CONTACT TRACING APPLICATION USING QUICK RESPONSE CODE AND THERMAL SCANNER

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Abstract

As this time of pandemic health risk is undeniable communication and technology is a very important aspect of everyday living, that is why through the use of technology we the researcher developed Contact Tracing Application using Quick Response Code and Thermal Scanner in order to help prevent the spread of the COVID 19 and to help spread health awareness to the people. This system together with the collaboration of our clients' ideas and suggestion aims to improve the contact tracing of All for Christ Church in Tanyag, Taguig City. The purpose of this system is to trace the possible person under investigation or what we call the PUI in this case we are using a contactless thermal scanner to scan the temperature and directly send it the to the database of the system by this it lessens the work of the staff of the church as we aim for a paperless transaction.By registering to the system, it will generate a unique Quick Response code for every registry to serve as their id whenever they go to the church. The system will mean some various benefits that will be done towards certain purpose. The system is created to help fight the spread of the virus, it detects certain symptoms like high temperature and notifies the admin of the system. Many people are not aware of the risk of COVID 19 and just realized it later on that they socialized on the person with possible virus, that is why we developed the system to prevent and to aware a person if they encounter a certain person with COVID19.

I. INTRODUCTION

As our country is facing the pandemic, technology development is raising and ever-growing innovative ideas are boundless. With the constant struggle of life due to the pandemic, much of the world is pinning its hopes of a much better way to lessen the spread of the virus and being able to quickly identify people who might have been exposed to the virus. Most of the facilities and government official uses manual filling out of form before entering to the establishment, sharing of pens may cause of spreading the virus.

Contact tracing application and website are being develop, some of the program developers and researcher studies the uses of contact tracing system to help lessen the probability of spreading the virus. The best way to make use of the contact tracing system is through online web base and android application. In the studies of Mayo Clinic according to Mr. William F. Marshall, III M.D. Contact tracing is a tool that can help slow the spread of infectious diseases, such as coronavirus disease 2019 (COVID-19). In communities using contact tracing, clinics, labs and hospitals send the names of people who have recently been diagnosed with COVID-19 to their local health department.

The health department asks each person with COVID-19 about people with whom they've recently had close contact. Health department officials then quickly (usually within 24 hours) alert people who are close contacts that they may have been exposed to the COVID-19 virus. Officials don't share the name of the person who may have exposed them. This makes the contact tracing process anonymous and confidential.

The sooner health officials can alert close contacts, the lower the risk of the COVID-19 virus spreading further. But not all health departments have enough staff to do contact tracing.

For COVID-19 contact tracing, a close contact is someone who's been within 6 feet (2 meters) of a person with COVID-19 within two days of the person's diagnosis. Close contacts can include family, friends, co-workers and health care providers.

The health department evaluates close contacts and asks them about symptoms. They generally give close contacts several instructions. These steps can help close contacts reduce the risk of unknowingly

spreading the COVID-19 virus to others. For close contacts who don't have symptoms and test negative for the COVID-19 virus, doctors and the health department will:

1. Ask them to self-quarantine at home for 14 days after they were exposed.
2. Request that they keep social distance from others. They may be asked to isolate themselves from family and pets, and use a separate bedroom and bathroom.
3. Request that they monitor their health and watch for any COVID19 symptoms.
4. Ask them to check their temperature twice a day.
5. Ask them to let their doctor and health department know right away if they develop any symptoms.
6. Request that they send doctors and the health department daily health updates

For close contacts who have symptoms and test positive for the COVID19 virus or develop symptoms, doctors and the health department will:

1. Ask them to self-isolate and recover at home for at least 10 days and selfquarantine for 14 days after being exposed. People with symptoms will likely be asked to isolate themselves from family and pets and use a separate bedroom and bathroom.
2. Ask them to seek medical care if they have any emergency warning signs, such as trouble breathing or persistent chest pain.
3. Give them specific instructions to monitor their symptoms and avoid spreading the COVID-19 virus to others.

Doctors may give different instructions to close contacts who have been diagnosed with the virus that causes COVID-19 in the last three months. Until a vaccine is available, communities will need to use other ways to reduce the spread of the COVID-19 virus. Contact tracing can be a powerful tool to help reduce the spread of the COVID-19 virus and help control the COVID19 outbreak.

By implementing a Contact Tracing Application using Quick Response Code and Thermal Scanner in All for Christ Church (Tanyag, Taguig City). Each person entering within the establishment will no longer fill out the form manually to expedite the entry process. After the registration process the system will automatically generate a Quick Response Code for the registry as their own id, once they already have the Quick Response Code they will no longer register again and just scan the Quick Response Code for the record helps to listen the time and effort of that person to manually fill out again their details to continuously proceed to their own business in the establishment, it helps the staff of the establishment to expedite the classification and identification of people under investigation so that the local government health workers can take immediate action in this regard.

