**DESIGN AND IMPLEMENTATION OF A COMPUTER BASED AUTOMOBILE FALUT DIAGNOSIS SYSTEM**

**BY**

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**BEING A BSC PROJECT REPORT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF A BACHELOR’S DEGREE IN COMPUTER SCIENCE OF THE GODFREY OKOYE UNIVERSITY.**

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**APPROVAL**

This project is approved for submission.

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**Abstract**

This report on Design and Implementation of an Automobile fault diagnosis system is a web-based application developed to solve the issue of Automobile fault. The report is motivated by the need to guide car owners and learners of motor mechanics in the maintenance and troubleshooting of automobile problems without having to resort for presumptions and conjectures. The system features a simple user friendly interface that could allow you to search for solutions to faults developed by one’s Automobile. The methodology adopted is the Structured System Analysis Design Methodology (SSADM). The language used is Php (Hypertext preprocessor) for the server side development of the dynamic content, Mysql is used for the database design. The software is divided into two that is the admin area, and the user area. The developed software would ensure that automobile owners have proper assistance in time of crisis and will save them from the clutches of exploitative roadside mechanics.

**TABLE OF CONTENTS**

Title page i

Certification page ii

Approval page iii

Dedication iv

Acknowledgement v

Abstract vi

Table of content vii

List of figures x

List of table xi

**CHAPTER 1: INTRODUCTION**

1.0 Background of study 1

1.1 Statement of problem 1

1.2 Objectives of the study 2

1.3 Significance of project 2

**CHAPTER 2: LITERATURE REVIEW**

2.0 Introduction 3

2.1 Theoretical background 5

2.2 Review of related literature 8

2.3 Future of automobile systems. 9

2.4 Advantages of systems over conventional mechanics. 9

**CHAPTER 3: SYSTEM ANALYSIS AND DESIGN**

3.0 Introduction 18

3.1 Description of existing system 18

3.2 Analysis of proposed system 22

3.3 Design of the proposed system 23

3.3.1 Database design 23

3.3.2 System architecture 26

**CHAPTER 4: SYSTEM IMPLEMENTATION**

4.0 Introduction 27

4.1 Development tools. 27

4.2 Implementation of architecture. 30

4.3 Software testing 31

4.4 Input and output specifications. 41

4.5 Program flowchart 42

 **CHAPTER 5: SUMMARY AND CONCLUSION**

5.0 Summary 44

5.1 Conclusion 44

5.2 Recommendation 45

References 46

Appendices

Appendix A: source code

**LIST OF FIGURES**

4.1 System architecture implementation 31

4.2 Public registration form. 33

4.3 User verification form. 34

4.5 Programme flowchart. 35

**LIST OF TABLES**

3.1 Model database. 19

3.2 Admin Registration table. 20

3.3 User Registration table. 20

**CHAPTER ONE**

**1.0 INTRODUCTION**

In present time most households own at least one car. This figure shows that a car is very important to people’s lives as it completes the cycle of living. Having that we are in the era of computer age and internet application, it would be nice if a web-based expert system can be developed to diagnose mechanical and other related faults in our vehicles.

Software for car faults diagnosis is a system that detects information about car faults and provides possible solutions to fixing the problem. It works by entering the type of fault your car is giving you, and then it will retrieve the information of the possible fault and also display the result of how you can solve the problem without the presence of an expert.

So, this web-based software is hoped to help those who are in need of guides to deal with their cars problems. Although it might not give a complete guide and help as a human expert, namely mechanics, at least it can give temporary assistance to those who are in need of instant help, as a result of the limitation of time and distance.

Faults occur in vehicles or automobiles very often than not. This can be due to several reasons. The ability to detect and isolate these faults in complex technical systems such automobile is important in order to fulfill dependability requirements. Fault detection and isolation in automobiles is very important because it helps to maintain high vehicle operational efficiency, low exhaust emissions, high vehicle uptime, fuel consumption reduction or fuel economy, high vehicle safety and it guarantees efficient repair. These factors are very important because they help to reduce overall life-cycle cost of a vehicle.

