SMART FACE SHIELD WITH EMERGENCY FEATURES USING IOT SYSTEM

Garduque Daniel L., Guillermo Courtney O., Ibanez Czar Ryenbert C., Napila Jaspher, Ocampo Rodolofo Jr. S., Ortiz Christine Grace M., Samson Kyllie Anne A.

Department: College of Engineering   Course: Electronics and Communication Engineering

INTRODUCTION

The first ever human cases of COVID - 19 , was in Wuhan China , the disease caused by the novel coronavirus causing COVID-19, subsequently named SARS-CoV- 2 were first reported by officials in Wuhan City, China, in December 2019. And then the Chinese authorities have identified human cases with one of symptoms in early December 2019. While some of the earliest known cases had a link to a wholesale food market in Wuhan, a lot of the initial patients were either stall owners, market employees , or regular visitors to this market. The environmental samples taken from this market in December 2019 tested positive for SARS - CoV - 2, further suggesting that the market in Wuhan City was the source of this outbreak or played a role in the initial amplification of the outbreak. COVID-19 spreads mainly from person to person through respiratory droplets. Respiratory droplets travel into the air when you cough, sneeze, talk, shout, or sing.

In our current situation, it is now normal to wear any kind of personal protective equipment . Primarily because, the effect of COVID - 19 to our everyday lives ' changes everything. We will not be focusing on the virus itself however , this study will be focusing on the device which we can consider as an "everyday essential". Personal protective equipment is anything you can wear that will protect you against any hazardous conditions, particularly in this current outbreak. Personal protective equipment is important because it prepares you for any health and safety risks and gives you extra protection in the event of an accident or against the elements . Our device called " Smart Face - shield with emergency features using IoT system " is what we can say, an advanced and innovative type of personal protective equipment. This is not just an ordinary face - the shield everyone is using at the present

time. It has numerous features such as sound indicator buzz, GPS, and it can send this information via SMS using the IoT system.

GENERAL OBJECTIVE

This study is aimed to develop a Smart face shield with emergency features using IOT System.

The general objective of this project was to build Personal Protective Equipment for everyone, especially the Frontlines for the safety and well - being of the one using the face shield by protecting them from the virus and securing them from the harmful elements of the surrounding. The Smart face shield with emergency Features using IOT System can be used anywhere for example hospital, mall, government facilities, private sector and mostly in public transportation.

SPECIFIC OBJECTIVE

The specific objective of this project is to build a Personal Protective Equipment of the Frontliners for their safety at secure protection on their health and safety whenever they are on duty. That will allow them to go and fulfill their obligation to the public mostly the ones that work in the field of Health and security of everyone.

STATEMENT OF THE PROBLEM

This project aimed to build a Smart face shield with emergency feature using ioT System, It sought to answer the following research questions:

1. What are the characteristic of the device /system in terms of LoT System which is currently used?

2. What improvement can be made out of the existing device/system?

3. What new device/system can be derived with the improvement?

4. What is the assessment of the group for the functionality of the device?
a. Functionality
b. Usability
C. Reliability
d. Efficiency
e. Maintainability

5. What claim can be derived from the developed inventions?

METHODOLOGY

The research used the developmental type of research which has been defined as the systematic study of designing, developing, and evaluating instructional programs, processes, and products that must meet criteria of internal consistency and effectiveness. Developmental research is particularly important

in the field of instructional technology. The most common types of developmental research involve situations in which the product-development process is analyzed and described, and the final product is evaluated. A second type of Developmental research focuses more on the impact of the product on the learner or the organization. A third type of study is oriented toward a general analysis of design development or evaluation processes as a whole or as components. A fundamental distinction should be made between reports of actual developmental research (practice) and descriptions of design and development procedural models (theory. Although it has frequently been misunderstood, developmental research has contributed much to the growth of the field as a whole, often serving as a basis for model construction and theorizing (Richey,1994).

The method of sampling is purposively in nature. The purposive sampling technique is a type of non-probability sampling that is most effective when one needs to study a certain cultural domain with knowledgeable experts within. Purposive sampling may also be used with both qualitative and quantitative research techniques. The inherent bias of the method contributes to its efficiency, and the method stays robust even then tested against random probability sampling. Choosing the purposive sample is fundamental to the quality of data gathered; thus, Reliability and competence of the informant must be sure (Tongco, 2007).
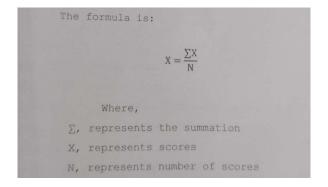
Evaluation

The project was evaluated on the following criteria namely:
- Functionality
- Usability
- Reliability
- Efficiency
- Maintainability

Statistical Treatment

The mean was used as the tool for evaluating the project.

The formula is:

$$X = \frac{\sum X}{N}$$

Where,

$\sum$, represents the summation

X, represents scores

N, represents number of scores

The Likert Scale was used for descriptive ratings.

Table 1: Likert Scale for descriptive ratings.

