

**MASENO UNIVERSITY**

**SCHOOL OF COMPUTING AND INFORMATICS**

**DEPARTMENT OF INFORMATION TECHNOLOGY**

# **MASENO E-HELP EMERGENCY SYSTEM**

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**PROJECT PROPOSAL SUBMITTED TO THE SCHOOL OF COMPUTING AND INFORMATICS IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY**

**MASENO UNIVERSITY**

**P.O. BOX PRIVATE BAG**

**MASENO, KENYA**

**MARCH, 2022**

# **DECLARATION**

We the undersigned do hereby declare that this project proposal is our own original work and where there’s work or contributions of other individuals, it has been duly acknowledged and relevant citations given. To the best of our knowledge, no material herein has been previously presented to any other academic institution for examination, award of degree or any other award(s).

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**KATUMO BENSON MAKAU Date**

**Admission No. CIT/00046/019**

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**Supervisor**

I hereby certify that project Proposal/report has been presented for examination with my approval as the university appointed supervisor.

Supervisor’s Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# **DEDICATION**

This project proposal is dedicated to our parents, lecturers and colleagues whose love, understanding, guidance and encouragement has made it a success. We also dedicate this project proposal to the School of Computing, Maseno University for their ultimate sacrifice to ensure that we have the hands on skills required.

# **ACKNOWLEDGEMENT**

We would like to express our sincere gratitude to our supervisor Mr. Omuono for providing his invaluable guidance, comments and suggestions throughout the course of this project.

# **ABSTRACT**

One of the major aspects in dealing with emergencies in regard to ensuring the safety of people as well as safeguarding their lives is the emergency response. It is common all over the world that emergency response is a critical aspect that is required in all nations. Even developed countries like United States, United Kingdom and China, have all experienced events that could be termed as emergencies. For the case of United States, wildfires and terrorist attacks have often been experienced while for nations like China, matters addressed as emergencies were earthquakes and hurricanes. However, the developed countries have embraced technology to help in detecting, responding and preventing emergencies. Kenya on the other hand being a developing country still lags behind when it comes to responding to emergencies as a result of the poor and inefficient systems that are in place. These systems are also are dependent on the human effort which at times results to inaccuracy. This study targets to design, develop and test a web-based prototype for Maseno University which is located in Kenya in an attempt to prove the concept of the use of technology in handling health emergencies. For that reason this study will rely on exploratory research technique since the research explores and attempts to test a prototype. The research design will focus on collecting data from a sampled population, using purposive sampling technique. The focus groups in this study will consist of paramedics, call center staff and students who at given times had a health emergency that needed immediate response.

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# **CHAPTER 1: INTRODUCTION**

## **1.1 BACKGROUND INFORMATION**

Mitigating the consequences of emergencies is a major challenge in many areas of the world given the limited resources allocated for emergency response. For Maseno University, the major incidents include fires and diseases. Lack of an integrated emergency service, many incidents in Maseno University escalate to such an extent that students end up admitted in hospitals or even lose their lives. Poor coordination of incidents, lack of standard operational procedures, and emergency response operation plans have all been shown to expose victims to increase morbidity and mortality (Wachira and Smith, 2013). According to Jeanine Cooper, who was once the head of the UN office for coordination of humanitarian affairs (OCHA-Kenya), Kenya is “ill-prepared” to respond to emergency scenarios. This comes after a series of earth tremors that left every Kenyan in the capital in panic. It was a situation that left Kenyans questioning the country’s ability to respond to emergencies. (Rono-Bett, 2018), states that Kenya lacks standard operating procedures for multiple types of disasters/emergencies. In addition, emergency response activities have been poorly coordinated, due to lack of standard operational procedures and disaster emergency operation plans. This remains to be a challenge that has led to duplication of efforts and wasteful use of resources. In absence of coordinated plan and action, preparedness and mitigation have not always been attained. In addition, collection of data is not uniformly adequate, which leads to poor planning of emergency response. Similarly, this inadequacy has also resulted in lack of effective monitoring in emergency response situations. Therefore, there is need to develop a system that collects, centralizes data, coordinate emergency response activities and reduce response time for emergency situations, thus saving lives as well as increase recovery from the emergencies. The system should also reduce dependence on human effort, therefore increasing accuracy and making affected persons be reached on time.