**1.1 BACKGROUND OF THE STUDY**

With the help of a car, movement from one place to another has been made easy especially for those who are always mobile in their jobs. Cars simplify our lives and make time to be more valuable as we can save more time using the car. But at the same time, people who own cars definitely don’t want to have a problem with their cars as the troubleshooting of a car can be a nightmare to them, especially women[2]. Some of those own a car individually don’t know how to deal with their cars whenever it has a problem. All they know is to start the engine, drag the clutch if it is not automatic, press the paddle and break when they need to. An even the worse situation is that they don’t even know how to fill the fuel tank, and that is not good. They won’t know what to do when something happens to their cars. All they can do at best is, call the automobile repairer for help.

So, this web-based software is hoped to help those who are in need of guides to deal with their cars problems. Although it might not give a complete guide and help as a human expert, namely mechanics, at least the expert system can give temporary assistance to those who are in need of instant help, as a result of the limitation of time and distance.

**1.2 STATEMENT OF THE PROBLEM**

 In dealing with problems of a car and troubleshooting, automobile repairers are those who can help to solve them. The use of a computer expert system is beneficial in different ways. It gives a temporary and instant guide to car owners in different situations like:

* Assistance in the absence of automobile repairers.
* Being an alternative considering the distance of automobile repairers.
* Situations where automobile repairers diagnosis wrongly, etc.

**1.3 OBJECTIVES OF THE STUDY**

* Developing a system for car maintenance and troubleshooting that is capable of assisting car owners in dealing with their cars problems and troubleshooting them whenever time is limited and the human experts, also known as mechanics is not available at that very time.
* Providing recommendations in cases of automobile break down.
* Providing maintenance advice to users in order to avoid future fault from occurring.
* Testing and validating the system’s performance.
* Helping automobile repairers diagnose serious faults and repair vehicles at a faster rate through the pre-diagnosis and advice a web-based software.
* Developing appropriate representation architecture to the proposed car failure and malfunction diagnosis assistance system.

**1.4 SIGNIFICANCE OF THE STUDY**

The proposed system can help inexperienced automobile repairers or drivers in diagnosing the fault of the car.

 In addition, the system has the following benefits:

* Improvement of productivity: Having this system will enable mechanics to do more work in less time.
* Reduces the need for skilled mechanics: The repairs of a car require a high level of expertise. With this system, inexperienced mechanics can be guided to find the fault.
* Places expert knowledge into machine readable form, where it can be summoned at any time.

**1.5 SCOPE OF THE STUDY**

 This software may contain certain limits and flaws, as it is only a prototype. We commonly know that a car has many parts on its body and even in the body itself. However, the system will only deal with problems that are commonly found in the engine part of the car as the system is just a prototype, which means the function will be expanded through time. The system will also deal with only cars produced from the year 2000 till date.

**CHAPTER TWO**

**Literature Review**

**2.0 Introduction**

The first diagnostic System for technical fault troubleshooting in motor vehicles was developed at MIT in the early 1970’s [8]. Kadarsah proposed and designed a decision model for car fault troubleshooting in which a system was utilized to help inexperienced mechanics and drivers. The model consisted of inference engine, Knowledge base, database, user interaction and adaptive mechanism. The Inference engine used backward chaining as a result of a small number of outputs with many possible inputs. In additions, the adaptive mechanism was utilized in the user interaction section in order to receive feedback about system troubleshooting result. The feedback results were stored in a database. The adaptive system then processed the stored data and extract addition rules with the goal of improving the knowledge base[9]. Car failure detection KBS was proposed by Ricardo Nurzal. In this system, car faults were divided into three states: Start-up state, Run-stable and Movement-state. Shell Rule based expert system (CLIPS). With forward chaining inference engine were used in the implementation. CLIPS stored the knowledge in rules form, which had logic-based representation as well as the production rules. The system interacts with the user through an interface and gave the troubleshooting result with illustration. The rule-based expert system contained 150 rules for car failure causes. However, improvement in the domain knowledge and applying adaptive technique for knowledge creation were required in such system. In the work of Peter Nabende and Tom Wanyama, Heavy Duty Diesel Engines (HDDEs) troubleshooting was proposed. As a result, employing an expert system in such domain was highly useful.

