In addition, to protect

users' privacies, GatorSeach will not share their searching histories with other unauthorized users or companies.

VIII. MANAGEMENT TEAM

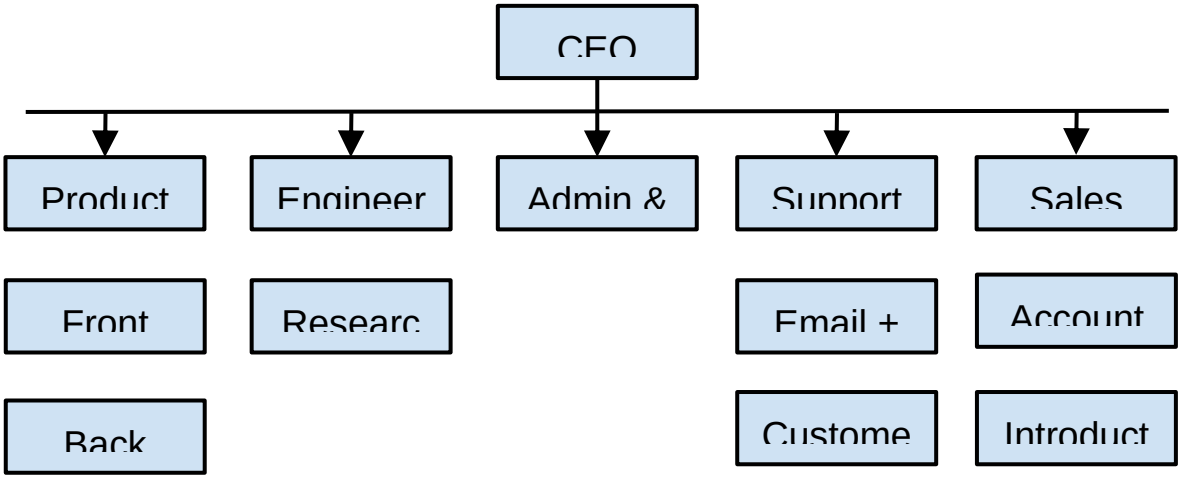

Figure VIII-1. Organizational Chart

A. Organization

The organizational chart is illustrated in Figure VIII-1. In the chart, there are three parts that have been be filled initially, the Product, Engineering, and Sales. The Engineering part is responsible for testing and researching the state-of-the-art algorithms for our search engine, while the Product part is for providing reliable web-based search service, which include front end user portals and back end database management and query evaluation. Finally, the Sales part becomes important when we have large number of users.

Initially, we have to fill the roles in Product and Engineering department to make our services available to a wide range of users. These roles are filled primarily by UF students who have in professional experiences in related technologies. After we getting enough amount of users (e.g. 1 million), then we begin hiring full time employees to fill the roles in organization.

B. Key Management Personnel

Our team consists of four members currently, all of which are graduate students. Among these four key persons, three of which are from the department of computer science, and the other one is from material science. One of the members is a Ph.D. student specialized in data science research, with strong research backgrounds in computer vision and data science areas, and has more than 10 papers published in the last three years.

C. Management Compensation and Ownership

Initially, all our members are agree to work with low salary to support the company. At the same time, we give shares of the company as part of the compensation.

D. Other Current Investors

There is no current external investor for the company. All the financial supports come from the members or the families of the members.

E. Employment and Other Agreements, Stock Options and Bonus Plans

All the members in this plan have agreed to work and support the growth of the company for at least one year. After one year, we will decide whether to continue the engagement based on the development of the company.

F. Board of Directors or Board of Advisors

Our company is initially a small company of a few members specializing in product design and development. The board consists of two members for product quality control, and four people for product development. After having more users, we will increase the size of our company to provide better service and accommodate more users.

Product quality control members: Dihong Gong and Siliang Xia. The proposed two members are Ph.D. students in computer science with rich experiences in software development and data science research. These two members are also the authors who build the first version of the online product search system.

Product development members: Dihong Gong, Siliang Xia, Siva Prasad BV, and Haitang Wang. In addition to the first two members who are also playing the roles in product quality control, the other two members are graduate students who are willing to contribute to the company and participate in the development of the products. Siva Prasad BV is an experienced database administrator with 5 years' working experience in Oracle Inc.

G. Supporting Professional Advisors and Services

As a web-based service provider, the users are the most important parts of our treasures. Initially, we provide services to both retailers and buyers for free to build up our user relationship. At this stage (this stage might take around one year), we don't need roles in accounting or banking advisors. After we have enough amount of users, we begin consider these roles, since at that time our company begins doing business with retailers by doing advertisement.