## **1.2 PROBLEM STATEMENT**

The traditional way of responding to health emergencies in Maseno University brings forth several challenges; it is slow, inaccurate, inefficient and unreliable thus implying low emergency success rates. These delays have even led to students getting hospitalized or even at worst scenarios succumbing to different diseases as a result of unreliable emergency response. The procedure itself is dependent on the skills of a human being to assess the situation, gather information such as the geolocation of the affected students therefore making it inefficient, inaccurate, slow and unreliable.

## **1.3 Objectives**

### **1.3.1 Overall Research Objective**

To design, develop and evaluate a web-based emergency reporting and response prototype for Maseno University.

### **1.3.2 Specific Research Objectives**

1. To identify challenges of the existing emergency response system in Maseno University.
2. To identify the functional modules in an emergency response system.
3. To design an emergency response prototype.
4. To develop the designed emergency response prototype.
5. To test the developed prototype.

## **1.4 Research Questions**

1. What are the challenges of the traditional emergency response systems in Maseno University?
2. What is the most appropriate design for emergency reporting and response prototype?
3. What is the best approach to development of the designed emergency reporting and response prototype?
4. What tests can validate the performance of the developed prototype?

## **1.5 Significance**

This project expects to create a prototype that aims to prove the concept of the use of technology in handling health emergencies: It will provide a foundation for further research in this area with the aim decreasing response time, and increasing accuracy of the location of emergency.

## **1.6 Limitations**

1. Network downtime from internet service providers may interfere with the emergency handling process and data collection process.

## **1.7 Assumptions**

1. Users have access to fast internet.
2. Users have devices that have GPRS, GPS, compass, or have an accurate IP address.
3. Users provide accurate information when accessing the Emergency Response System.

# **CHAPTER TWO: LITERATURE REVIEW**

## **2.1 Introduction**

This chapter review literature on emergencies, emergency response and emergency response systems in both developed and developing countries. The emergency strategies, successes, failures and challenges in both developed and developed countries are reviewed. The chapter is organized as follows: emergency and emergency response, managing emergencies in developed countries; America, Europe, Japan, China and Emergency response in developing countries; South Africa and Kenya.

## **2.2 Emergency Response**

There are various definitions of the term emergency. According to Oxford Dictionary (Dictionary, 1989), an emergency is defined as a sudden, unexpected and often dangerous situation that requires immediate action. On the other hand, Business Dictionary (2018) defines an emergency as a sudden, unexpected and impending situation that causes injury, loss of life, damage to property and causes interference with the normal activities of a person therefore requires immediate attention and remedial action. From the definitions above, an emergency can therefore be defined as a sudden, unexpected, impending and dangerous situation that causes injury, loss of life and damage to property therefore requiring immediate action that will provide remedy. Emergency response, which is a process of gathering information and resources about the specific emergency case and acting immediately after the incident happens within the shortest time possible is a fundamental and a basic ingredient necessary to lessen the possible impact of the emergency on human life and property. It should be carried out in a systematic manner, since the first actions taken are very critical in determining whether the impact of the emergency will be manageable. An emergency response system is a multi-disciplinary concept that includes not only information technology (IT), but also social communication networks of response agents, and organizational designs (Shen and Shaw, 2004). According to the National Institute of Environmental Health sciences of the United States (2021), scenarios that can be considered as emergencies include; Shooting, bomb threats, toxic chemical/radioactive/biological spills, criminal activities and terrorist attacks, fire, flooding, accidents and medical emergencies, explosions, earthquakes, hurricanes and civil unrest. The scenarios above require a fast-quick response due to the following facts:

1. A terrorist attack is a scenario that requires immediate response, because many lives are in danger and thus there is need to save them and make sure they are alive and safe. In addition, there is destruction of property that is of value hence there is the need of quick response in order to safeguard these valuable properties during such an occurrence.
2. Road accidents require fast response as there is the need to save the lives of those involved in the accident through giving them fast aid and then taking them to the hospital for emergency medical treatment.
3. Fire outbreaks needs immediate response as lives and variable properties are in danger of death and destruction respectively thus the need of saving them from destruction.
4. Toxic chemical and radioactive spills require immediate attendance when they occur to prevent death of people caused by consuming the chemicals in case of contamination.
5. Health related emergencies require quick attention as they may lead to loss of life if not attended to on time.

In order for these emergencies to be dealt with, the first step should be relevant personnel responding quickly to the emergency. Emergencies therefore require quick emergency response to prevent further damage to people or property already affected therefore reducing severity and mortality. Quick response also guarantees better chances of recovery from the emergency.