The HDDIEs faults troubleshooting System was able to successfully detect malfunctions in the engines and give recommendation of corrective actions. However, the proposed prototype was not promoted to be used as a complete application due to time and resources limitations. Further surveys were done for developing motor cultivator fault troubleshooting model[4]. This model was based on the decision support system (DSS) in which the outcome represents the input to the DSS. The supplier selection for faulty component replacement was made by DSS based on the outcome. It proved to be a very useful tool for equipment servicing needs with low development cost. It increased the efficiency of labor and workers’ satisfaction.

**2.1 Theoretical Background**

In the development of the automobile system for detecting faults in cars, the technologies were used as follows:-

1. **HTML:** Html documents are text files that contain tags, which are used to mark up html elements, these documents are usually saved with html file extension, although some prefer html which is a holder from DOS file name limitation, which restricted you to eight characters for the filename and three for the extension.

<body< Automobile fault detection system <body>

In Htmlthe use of form was introduced as to help in storing information in the database.

1. **CSS:** CSS is W3C standard for defining the visual presentation for the web pages.

The CSS is written as follows:-

h1{

text –allign: center;

color: red

}

Here the p tag is the selector color code is the declaration of the color and text alignment.

1. **PHP:** Php is the acronym of the hypertex preprocessor. Php is chosen as the choice of programming because of it’s flexibility and ease in developing the dynamic user’s interface. While HTML and CSS was chosen for the development of the static user interface. Therefore, it is suitable for the researcher's work. The code display are as follows.

<?php

if (!function\_exists("GetSQLValueString")) {

function GetSQLValueString($theValue, $theType, $theDefinedValue = "", $theNotDefinedValue = "")

{

 if (PHP\_VERSION < 6) {

 $theValue = get\_magic\_quotes\_gpc() ? stripslashes($theValue) : $theValue;

 }

 $theValue = function\_exists("mysql\_real\_escape\_string") ? mysql\_real\_escape\_string($theValue) : mysql\_escape\_string($theValue);

 switch ($theType) {

 case "text":

 $theValue = ($theValue != "") ? "'" . $theValue . "'" : "NULL";

 break;

 case "long":

 case "int":

 $theValue = ($theValue != "") ? intval($theValue) : "NULL";

 break;

 case "double":

 $theValue = ($theValue != "") ? doubleval($theValue) : "NULL";

 break;

 case "date":

 $theValue = ($theValue != "") ? "'" . $theValue . "'" : "NULL";

 break;

 case "defined":

 $theValue = ($theValue != "") ? $theDefinedValue : $theNotDefinedValue;

 break;

 }

 return $theValue;

}

}

?>

This is an extract of the php code for the login of the admin as to be given an access login right.

**2.2 Review Of Related Literature**

**Troubleshooting Of Cars**

Troubleshooting means to determine or analyze the cause or nature of a problem or situation. Motor vehicles are bound to develop fault(s) at one point in time and it is desirable to detect severe faults in order to protect the vehicle from damage. Early detection of faults can lead to avoidance of serious damage of the vehicle[18].

Troubleshooting section can be divided into three parts: fault detection, fault isolation, and fault size estimation. It is important to determine if a fault has occurred or not (detection): when a fault is present, the location of the fault is needed (isolation): and we also desire to know where applicable the size of the fault (identification).

Another approach that is described in Literature that should apply to troubleshooting and troubleshooting of Motor vehicles would be Failure Mode and Effects Analysis[12].

When designing any troubleshooting system whether a hard copy service manual or an elaborate troubleshooting expert system, models of device failures are used to race the root cause of the system and component failures.