NUMERICAL SCALE	AVERAGE RESPONSE	DESCRIPTIVE RATING	VERBAL INTERPRETATION
5	4.20-5.00	Excellent	E
4	3.40-4.19	Very Good	VG
3	2.60-3.39	Good	G
2	1.80-2.59	Fair	F
1	1.00-1.79	Poor	P

Equal Variance Not Assumed

When the two independent samples are assumed to be drawn from the populations with equal variances (i.e., $O1_2$ $O2_2$), the test statistic t iS computed where:

X--1 = Mean of the first sample
x--2 = Mean of the second sample
n1 = Sample size (i,e., number of observations) of first sample
n2 = Sample size (i.e., number of observations) of second Sample
1 = Standard deviation of first sample
s1 = Standard deviation of second sample

The calculated t value is then compared to the critical t value from the t distribution table with degree of freedom.

DATA GATHERING PROCEDURE

1. Deciding the title of the thesis Smart Face Shield with emergency features using IoT systems."

2. Gathering data through research.

3. Presentation of the proposed title.

4. Designing the project's structure and circuitry.

5. Deciding on where the researchers will construct their design project.

6. Collection of materials and equipment that would be used for the whole project.

7. Construction and wiring the project.

8. Testing and trial of the output.

9. Writing the final report of the thesis.

10. Final defense of the study.

11. Final checking of the output.

12. Submission of the final report.

SUMMARY OF FINDINGS

SOP 1. Who is the beneficiary of this project?
  - Frontliners will benefit when it comes to using a smart face shield with emergency features using IOT System as their number one protection.

SOP 2. How can it help prevent infections?
  - Smart Eace shield aims to protect the wearer's entire face (or part of it) from hazards such as flying objects and road debris, chemical splashes, or potentially infectious

materials in medical and laboratory environments.

SOP 3. What are the device' s systems for communication?
- Smart Face-shield with emergency features using IoT Systems use GSM as the main communication medium.

SOP 4. WHAT IS THE ASSESSMENT OF THE 3 GROUPS OF RESPONDENTS NAMELY: STUDENTS, PROFESSIONAL AND SECURITY TO SMART FACE SHIELD WITH EMERGENCY FEATURES USING IOT SYSTEM IN TERMS OF CRITERIA? IS THERE ANY SIGNIFICANT DIFFERENCES?
- The following criteria were being assessed by a group of three respondents' students, professional and security.

Table 2: Overall Assessment of Three Groups of Respondents

Criteria	Students	Professor	Community	Composite Mean	VI	Rank
Functionality	4.67	4.57	4.33	4.52	E	2.5
Usability	4.75	4.40	4.50	4.55	E	1
Reliability	4.35	4.40	4.25	4.33	VS	5
Efficiency	4.43	4.73	4.40	4.52	E	2.5
Maintainability	4.27	4.73	4.37	4.46	VS	4
Over all Composite				4.48	VS	

Table 2 shows the result of the overall assessment of the three groups of respondents, namely: Students, Professionals, and Community. The overall composite mean haas a numerical value of 4.48 interpreted as "Very Satisfactory".

  A. ASSESSMENT ON FUNCTIONALITY AND EFFICIENCY

- Rank 2.5 are "Functionality" and "Efficiency" with composite means of 4.52 and interpreted as "Excellent".
B. ASSESSMENT ON USABILITY
- Rank 1 is "Usability" with a composite mean of 4.55 and interpreted as "Very Satisfactory".
C. ASSESSMENT ON RELIABILITY
- Rank 5 is "Reliability" with a composite mean of 4.33 and interpreted as "Very Satisfactory".
D. ASSESSMENT ON MAINTAINABILITY
- Rank 4 is "Maintainability" with a composite mean of 4.46 and interpreted as "Very Satisfactory".

CONCLUSION

Based on the findings of the study, the following conclusions are drawn:

A. According to the evaluation result of functionality of the System, the degree to which the sets functional completeness, correctness and appropriatenesS Were interpreted as "Excellent " and "Very Satisfactory" by the respondents, which means that the functionality of Smart Face Shield with Emergency Features using IOT System provided the specific tasks and user objectives Correctness of results with the needed degree of precision, and facilitated the accomplishments of the specified task and objectives.

B. According to the evaluation result of the usability of the System, the degree to which the sets operability and accessibility were interpreted as "Excellent" by the respondentS, which means that the usability of Smart Face Shield with Emergency Features using IoT System had an attribute that make it easy to operate and Control and can be used by the people With widest range of characteristics and capabilities to achieve a specified context of use.

C. According to the evaluation result of the Reliability of the system, the degree to which the sets maturity and availability were interpreted as "Very Satisfactory" by the correspondents, which means that the reliability of Smart Face Shield with Emergency Features using IoT System has met the needs for reliability under normal operation and it was operational and was accessible when required for use

D. According to the evaluation result of the Efficiency of the System, the degree to which the sets of time behavior, resource utilization and capacity were interpreted as "Excellent or Very Satisfactory" by the respondents, which means that the efficiency of the Smart Face Shield with Emergency Features using IOT System met the requirements of performing its functions.

E. According to the evaluation result Of the Maintainability of the system, the degree to which the sets modularity, reusability and modifiability were interpreted as "Very Satisfactory or Excellent" by the respondents, which means that the maintainability of Smart Face Shield with Emergency Features using IOT System was composed of discrete components such that a change to one component had minimal impact on other components, an asset and can be effectively
and efficiently modified without introducing defects or degrading existing system quality.