II. LITERATURE REVIEW

Quick Response Scanning Using Android Phone

According to Bassilya Uzon and Sami Bilgin (2016), a study was undertaken in Turkey to evaluate and implement the Quick Response Code Identity Tag system in the healthcare field. The research looked into how to improve policy formation, planning, supervision, monitoring, and evaluation in the health-care system. Every member of the medical system receives a unique QR Code Tag that can be worn as a bracelet or necklace or carried as an ID card to aid in medical identity notifications. On hospital grounds, patients must always wear their QR Code ID wristbands. These bracelets have QR codes that lead to the QR Code Identity website.

Thermal Scanner

Thermal imaging systems are devised and manufactured for coronavirus management, according to East image. It takes the body temperature of a group of individuals, analyzes it, and reports it to our software system, which displays all real-time body temperatures and alerts people with light and sound if their temperature is too high. Make a list of everyone who has been alarmed. Without touching anything, the entire inspection process is carried out automatically.

Arduino

According to a study conducted by "Leo Louis" Department of Electronics and Communication Engineering, Gujarat Technological University, Ahmedabad, India (July 2018), the working principle of Arduino and how to use it as a tool for research and study. The purpose of this research is to develop a low-cost, simple method for enthusiasts, students, and professionals to build devices that interact with their surroundings utilizing sensors and actuators. It's a low-cost microcontroller board-based open-source computing platform for building and programming electrical devices. Like other microcontrollers, it may also function as a small computer, receiving inputs and regulating outputs for a variety of electronic devices.

Ultra-Sonic Sensor

According to Savitribai Phule Pune University's (2015-16) Navlesh Gavhale, Devendra Gavhane, and Siddheshwar Kurkute, who developed the Eye Tracking Interpretation System. The goal of this system is to determine the distance between an object and a person's path. The use of an ultrasonic sensor for measurement is one of the most cost-effective solutions available. This project shows how to measure the distance to an obstacle using an ultrasonic sensor and a microcontroller. To reduce the error in the measured distance, a correlation is used. In terms of distance measuring, an ultrasound sensor is extremely adaptable. Ultrasound sensors can be used in the air as well as underwater. For the most part, ultrasonic sensors are quite fast.

III. RESEARCH METHODOLOGY

For the descriptive and development design method of the researcher used is a systematic way of developing a system up to its completion. The researcher uses the software development cycle (SDLC) as the guide for the development of the system. Each phase of the software development cycle is being followed all throughout the development to ensure that the developed system is meeting the standard set by ISO. The SDLC used was RAD, RAD is research and industry proven software development model that produces a well-designed and robust system. There is less long-term planning involved in the process, and more focus is paid to the adaptability of the development workflow.

IV. FINDING AND DISCUSSION

Survey Interpretation

Students and IT professionals were evaluated on the Contact Tracing Application with Quick Response Code and Thermal Scanner utilizing ISO 25010 criteria in terms of the following variables:

1. Functional Suitability

Evaluation of All for Christ Church members and IT Practitioner on the Contact Tracing Application using Quick Response Code and Thermal Scanner for All for Christ Church in Tanyag, Taguig City.

Indicators	ACC Members		IT Practitioner		Average	
	W.M	Interpret	W.M	Interpret	W.M	Interpret
Functional Completeness	3.6	Strongly Agree	4	Strongly Agree	3.8	Strongly Agree
Functional Correctness	3.5	Strongly Agree	4	Strongly Agree	3.8	Strongly Agree
Functional Appropriateness	3.6	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Overall Weighted Mean	**3.6**	**Strongly Agree**	**3.9**	**Strongly Agree**	**3.8**	**Strongly Agree**

Table 1: Performance Monitoring and Improved Service in terms of Functional Suitability.

Table 1 Presents the evaluation of ACC members and IT Practitioners on the proposed **Contact Tracing Application using Quick Response Code and Thermal Scanner in terms of Functional Suitability**. It was revealed that the overall weighted mean of the indicators has a rating of **3.8** which is interpreted as **"Strongly Agree".** It also shows that both ACC Members and IT Practitioner evaluated the proposed system **as** "Strongly Agree". It can be seen that the IT Practitioner garnered the higher rate of **3.9** compared to the ACC Member only obtained **3.6.** It is also shown that the indicative **statement "Functional Appropriateness" and "Functional Correctness"** garnered the same highest rating of **3.8** which is interpreted as **"Strongly Agree",** while the indicative statement **"Functional Appropriateness"** obtained the lowest rating of **3.7** which is interpreted as **"Strongly Agree".**

This means the proposed system is functionally compliant but need to enhance its functional Appropriateness.

2. Compatibility

Evaluation of All for Christ Church members and IT Practitioner on the Contact Tracing Application using Quick Response Code and Thermal Scanner for All for Christ Church in Tanyag, Taguig City.