**Future Of Automobile System**

Automobile repairers are involved with the servicing, maintenance and repair of cars and light vehicles. The work is wide ranging and includes routine serving in accordance with manufacturer’s recommended procedures and the testing and approval of the structural, mechanical and electrical systems of the vehicle[16]. A vehicle may be due for a service after a certain period a certain number of kilometers or after a certain period of time, according to instructions set out by the vehicles manufacturers.

Mechanics also repair vehicle that have broken down or been involved in accidents serving involves:

Making routine checks according to a list.

Finding faults or problems,

Overhauling or replacing worn or faculty parts, and

Using special equipment and road test to make sure the vehicle performs as it should.

Sometimes customers take their vehicles to mechanics to investigate a particular mechanical fault. Solving these problems may involve stripping down the affected part of the car in a workshop area, finding the faculty components and replacing them, and then putting all the parts together again[17]. Mechanics tend to replace parts rather than repair them because this is quicker and therefore less costly.

Mechanics also deal with electrical and electronic systems, which are becoming more and more sophisticated on modem vehicle. For example, mechanics may connect laptop computers to a vehicles electronic control unit, using an on-screen menu to choose the part of the vehicle they want to investigate. The computer is able to find and report back information on the fault, for example, a break in circuit wiring. With order vehicles, mechanics use electrical testing equipment like voltmeters and aments to test electric circuits/components.

**2.3 ADVANTAGES OF SYSTEMS OVER CONVENTIONAL MECHANICS**

The use of systems provides many advantages over conventional mechanics.

Conventional automobile repairers would sometimes result in low performance and reliability (in the case of one that is not well equipped with car diagnostic knowledge). Some reasons given[11] as to why systems have been developed to replace a human expert include:-

1. To reduce on expenses associated with a human expert.etc.

**CHAPTER THREE**

**System Analysis and Design**

**3.0 Introduction**

System analysis is the step by step approach used to document the entire system of a particular systems operation, which is normally done in order to discover the errors that are associated with the present system and suggesting a lasting solution to tackle and solve the problem. The objective of system analysis is to ensure proper execution of the right decision taken in the same system.

The methodology that will help in this study is the Structure System Analysis and Design Methodology (SSADM). It is a systems approach to the analysis and design of information system and involves the application of a sequence of analysis, documentation and design task.

The system design stage involves the series of object modification and manipulations until the desired results of the small prototype are evolved. It is this manipulation that gives rise to the newly evolved vehicle fault detection system. The main feature guides the simulation of this application and such features include:-

* Instant reporting fault to selected mechanic for appropriation. This feature allows vehicle owners to report complex faults to mechanic via text messages or E-mails.
* Classification of faults base vehicle parts affected.
* The system shall be a database driven web application that is completely updateable by a privileged personnel (Administration), the information will be stored or updated based on manufacturers brand, year and model.
* The application user will obtains required information through links to each category of vehicles they want, in addition, searches are carried out extensively as well through search boxes category selection boxes ensuring proper accurate results are obtained by the user.
* To promote easy access of information, searches can be done straight from the home page reducing stress to the user therefore improving user experience to some degree.

**3.1 ANALYSIS OF THE EXISTING SYSTEM**

 The system will comprise of an administrative section and a user section. The administrative section consists of the administrator login panel for user authentication and the administrator dashboard which contains tools for creating, viewing and consequently editing vehicle related information based on predefined categories in car parts and sub car parts where necessary, associated problems, and solution. The administrative section utilizes forms elements for collection of data from the application administrator, this data in turn will be sent to PHP snippets created to handle the tasks of obtaining sub data validating them where necessary and sending them to the database application for storage. These snippets make up the backbone of the application as they responsible for all interactions from the administrator to the database.

 The user section will comprises of the application home page containing information on how to use the system, and a chief search input element which the users utilize in launching a pilot search on the problem they are experiencing with their vehicle. Upon user search data submission, a search is carried out based on the car-part, sub car-part, problem description, and solution, the user is redirected to the main user dashboard containing the tools they would need to take advantage of the application, should their view all the yield no result at first, the user dashboard allows them views all the problems information the system has to offer.

