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Small Business Owner App to Showcase COVID Prevention Policies and Reopening Guidelines

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**Small business owner app to showcase
COVID prevention policies and
reopening guidelines**

Master's Project Report

**In Partial fulfillment of the requirements for a
degree in Master of Science in Computer
Science**

January 2021

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ABSTRACT:

Almost a year after the emergence of the Coronavirus, the pandemic still negatively affects the world's economy and quality of life. In the U.S., Covid-19 has shut down nearly 100,000 businesses.

The goal of this project is to develop an app that can assist business owners to accurately display their coronavirus prevention methods so that people can feel safe while using their services. This project will focus on how the business owner (Vendor) will be able to interact, utilize, and display important information for the customer (Patron) to use.

The vendor will be able to create an individual profile for his/her business and display their business page for the patron to see. The page will include basic business information and coronavirus prevention methods. These prevention methods are highlighted and shown clearly through either text or pictures. For example, a vendor that owns a restaurant that provides outdoor seating can display a picture of how they are practicing safe distancing between tables. This shows patrons what they can expect without having to visit the establishment.

This app will assist vendors and patrons through honest communication. This app will show how many business owners are trying to make their establishment as safe as possible.

BACKGROUND:

Corona virus disease (COVID-19) is an infectious disease that has been negatively affecting the world's economy starting in the beginning of 2020. "The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes" [1]. Since it is so easy to transmit the virus, there has been a need to shut down businesses and limit large gatherings all around the world. More specifically, in the US, limiting public gatherings has caused many businesses to shut down. As of September 2020, reported by CNBC with assistance from YELP Inc, 163,735 total businesses closures have been caused by the Coronavirus [4]. Of those businesses, Restaurant categories have been hit the hardest. Many small businesses have a difficult time getting information to the public about the precautions they are taking during this difficult time. Our app will be able to let Business owners (Vendors) display their Covid-19 precautions and updates in a transparent and effective manner.

RELATED WORK:

Covid-19 research is still in its beginning stages. Many top health organizations, lead research coalitions, and government organization have been studying COVID-19 since its emergence in early 2020.

Fairlie (2020) discussed the impact of covid-19 on small business owners focusing on the first three month after social distancing restrictions. He provided estimates of the early-stage effects of covis-19 on small business owners. He estimated that the number of working business owners dropped from 15 million in February 2020 to 11.7 million in April 2020. He compared many different factors including race, gender, and ethnicity to show the impact of the economic decline. As more closures are sure to persist, small businesses need help now more than ever. A localized

application, like ours, could really help small business owners connect with patrons to drive more business. Customers need to feel safe about shopping in populated areas and locally owned establishments.

In an early paper by **Bartik et al (April 2020)**, conducted surveys of small business owners in April 2020. The results showed businesses were starting to close very early into the pandemic. **Bartik et. al (July 2020)** discussed the impact of Covid-19 on small business with respect to the outcome and expectations from March to April 2020. The authors explained covid-19's early impact, beginning with mass layoffs, expected closures, and financial stability of small businesses. They explain the anticipated difficulties small businesses would face trying to secure financial aid and program relief accessibility and eligibility. Utilizing a public survey they were able to provide light on both the financial fragility and evidence on perceptions of government relief programs. The authors explain that early closures were largely due to reductions in demand and employee health concerns. Working toward a safer work environment for employees will also show customers that safe and secure work environments can hopefully drive demand up again. With our app, we can highlight COVID-19 prevention methods available so when we enter a post COVID-19 stage, customers and employees can feel safe with shopping.

Other websites such as **google.com** and **Yelp.com** also provide some form of covid-19 prevention information sporadically. However, they do not provide information to all small business. It is only updated for participating yelp/google reviewers and owners. Our app will be able to connect the small business owners with local customers that can drive their demand.

Software and consulting company Xybion Corp. has announced the release of their cloud based health and safety platform [11]. Their platform will help keep employees safe and compliant with government recommendations. This is an example of an application created in the response

to the Covid-19 pandemic. Much like the app discussed in this paper, the goal is help people remain safe and informed during the pandemic.

As the landscape changes during covid-19, assumptions on the timeframe of cures and vaccines are still uncertain. Once the pandemic subsides, and the economy starts to improve, businesses will need to be able to show they are taking the proper safety steps.