Indicators	ACC Members		IT Practitioner		Average	
	W.M	Interpret	W.M	Interpret	W.M	Interpret
Co-existence	3.4	Agree	3.6	Strongly Agree	3.5	Strongly Agree

Interoperability	3.5	Strongly Agree	3.6	Strongly Agree	3.6	Strongly Agree
Overall Weighted Mean	**3.5**	**Strongly Agree**	**3.6**	**Strongly Agree**	**3.6**	**Strongly Agree**

Table 2: Performance Monitoring and Improved Service in terms of Compatibility.

Table 2 Presents the evaluation of ACC members and IT Practitioners on the proposed **Contact Tracing Application using Quick Response Code and Thermal Scanner in terms of Compatibility.** It was revealed that the overall weighted mean of the indicators has a rating **of 3.6** which is interpreted as **"Strongly Agree".**

It also shows that both ACC Members and IT Practitioner evaluated the proposed system as **"Strongly Agree"**. It can be seen that the IT Practitioner garnered the higher rate of **3.6** compared to the ACC Member only obtained **3.5.** It is also shown that the indicative statement **"Interoperability"** garnered the highest rating **of 3.6** which is interpreted as **"Strongly Agree",** while the indicative statement **"Co-existence"** obtained the lowest rating **of 3.5** which is interpreted **as "Strongly Agree"**
This means the proposed system is functionally compatible but need to enhance its Co-existence.

3. Usability
Evaluation of All for Christ Church members and IT Practitioner on the Contact Tracing Application using Quick Response Code and Thermal Scanner for All for Christ Church in Tanyag, Taguig City.

Indicators	ACC Members		IT Practitioner		Average	
	W.M	Interpret	W.M	Interpret	W.M	Interpret
Appropriateness	3.5	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Learnability	3.6	Strongly Agree	3.6	Strongly Agree	3.6	Strongly Agree
Operability	3.7	Strongly Agree	3.8	Strongly Agree	3.8	Strongly Agree
User error Protection	3.7	Strongly Agree	3.8	Strongly Agree	3.8	Strongly Agree
User Interface Aesthetics	3.6	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Accessibility	3.6	Strongly Agree	4	Strongly Agree	3.8	Strongly Agree
Overall Weighted Mean	**3.6**	**Strongly Agree**	**3.8**	**Strongly Agree**	**3.7**	**Strongly Agree**

Table 3: Performance Monitoring and Improved Service in terms of Usability.
Table 3 Presents the evaluation of ACC members and IT Practitioners on the proposed **Contact Tracing Application using Quick Response Code and Thermal Scanner in terms of Usability.** It was revealed that the overall weighted mean of the indicators has a rating of **3.7** which is interpreted as **"Strongly Agree".**

It also shows that both ACC Members and IT Practitioner evaluated the proposed system as **"Strongly Agree".** It can be seen that the IT Practitioner garnered the higher rate of **3.8** compared to the ACC Member only obtained **3.6.** It is also shown that the indicative statement **"Operability", "Accessibility"** and **"User error Protection"** garnered the highest rating of **3.8** which is interpreted as **"Strongly Agree",** while the indicative statement **"User Interface Aesthetics" and "Appropriateness"** obtained the second rating of **3.7** which is interpreted **as "Strongly Agree"** while the lowest indicative statement is **"Learnability"** obtained the rating **of 3.6.**

This means the proposed system is usable but need to enhance its Learnability.

4. Security
Evaluation of All for Christ Church members and IT Practitioner on the Contact Tracing Application using Quick Response Code and Thermal Scanner for All for Christ Church in Tanyag, Taguig City.

Indicators	ACC Members		IT Practitioner		Average	
	W.M	Interpret	W.M	Interpret	W.M	Interpret
Confidentiality	3.6	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Integrity	3.5	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Non-repudiation	3.4	Strongly Agree	3.6	Strongly Agree	3.5	Strongly Agree
Accountability	3.5	Strongly Agree	3.6	Strongly Agree	3.6	Strongly Agree
Authenticity	3.6	Strongly Agree	4	Strongly Agree	3.8	Strongly Agree
Overall Weighted Mean	**3.5**	**Strongly Agree**	**3.8**	**Strongly Agree**	**3.7**	**Strongly Agree**

Table 4: Performance Monitoring and Improved Service in terms of Security.