The structure of software, which is our case study, has two standard divisions, which are:-

1. Administrative division.
2. User service division.

**Administrative division**: This is the major division of the software and it is so organized that it has span of control, It coordinates and controls all administrative works of the software. It has two sections:

* Definition of car parameters
* Coding of the vehicle parameters.

**User service division**: This is the division of the application where the user searches for solutions to the existing fault in his/her car.

This application acts under the general direction of the administrator, to initiate and develop systems (manual or automated) for the improvement of its processes and services.

**The problems facing the existing systems are as follows.**

* **Lack of Accuracy:** Considering the fact that human factor can set at any time, there are likely tendencies of mistake, especially taking instructions from the software.
* **Manpower Requirement:** Manpower resources are required in cases of complicated faults, the user is advised to call on the attention of the automobile repairer
* **New Fault Update:** in the existing system, new faults and its solutions are updated when it is detected in the studied Automobile, not all automobile faults can be found.

**3.2 Analysis Of The Proposed System**

The proposed system is expected to overcome most of the deficiencies encountered in the present system.

The system will be easy to understand and use which makes it possible for every user of the system to use it without necessarily undergoing training. Also data is stored on centralized system making data retrieval fast, easy to modify and update. Therefore, with simply sending query to the database, information concerning a particular fault is made available including the solutions to such fault. This single ability of the system solves the problem of time.The problem of omission and duplication will be solved because the system follows a sequential method to create, read, and update every record and cannot jump this sequence.

The proposed system, web-based car fault diagnosis is considered an improvement of the existing system. This is because the tested system takes care of the main problems associated with cars.

In other words, the problems of delay, inefficiency and tedium in the current system have been completely taken care of, by the proposed system.

Therefore, it can be concluded that the proposed system provided more efficient method of car repair. The merits of the proposed system are as follows:

The proposed system, web-based application for car fault detection is considered an improvement of the existing system. This is because the tested system takes care of the main problems associated with the current manual method of repairing cars.

In other words, the problems of delay, inefficiency and tedium in the current system have been completely taken care of, by the proposed system.

Therefore, it can be concluded that the proposed system provided more efficient method of car services operation.

**3.3. Design of the Proposed System**

**3.3.1 Database Design**

Database specification

The database is designed with Mysql. The following are the tables in the database:

**Admin Registration Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **FIELD NAME** | **DATA TYPE** | **FIELD LEVEL** |
| 1. | Id | Int | 11 |
| 2. | Surname  | varchar | 30 |
| 3. | First name | varchar | 30 |
| 4. | Least name  | varchar | 30 |
| 5. | Age | date |  |
| 6. | Gender  | varchar | 8 |
| 7. | Phone No | varchar | 11 |
| 8. | User name  | varchar | 30 |
| 9. | Password | varchar | 30 |
| 10. | E-mail | varchar | 30 |

**User Registration Table**

|  |  |  |  |
| --- | --- | --- | --- |
| **S/N** | **FIELD NAME** | **DATA TYPE** | **FIELD LEVEL** |
| 1. | Id | Int | 11 |
| 2. | Surname  | varchar | 30 |
| 3. | First name | varchar | 30 |
| 4. | Least name  | varchar | 30 |
| 5. | Age | date |  |
| 6. | Gender  | varchar | 8 |

User Search

     Form

User dashboard

   With search

    results and

 vehicle part date

Database

Coding of

 Vehicle

Parameters

Admin Login

 Form

Definition of

 Car

Parameters

**Users:**

Application Users,

Administration Users.

**3.3.2 System Software Architecture**

A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system.

It presents a synthetic view including: the resolution of ambiguity to identify system goals and boundaries; the creative process of mapping form to function; and the analysis of complexity and methods of decomposition and re-integration. System architecture helps in setting of conventions, rules, and standards employed in a computer system's technical framework.