IMPLEMENTATION

Methods and design

The focus of this app is to allow vendors to display information to customers (patrons) in an easy to use smartphone application. The name of our app is “My Covid Safe Town”. Wireframe diagrams are used in early development to give a visual representation of the initial application layout. First, we created wire frame models listed in figure 1-4 below.

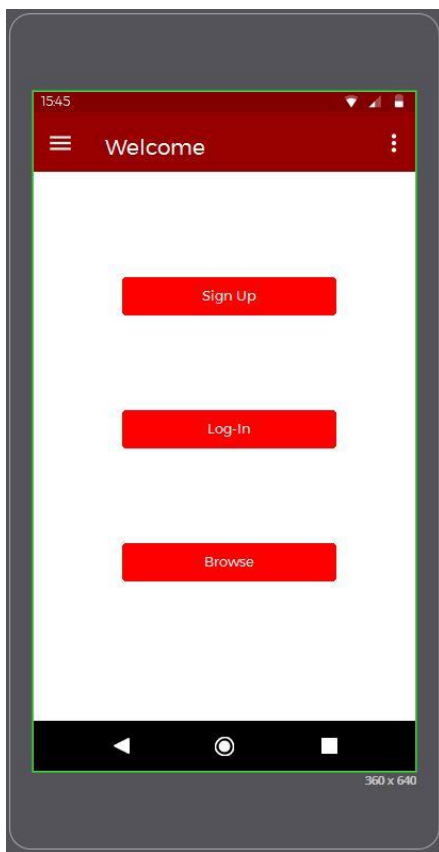


Figure 1. Welcome Screen Layout

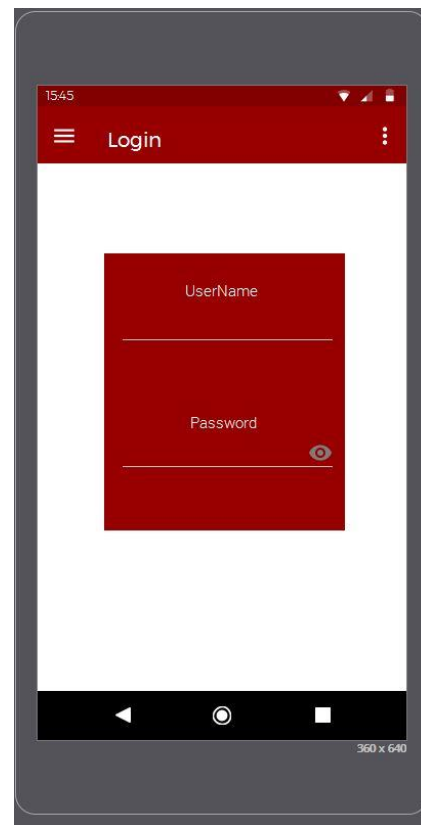


Figure 2. Login Screen Layout

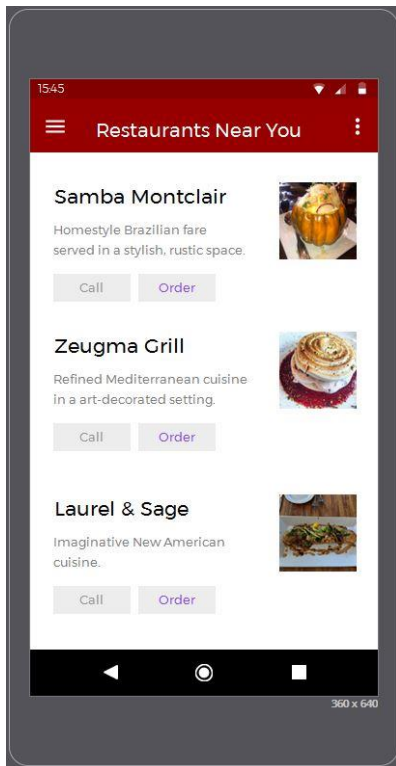


Figure 3. Browse Screen Layout

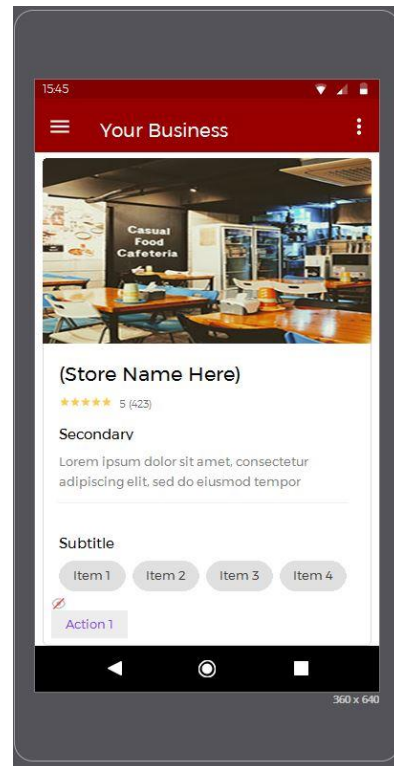


Figure 4. Page Screen Layout

Figure 1 – Welcome Screen Layout lets either the vendor sign-in and manage their business page, or lets the vendor browse businesses in the database.

Figure 2 – Login Screen Layout will let the vendor sign in with their credentials created in the “Sign up” page.