## **2.3 Importance of Emergency Response**

Emergency response leads to saving of lives that would be lost if quick action was not taken. Furthermore, property that would otherwise be damaged if not recovered in time is saved.

## **2.4 Emergency Strategies and Management in Developed Countries**

Developed countries have vast knowledge, experience and fairly refined strategies of dealing with emergencies. This has come as a result of many years of practical experience in managing high level emergencies that include fire outbreaks, flooding, chemical accidents and hurricanes and collapsed buildings.

### **2.4.1 United States of America**

United States has experienced major emergency cases over the years. A national emergency strategy involves a toll-free call to 9-1-1. Nine-one-one is a number that people in the United States of America and other countries call to get help in a crime, fire or medical emergency. A 9-1-1 call goes over dedicated networks to the appropriate 9-1-1 public-safety answering point (PSAP) for the caller’s location, and trained personnel organize the resources required and then send the emergency help needed. The 9-1-1 call taker will typically ask the caller to verify the information, which appears on his or her computer screen. In most areas, phone number and location information are available for 9-1-1 calls made from a cellular/wireless phone. In most areas each household and business pay a small monthly fee for 9-1-1 service that appears on their phone bill. There is no per-call charge for calling 9-1-1. However, EMS/ambulances dispatched through 9-1-1 may charge for taking someone to the hospital; this is a separate ambulance charge, not a 9-1-1 charge (Dalby, 2003). The general convention is that the Nine-one-one (9-1-1) is only to be used in emergency situations; any situation that requires immediate assistance from the police/sheriff, the fire department or an ambulance. Texting is also used where one is unable to make a voice call to 9-1-1. Some of the scenarios that occur in America that can be termed as emergencies include: wildfires that in forests out of human carelessness such as camp fires, nuclear toxic spills that occur accidentally, shooting by gang members and armed thieves, hurricanes such as hurricane Florence and Katrina and cyclones that can sweep households and road accidents out of drunk driving and health related causes such as fainting while driving.

### **2.3.2 Europe**

The Emergency Response Coordination Centre (ERCC), operating within the European Commission’s Civil Protection and Humanitarian Aid Operations department, was set up to support a coordinated and quicker response to disasters both inside and outside Europe using resources from the countries participating in the EU Civil Protection Mechanism (European Civil Protection and Humanitarian Aid Operations (Europa.eu, 2018) It collects and analyses real-time information on disasters, monitors hazards, prepares plans for the deployment of experts, teams and equipment, and works with Member States to map available assets and coordinate the EU’s disaster response efforts by matching offers of assistance to the needs of the disaster-stricken country. Forest fires, severe floods, storms, earthquakes and landslides resulted in loss of lives and devastated whole regions. Climate change is predicted to further exacerbate the effects of such disasters. When these disaster strike, response teams, technical equipment and other resources need to be deployed in the shortest time possible. Being well prepared to intervene immediately in a disaster is crucial to save lives and to minimize damage. At times of increasing disaster risks the European Emergency Response Capacity allows for betterorganized and more coherent EU operations. The European Commission has set up a certification and registration process to ensure that experts or technical equipment can be deployed most effectively (Europa.eu, 2018) Certifications help to ensure that national capacities are of high quality and comply with international standards. The European Commission, with the support of peers nominated by the participating states, assesses the capacities. Experts also need to participate in disaster simulation exercises to train together with peers and other in 2017, the south of Europe experienced severe forest fires which resulted in the tragic loss of human life and property. The EU Civil Protection Mechanism was activated 17 times for forest fire emergencies in Europe (Europa.eu, 2018). Assistance could be sent 10 times from one of the participating states to Portugal, Italy, Montenegro, France, and Albania. As part of the voluntary pool, two firefighting airplanes from Italy, two airplanes from Spain and three planes from France were mobilized teams for emergencies, in Europe and worldwide (Europa.eu, 2018).

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# **GANTT CHART**

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| --- | --- | --- | --- | --- | --- | --- |
| **WEEKS**  **Deliverables** | WEEK 5 | WEEK 6 | WEEK 7 | WEEK 8 | WEEK 9 | WEEK 10 |
| Present proposal to supervisor. |  |  |  |  |  |  |
| Define requirements analysis tools and Gantt chart |  |  |  |  |  |  |
| Chapter 1: Introduction  Chapter 2: Literature Review |  |  |  |  |  |  |
| Chapter 3: Methodology |  |  |  |  |  |  |
| Final Copy and Presentation |  |  |  |  |  |  |
|  |  |  |  |  |  |  |