**CHAPTER FOUR**

**SYSTEM IMPLEMENTATION**

**4.0. Introduction**

In [computer science](https://en.wikipedia.org/wiki/Computer_science), system implementation is the realization of a [technical specification](https://en.wikipedia.org/wiki/Technical_specification) or algorithm as a [program](https://en.wikipedia.org/wiki/Computer_program), [software component](https://en.wikipedia.org/wiki/Software_component), or other [computer system](https://en.wikipedia.org/wiki/Computer_system) through [computer programming](https://en.wikipedia.org/wiki/Computer_programming) and [deployment](https://en.wikipedia.org/wiki/Software_deployment). Many implementations may exist for a given specification or standard. For example, [web browsers](https://en.wikipedia.org/wiki/Web_browser) contain implementations of [World Wide Web Consortium](https://en.wikipedia.org/wiki/World_Wide_Web_Consortium)-recommended specifications, and software development tools contain implementations of [programming languages](https://en.wikipedia.org/wiki/Programming_languages).

System implementation generally benefits from high levels of user involvement and management support. User participation in the design and operation of information systems has several positive results. First, if users are heavily involved in systems design, they move opportunities to mold the system according to their priorities and business requirements, and more opportunities to control the outcome. Second, they are more likely to react positively to the change process. Incorporating user knowledge and expertise leads to better solutions.

The relationship between users and information systems specialists has traditionally been a problem area for information systems implementation efforts. Users and information systems specialists tend to have different backgrounds, interests, and priorities. This is referred to as the user-designer communications gap. These differences lead to divergent organizational loyalties, approaches to problem solving, and vocabularies.

**4.1 The Development Tools**

The development tools are the necessary requirement tools used during the design to enable us achieve the system design. The listed packages was used because of their features, accessibility and also because it is more effective.

1. My SQL database application

2. PHP scripting Language

3. HTML language

**PHP scripting Language:** The PHP programming a scripting language is a language that offers great programming capabilities to web application developers using integrated development environments.

However, this language was chosen for the development of this project; not only because it is the language the developer is most comfortable with; but because, it offers the following programming merits:

1. It makes the art of programming very approachable.
2. It is one of the Object oriented Language that’s easy to learn and understand.
3. It quickens the development of applications (Rapid Application Development).

PHP also, being a unified web development tool, aids in building powerful web applications with minimum coding. Here, mark –up codes for PHP server controls and PHP files are automatically generated; thus reducing the need for writing codes for each control and event handlers needed.

**4.2 Implementation of the Architecture**

SYSTEM MENU

STAFF/ADMIN

PUBLIC

CREATE USER ACCOUNT

ENTER SEARCH

LOGIN

SUBMIT SEARCH

CONFIRMATION

UPLOAD INFO

CONFIRM INFO

VIEW INFO

VIEW/MANAGE INFO

MANAGE INFO

LOGOUT

LOGOUT

**Fig 4.1: System Architecture Implementation**

**4.3 Software Testing**

Software testing is a process of executing a program or application with the intent of finding the software bugs. It can also be stated as the process of validating and verifying that a software program or application or product:

* + Meets the business and technical requirements that guided it’s design and development
	+ Works as expected
	+ Can be implemented with the same characteristic.

Let’s break the definition of [**Software testing**](http://istqbexamcertification.com/what-is-a-software-testing/) into the following parts:

**1)  Process:** Testing is a process rather than a single activity.

**2)**  **All Life Cycle Activities:** Testing is a process that’s take place throughout the [Software Development Life Cycle (SDLC)](http://istqbexamcertification.com/what-are-the-software-development-life-cycle-sdlc-phases/).

* The process of designing tests early in the life cycle can help to prevent defects from being introduced in the code. Sometimes it’s referred as **“verifying the test basis via the** [test design](http://istqbexamcertification.com/what-is-test-design-or-how-to-specify-test-cases/)**”**.
* The **test basis** includes documents such as the requirements and design specifications.