Figure 3 – Browse Screen Layout will let any user view the businesses on the app and select a business.

Figure 4 – Page Screen Layout shows the selected business and their COVID-19 prevention methods

After the wireframes were completed, we distributed user surveys to gauge interest and requested feedback for app improvements.

Wireframe Survey

To evaluate the app’s possible success, we conducted user surveys on both the app proposal and wireframe visualizations. The survey included five questions in a Likert scale format. We used the survey monkey platform to create the surveys.

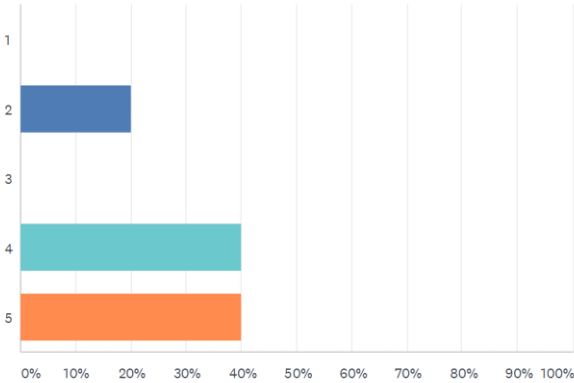
Q1 Name and Occupation

Q2 Do you own a business

ANSWER CHOICES	RESPONSES
Yes	0.00% 0
No	100.00% 5
TOTAL	5

Figure 11. Response to Q2

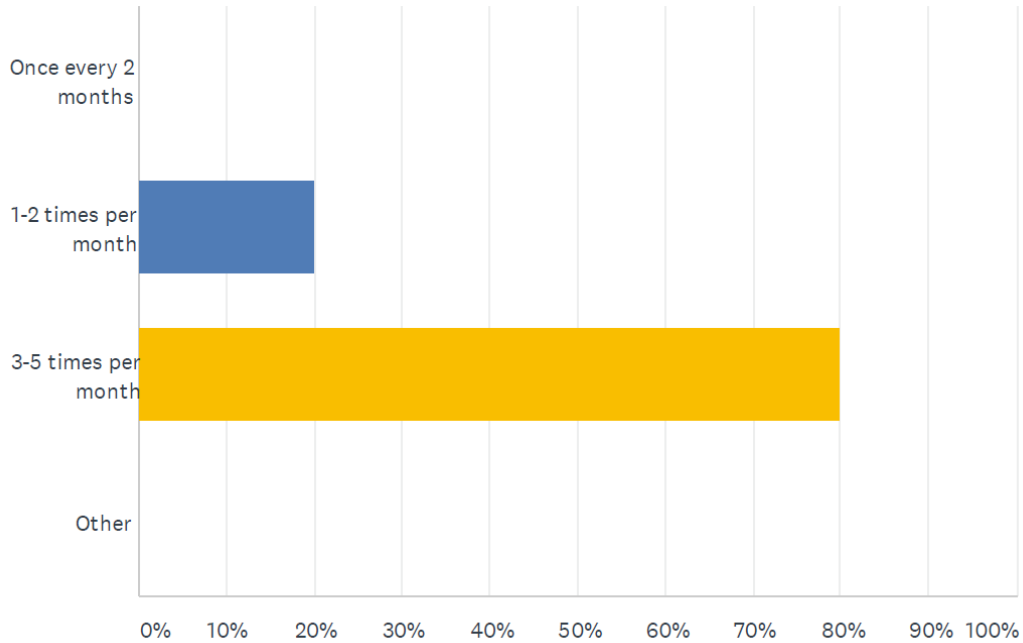
Q3 Please rate the quality of the app’s design.