Table 4 Presents the evaluation of ACC members and IT Practitioners on the proposed **Contact Tracing Application using Quick Response Code and Thermal Scanner in terms of Security**. It was revealed that the overall weighted mean of the indicators has a rating of **3.7** which is interpreted as **"Strongly Agree".**

It also shows that both ACC Members and IT Practitioner evaluated the proposed system as **"Strongly Agree"**. It can be seen that the IT Practitioner garnered the higher rate of **3.8** compared to the ACC Member only obtained **3.5**. It is also shown that the indicative statement **"Authenticity",** garnered the highest rating of **3.8** which is interpreted as **"Strongly Agree",** while the indicative statement **"Confidentiality" and "Integrity"** obtained the second rating of **3.7** which is interpreted as **"Strongly Agree".** And also shown that the indicative statement **"Accountability"** obtained the third rating **of 3.6** which is interpreted **as "Strongly Agree"** while the lowest indicative statement **is "Nonrepudiation"** obtained the rating of **3.5** which is interpreted **as "Strongly Agree".**

This means the proposed system is secure but need to enhance its Nonrepudiation.

5. Maintainability

Evaluation of All for Christ Church members and IT Practitioner on the Contact Tracing Application using Quick Response Code and Thermal Scanner for All for Christ Church in Tanyag, Taguig City.

Indicators	ACC Members		IT Practitioner		Average	
	W.M	Interpret	W.M	Interpret	W.M	Interpret
Modularity	3.7	Strongly Agree	3.8	Strongly Agree	3.8	Strongly Agree
Reusability	3.6	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Analyzability	3.6	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Modifiability	3.7	Strongly Agree	3.8	Strongly Agree	3.8	Strongly Agree
Overall Weighted Mean	**3.7**	**Strongly Agree**	**3.8**	**Strongly Agree**	**3.8**	**Strongly Agree**

Table 5: Performance Monitoring and Improved Service in terms of Maintainability

Table 5 Presents the evaluation of ACC members and IT Practitioners on the proposed **Contact Tracing Application using Quick Response Code and Thermal Scanner in terms of Maintainability**. It was revealed that the overall weighted mean of the indicators has a rating of **3.8** which is interpreted as **"Strongly Agree".**

It also shows that both ACC Members and IT Practitioner evaluated the proposed system as **"Strongly Agree".** It can be seen that the IT Practitioner garnered the higher rate of **3.8** compared to the ACC Member only obtained **3.7**. It is also shown that the indicative statement **"Modifiability"** and **"Modularity"**

garnered the highest rating of **3.8** which is interpreted as **"Strongly Agree",** while the indicative statement **"Reusability" and "Analyzability"** obtained the lowest rating **of 3.7** which is interpreted **as "Strongly Agree".**

This means the proposed system can be maintainable but need to enhance its Reusability and Analyzability.

6. Portability
Evaluation of All for Christ Church members and IT Practitioner on the Contact Tracing Application using Quick Response Code and Thermal Scanner for All for Christ Church in Tanyag, Taguig City.

Indicators	ACC Members		IT Practitioner		Average	
	W.M	Interpret	W.M	Interpret	W.M	Interpret
Adaptability	3.7	Strongly Agree	3.8	Strongly Agree	3.8	Strongly Agree
Install Ability	3.4	Strongly Agree	3.8	Strongly Agree	3.6	Strongly Agree
Replicability	3.6	Strongly Agree	3.8	Strongly Agree	3.7	Strongly Agree
Overall Weighted Mean	**3.6**	**Strongly Agree**	**3.8**	**Strongly Agree**	**3.7**	**Strongly Agree**

Table 6: Performance Monitoring and Improved Service in terms of Portability

Table 6 Presents the evaluation of ACC members and IT Practitioners on the proposed **Contact Tracing Application using Quick Response Code and Thermal Scanner in terms of Portability**. It was revealed that the overall weighted mean of the indicators has a rating of **3.7** which is interpreted as **"Strongly Agree".**

It also shows that both ACC Members and IT Practitioner evaluated the proposed system as **"Strongly Agree".** It can be seen that the IT Practitioner garnered the higher rate of **3.8** compared to the ACC Member only **obtained 3.6**. It is also shown that the indicative statement **"Adaptability"** garnered the highest rating of **3.8** which is interpreted as **"Strongly Agree",** while the indicative statement **"Replicability"** obtained the second rating of **3.7** which is interpreted as **"Strongly Agree".** And the indicative statement **"Install Ability"** obtained the lowest rating of **3.6** which is interpreted **as** "Strongly Agree".

This means the proposed system is functionally portable but need to enhance its Install Ability.

V. CONCLUSION AND FURTHER RESEARCH

Conclusion
Based from the research and study of the project therefore conclude that the system functionalities are done and useful in all aspects and will surely help in contact tracing and monitoring all entering the premises without worries. And also provide a staff work efficient for the benefit of the church.

The researcher believed that the finding study will contribute significantly in terms of contact tracing.

Recommendation
The researcher strongly recommended the implementation of the Contact Tracing Application using Quick Respond Code and Thermal Scanner. In addition, the following recommended are:

The propose system is open for further development and enhancement in terms of improving the following features:

1. Design in Website
2. Report can export in excel
3. Real time functions

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