**3)**  [Static Testing](http://istqbexamcertification.com/what-is-static-testing/)**:**  It can test and find defects without executing code. Static Testing is done during verification process. This testing includes reviewing of the documents (including source code) and static analysis. This is useful and cost effective way of testing.  For example: reviewing, [walkthrough](http://istqbexamcertification.com/what-is-walkthrough-in-software-testing/), [inspection](http://istqbexamcertification.com/what-is-inspection-in-software-testing/), etc.

**4)**  [Dynamic Testing](http://istqbexamcertification.com/what-is-dynamic-testing-technique/)**:**  In dynamic testing the software code is executed to demonstrate the result of running tests. It’s done during validation process. For example: [unit testing](http://istqbexamcertification.com/what-is-unit-testing/), [integration testing](http://istqbexamcertification.com/what-is-integration-testing/), [system testing](http://istqbexamcertification.com/what-is-system-testing/), etc.

**5)** [Planning](http://istqbexamcertification.com/what-is-the-purpose-and-importance-of-test-plans/)**:**  We need to plan as what we want to do. We control the test activities, we report on testing progress and the status of the software under test.

**4.4 Input and Output Specifications**

The website is classified into three which are as follows:

1. The public area
2. The staff area /Admin area

**The Public Area**

1. System Profile: this is the page that enables the public to view the project profile info.

2. Search Page: this page enable the public to make search for fault and see the possible solution.

**The Admin Area and its functionalities are as follows:**

1. Login: this is the page that enables the admin to login into the secret page.

2. Staff Account: this page allows a particular staff to have access to a hidden page.

3. Admin Account: this page allows the creation of new access to other administrators thereby enabling them to have a login account.

4. Confirm Registration: this page allows the admin to view registration as well as staff and admin registration with the help of other navigated links placed on the pages.

5. Hidden: this is where the hidden pages are located which if no access is granted to any staff he/she cannot be allowed into the hidden pages.

6. Registration page: This page allows the registration of the students.

**Input and Output Format**

**A. Input Format.**

The form is base on the data that needs to be entered into the system. It is will accept inputs either by keying in the inputs or by selection from already made inputs. Below is the input form designed in the new system.

 **User Information**

**Surname**

**First Name**

**Gender**

**Address**

**Phone**

**E-mail**

Cancel

Submit

Fig 4.2: Public registration form

 **LOGIN FORM**

**User Name**

**Password**

LOGIN

CANCEL

Fig4.3 User verification form

**B. Output Format**

The output for the new system will be obtained after the inputs have been made. The media through which output can be obtained from the system are Visual Display Unit (VDU) and printout from the printer. The system is designed to generate output on the following;

1. User information
2. User Registration
3. Complaints

**4.5 Program Flowchart.**

The program flow chart is seen in the figure below

FACILITATE LOGIN

Enter username and password

 YES NO

IF LOGIN = ADMIN

CARRY OUT ADMIN FUNCTIONS

**Fig 4.6 Program Flow Chart**

**CHAPTER FIVE**

**5.0 Summary Conclusion And Conclusion**

5.1 **Summary**

Car Fault diagnosis systems are designed to solve complex problems by reasoning about knowledge, represented primarily as if–then rules rather than through conventional procedural code. This study tries to review the impact of applying artificial intelligence into car fault detection system by creating an system that handles such. The study discussed the technology and application of system.

**5.2 Conclusion**

 This proposed system (web application) will help Toyota, Nissan and Mercedes Benz vehicle users have a better understanding of their cars. it will contain all the common faults experienced daily by users of mentioned brand of vehicles, as well as provides solution to those problems. Although, this software will provides solution to some categories of problem. It may not have all the problems and solutions but good news is that it is subject to improvement and enhancement-meaning that the web application administrators will continue working round the clock to keep it up-to-date in order to satisfy the needs of users.

**5.3. Recommendation**

I recommend that the system should be integrated in other to help technicians, or users to detect a problem in a car and provide available solution to that.

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