ANSWER CHOICES	RESPONSES
1	0.00% 0
2	20.00% 1
3	0.00% 0
4	40.00% 2
5	40.00% 2
TOTAL	5

Figure 12. Response to Q3 on quality of Wireframe design.

Q4 How frequently would you use this app?



ANSWER CHOICES	RESPONSES
Once every 2 months	0.00% 0
1-2 times per month	20.00% 1
3-5 times per month	80.00% 4
Other	0.00% 0
TOTAL	5

Figure 13. Response to Q4 on frequency of use

Q5 Please share any additional comments or suggestions.

Answered: 4 Skipped: 1

#	RESPONSES	DATE
1	It looks very plain	10/12/2020 5:21 PM
2	I would definitely use this app to check certain places I frequently purchase food for takeout from, just to make sure said places were following proper safety guidelines. I do also like how it includes hotels and stores, and those places are both equally important to know information about. The overall design of the app is simple, but easy to navigate from the screenshots shown, making the app easily accessible for anyone to use (which I appreciate).	10/12/2020 5:02 PM
3	Seems Good	10/11/2020 6:23 PM
4	How does the order function work in the app? Does it transfer you to uber eats or other similar food apps or can you actually order thru your own app?	10/11/2020 1:42 PM

Figure 14. Comments on Wireframe survey

Wireframe Survey results

The surveys in figures 11 – 14 gave very good insights to areas that needed improvements as well as positive engagement opportunities. The app survey was completed by 5 potential users. They were given 5 questions arranged in a Likert format. The first question had them fill in their name and occupation. The second question asked if they were currently a business owner. All 5 participants answered NO. The third question asked about the quality of the app. On a scale of 1-5 with 5 being the best, 40% answered with a 4 and 40% answered with a 5, and 20% answering with a 2. That lead us to believe that the initial design still needed to be improved. The fourth question asked about the frequency of use which resulted in very good engagement numbers. 80% of participants said they would use the app 3-5 per month and 20% said they would use the app 1-2 times per month. The last question asked participants to provide any additional comments. One participant wrote that the design was too plain. Another participant gave good feedback on the idea of the app and its ease of use. One participant wanted clarification on something provided in the wireframe which hinted to an “order” functionality. This was a good comment since this is something that can be implemented in the future to assist users that enjoy the options of quick ordering.

Some of the areas we focused on during implementation were the app’s design and usability as these were the areas that seem to need the most attention from the survey.

Use Case Diagram:

The next step on implementation was to create a Use Case diagram to specify the systems' expected behavior using a visual representation.

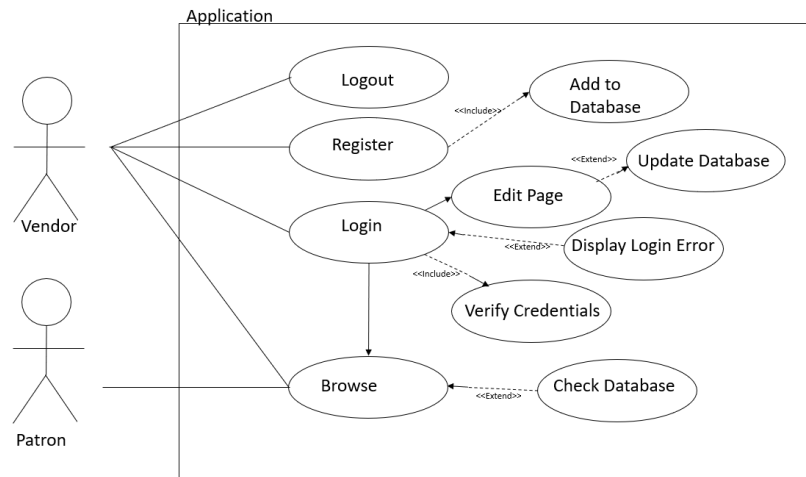


Figure 5. Use Case Diagram

As shown above in figure 5, the actors are the vendor and the patron. The vendor has the option to directly browse the database for different businesses. The vendor has the option to register their business, edit their page, or login.

The patron has the option to browse the businesses included in the database. They can also click on individual businesses to see additional business information provided by the vendor.

Database

We used android studio to code the app. Android studio is a development tool created by Google.

The database we decided to use is SQLite. (explain database). We decided to use Two tables which store Vendor Account information and Business information.

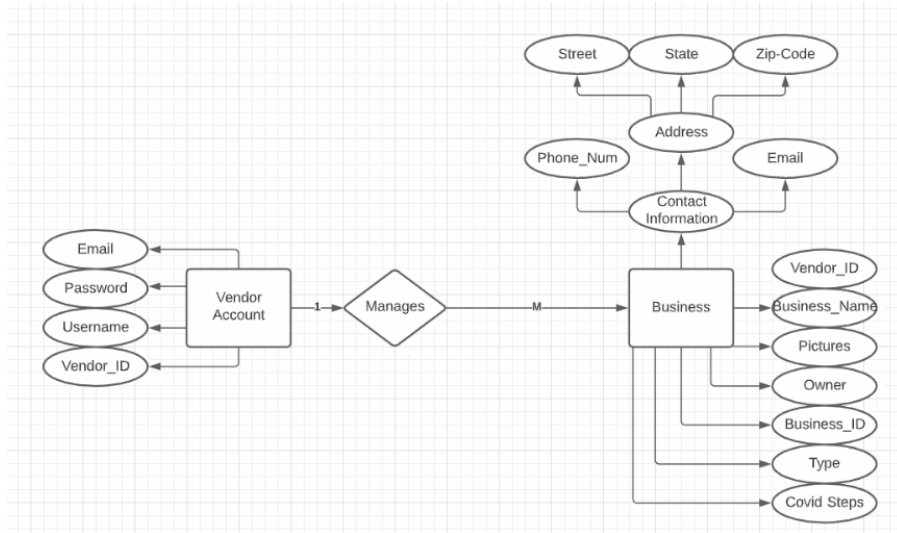


Figure 6. Database Diagram

FINAL APP DESIGN

Vendor portion:

Welcome:

Once the application is opened, the user is greeted by a welcome page and a short description. This portion of development focuses on the vendor side. If a vendor wants their business to be searchable through the app, they would need to create a profile and add their business. The first step would be to register.

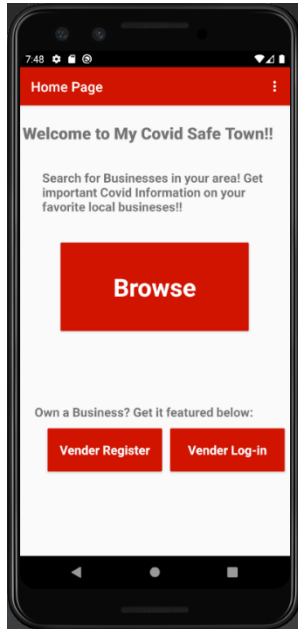


Figure 7. Welcome Page

Registration

Figure 8. Registration Page

As you can see in figure 8, the registration page is scrollable and includes all necessary fields the vendor will need to complete. Error checks are included to preserve certain formats like Zip code

length, phone number length etc. Once completed, the vendor is sent to the login page where they can login with their newly created credentials. Our database then stores a unique key which includes the user's email and password combination. This is used to identify the user which is shown in the table as "owner". If the user incorrectly inputs the data, the app will provide an error message.

Login and Vendor Welcome Page

After the vendor logs in with the correct credentials, they are then sent to the Vendor welcome screen.

The two screenshots below constitute figure 9.

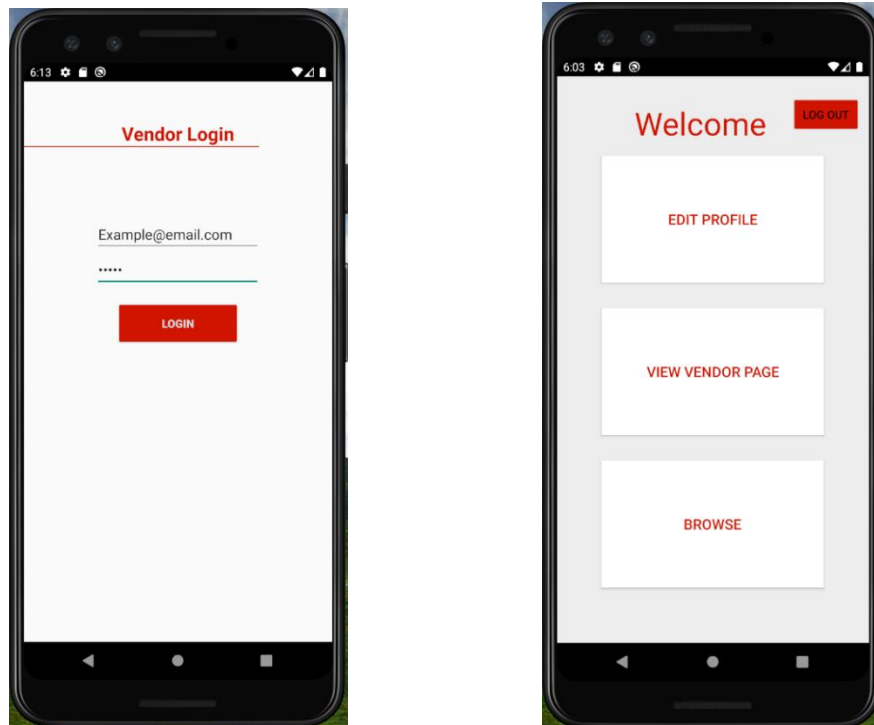


Figure 9. Vendor login and welcome

As you can see the figure 9, the user now has the option to either log out, edit profile, view vendor page, or browse other businesses.

Edit profile

The image displays two side-by-side screenshots of a mobile application's 'Edit Profile' page. The left screenshot shows the 'Vendor Account' section with fields for First Name (Example First Name), Last Name (Example Last Name), E-Mail (Example@email.com), and Password (masked with dots). Below this is the 'Business Info' section with fields for Business Name (Florence Ravioli), Business Type (Restaurant), Address (391 Park Ave.), City / Town (Scotch Plains), State (NJ), Zip Code (07076), and Phone (9083227222). The right screenshot shows the same 'Business Info' section with the same data, but with a red 'SAVE' button at the bottom. The 'Covid Info' field is set to 'Curb Side Pick-ups', the 'Business Description' is 'Established in 1943. A story c', and the 'Store Hours' are 'Tue-Sat: 9:00am- 6:00pm'.

Figure 10. Edit Profile Page

In figure 10, If the vendor selects, “edit Profile Page” they are sent to a page that shows all data pertaining to their business page. The information can then be altered and updated in the database.

Once the changes are made, the vendor is then sent back to the login welcome page.

The user also has the option to logout.

Final Survey

To evaluate the app's possible success on the final product, we conducted another user survey. This final survey consisted of sending a video explaining and walking through the application from the vendor and patron perspective. The survey included five questions in a Likert scale format. We used the survey monkey platform to create the surveys.

Q1: What is your occupation

The final survey was voluntary and anonymous, so we asked about occupation. This would be able to tell us how many kinds of users were taking the survey.

Q2:

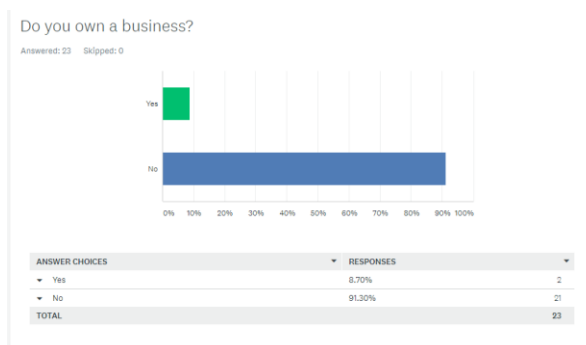


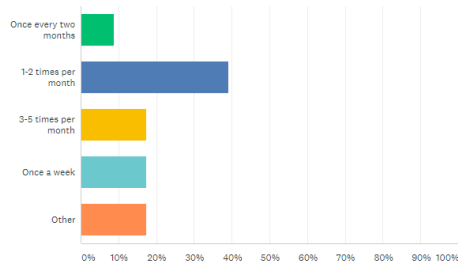
Figure 15. Response to Q2

Like this question asked during the wireframe survey, we used this information to find out how many participants were looking at the survey from the point of the vendor.

Q3.

How frequently would you use this application?

Answered: 23 Skipped: 0



ANSWER CHOICES	RESPONSES
Once every two months	8.70% 2
1-2 times per month	39.13% 9
3-5 times per month	17.39% 4
Once a week	17.39% 4
Other	17.39% 4
TOTAL	23

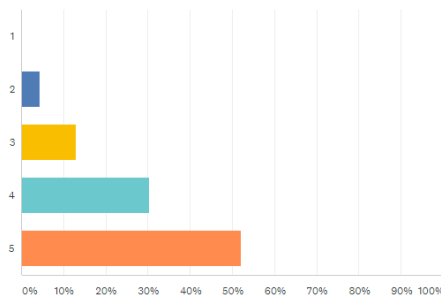
Figure 16. Response to Q3 on frequency of use of final app.

Question 3 gave very good feedback. It shows that many participants think they would frequently use this app.

Q4:

On a scale of 1 (worst)-5 (Best), please rate the overall quality of the application with respect to its ease of use, Navigation, and design appeal.

Answered: 23 Skipped: 0



ANSWER CHOICES	RESPONSES
1	0.00% 0
2	4.35% 1
3	13.04% 3
4	30.43% 7
5	52.17% 12
TOTAL	23

Figure 17. Response to Q4 on Overall Final App quality

Question 4 in figure 17 shows that 22 out of 23 people believe the app has a good to best overall quality of the app with respect to ease of use, navigation, and design appeal.

Q5

On a scale of 1 (Not helpful) - 5 (Very helpful), Do you think this app would be helpful in a Covid-19 recovery phase?

Answered: 23 Skipped: 0

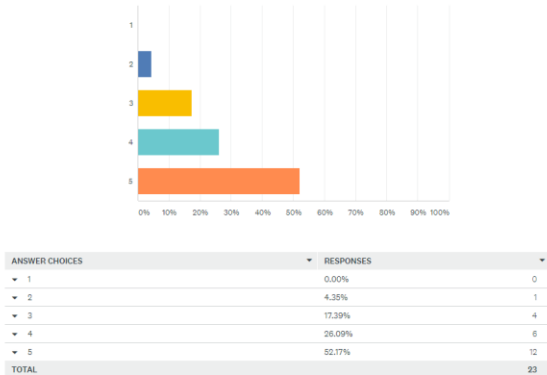


Figure 18. Response to Q5 on Helpfulness of App during Covid-19

Like Question 4, question 5 also shows that 22 out of 23 people believe the app would be helpful to very helpful in a Covid-19 recovery phase. This gives us a very good representation and confidence that this app idea could be very useful and beneficial to many users.

Additional comments:

Please share any additional comments or suggestions.

Answered: 14 Skipped: 1

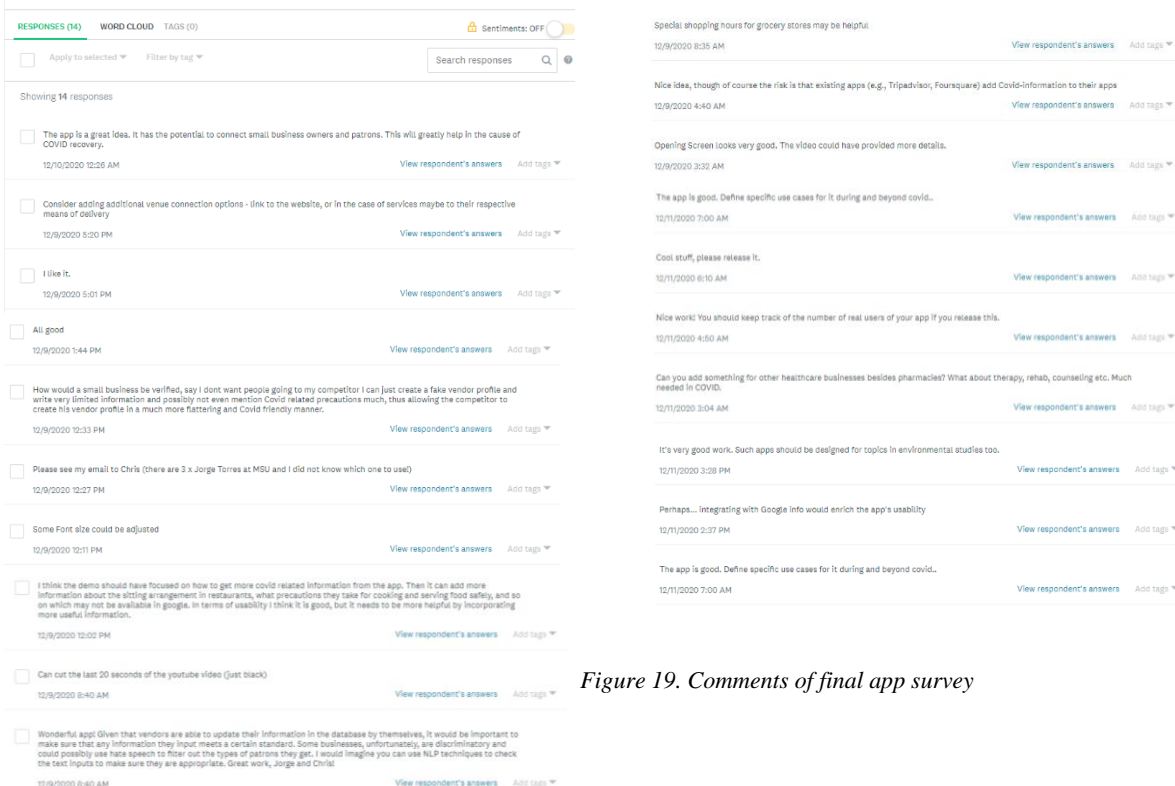


Figure 19. Comments of final app survey

Email Comments from Surveys on App (with details)

Is the app essentially an online yellow book? How exactly is it different from <https://www.yellowbook.com>?
I don't know how yellow books are maintained and updated, maybe the differences are that:

+ yellowbooks are static, while this is user-generated content hence more dynamic?
+ Another advantage could be that yellowbooks are not free probably while this may be free (but yellowbooks have a bigger impact).
- Exp. during covid recovery, stores can quickly respond to additional fields such as Covid 19 precaution or if something new comes up in three months like "all employees are covid vaccinated or something -yes no"
- the stores' inventory is not available online, and ordering is also not possible.

This is a great idea! I wondered why there are no easy ways to find out all the ways our favorite restaurants are distributing their products, so we haven't been to any of them since February (and only used delivery twice, someone in our household cooks better than most chefs!). We did collect a take-out yesterday, as we've done once or twice a month.

Comments on the app (no space in the survey, so please copy and paste):

- It needs an attractive, unique graphical logo so people can easily access the app (and you can advertise it effectively).
- Maybe use a color coding with symbols / icons indicating delivery (mode: GrubHub, proprietary...), i.e.:
 - curbside
 - take-out window
 - in-store take-out (no window)
 - socially-distanced sit-down outdoors
 - socially-distanced sit-down indoors
 - *rebel: we've ignoring all the rules!* [please don't include this one guys!]
- The video commentary could have been a bit slower at the beginning but was otherwise fine.
- Will the app's backend screen the images uploaded for inappropriate content (human or AI?) if the former, who? and if the latter, who will train?
- Will the app's backend screen text for typos (e.g., *Francis' Grill* vs *Francis' Grill*) and/or profanities (and how? see previous comment).

This looks like a great project, best of luck!

Thank you for sharing the app details. It looks neat and should be easy to follow for naïve users / vendors.

It would be interesting to integrate the results from Yelp/Google into the app to enrich the user experience.

Figure 20. Additional Email Comments

We received great feedback from our survey participants. They gave us many good ideas for future implementation and design improvements. Overall, we received great responses and we would take these into consideration if we decided to release this application.

This work falls in the general paradigm of research relevant to COVID-19 and related areas analogous to other works such as [12], [13], [14], [15]. It utilizes computational techniques to help make contributions in combating the pandemic and return to normalcy.

CONCLUSION

This project addresses the issues that small business owners face when trying to reach customers amid a global pandemic. A Small business owner app was created to showcase COVID prevention policies and reopening guidelines. Through honest communication and awareness, users can access up to date COVID-19 related information. From the data provided by the vendor, the patron can feel safe when traveling to their favorite small business. The vendor has the option to register with the app and create a unique profile to showcase their business. The vendor can login with their unique credentials and have the option to edit their page, view their page from the view of a patron, or view other business. The edit profile page also gives the ability update the page which also updated the database.

The work on this app can be extended not only outside New Jersey but also globally. Since the pandemic is global, many businesses outside of the united states are also facing economic hardships and can benefit from this app. Future work on this application can yield great results and assist business owners to accurately display their coronavirus prevention methods so that people can feel safe while using their services. The app will show how many business owners are trying to make their establishment as safe as possible.

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