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Design of Expert System Application for Android-Based DSLR Camera Damage Diagnosis

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Abstract

In the digital age it is possible for everyone to do anything including documenting moments. One of them is digital camera based on Digital Single Lens Reflex or DSLR. But sometimes the use that is not according to the procedure can cause damage to the camera. As a layman, of course, will be confused with the problems that arise when there is damage and will be more decided to buy a new one or sell it, even though the damaged camera can still be repaired alone or by expert technicians. To solve the problem, an Expert System was created to diagnose damage to the Digital Single Lens Reflex camera. The method used in this research is the method of needs analysis and data collection. The results of this expert system application can diagnose damage to the Digital Single Lens Reflex camera along with alternative solutions. This application can help people to be more sensitive to the condition of their Digital Single Lens Reflex cameras. The design of this application was created with the help of joomla and sublime text.

Keywords: Diagnosis, Digital Single Lens Reflex, Expert System.

1. Introduction

An expert system is an information system that captures and uses the knowledge and decision-making methods used by one or several experts in a particular field of expertise. Expert systems apply like an expert in their fields containing facts and heuristics to solve certain problems. Expert systems are

based on knowledge systems, so that computers can think and make decisions or conclusions from a set of rules.

An expert system has the advantage over an expert that is expertise can be used by the community without the presence of the expert, covers the whole expertise and is systematic, makes it possible to deal with complex problems more quickly, expertise can still be utilized even though the expert has been unable to work, helps clarity and effective understanding of an area of expertise and make it possible to create integrated knowledge of certain relevant fields. Expert systems enable knowledge to be transferred more easily at lower costs. One form of expert system implementation that is widely used is in the field of Technology.

Advances in technology and fashion are part of the development era. Moments and natural beauty can be captured easily using a camera with the latest technology. Increased public interest to explore more about nature and oneself and immortalize it in the form of

photos makes camera manufacturers compete to create and release the latest cameras. The latest cameras have satisfactory results, it is none other than the latest technology embedded into these cameras. DSLR cameras are one of the most popular cameras. Nearly every person, young and old, is able to own and use a DSLR camera. Do not rule out the possibility if the camera can be damaged or problematic. So we need clear and accurate information that can help someone to find out the condition of the camera.

There are so many factors that cause damage to the camera that results in users having difficulty repairing it. To handle this, users usually leave it to the technician, so that requires no cost, time and effort that is not small. At this time technicians need a long time to diagnose camera damage, even technicians often delay work just to produce a solution from camera damage.

Therefore, in this study the author intends to build an expert system to detect damage to a Digital Single LensReflex (DSLR) camera so that it helps lay users to get a solution quickly.

2. Research Method

In general, the research certainly asks for guidance in building its research, as well as in this study using a research method in which in this step the author makes direct observations to DSLR camera users in upper class adolescents to begin then make research. Which is part of data collection to get the problem formulation accurate, Literature Review, and also needs analysis methods obtained from the results of data collection and described in the form using case diagrams.

2.2 Literature Review

There are several psutaka fists that the author has previously researched that will support this research, following a literature study whose research is similar to this research:

1. Research conducted by Aprih Widyanto, Dany Pratmanto and Sahal

Tsani Musyaffa in 2018 from STMIK Nusa Mandiri entitled "Expert System to Diagnose Damage to Android-Based DSLR Cameras". This research is about the use of science and technology in creating new innovations that are combined into a form of application of knowledge. One of them is about mobile-based dslr cameras. With the hope that the tool can help an expert and user diagnose dslr camera damage from analysis according to a practitioner and the internet media is supported by feature questions that also answer the question of the problems faced and then display complete information about dslr damage. This application uses the Forward Chaining method.

2. Research conducted by Awang Harsa Kridalaksana, Ariel Hidayat and Dedy Cahyadi in 2019 from Mulawarman University entitled "Expert System to Diagnose Damage to DSLR Cameras Using the Certainty Sequential Sequential Method". The existence of this research is designed to create an expert system that is intended to diagnose damage to DSLR cameras based on expert knowledge. This system uses a testing method to get the expected results. The results of this system in the form of the possibility of the type of damage experienced is supported by a percentage of confidence and then described solutions and explanations. From 18 symptoms data, 7 damage data types and 7 data rules data.
3. Research conducted by Harvei Desmon Hutahaean in 2016 from STMIK Pelita Nusantara entitled "The Application of Case Based Reasoning Method in Identifying Damage to DSLR Cameras". This study describes an expert system that adopts human knowledge into computers to solve problems. Damage to the camera is usually caused by human error and age of the camera. The lack of common knowledge about DSLR cameras has caused the wrong handling of camera maintenance. The Case Based Reasoning method is able to analyze symptoms and produce a type of damage to the camera.
4. Research conducted by Ibrahim Al-Chanif in 2016 from Muhammadiyah University of Surakarta entitled "System to Diagnose Damage in Web-Based Single Lens Reflector (DSLR) Digital Cameras". This study describes the damage events that often occur on DSLR cameras. The results of this study are analysis of damage diagnoses on DSLR cameras along with accurate explanations along with solutions from experts, so that camera users are more sensitive and skilled in maintaining the camera.
5. Research conducted by Abas Sunarya, Sugeng Santoso and Windy Sentanu in 2015 from Raharja University, entitled "Expert Systems for Diagnosing LAN Network Disorders". This research is about LAN (Local

Area Network) which is generally used in a building or campus with a large capacity and long size intended to facilitate communication and data sharing. Use the forward chaining method to find out problems on the LAN network.

2.3 System planning

The design of this diagnostic expert system uses the Unified Modeling Language (UML) which consists of a Variable Use Case and Activity Diagram to explain the proposed system design process. Here is a Use Case Diagram Expert System Diagnosis Problems in DSLR Cameras.

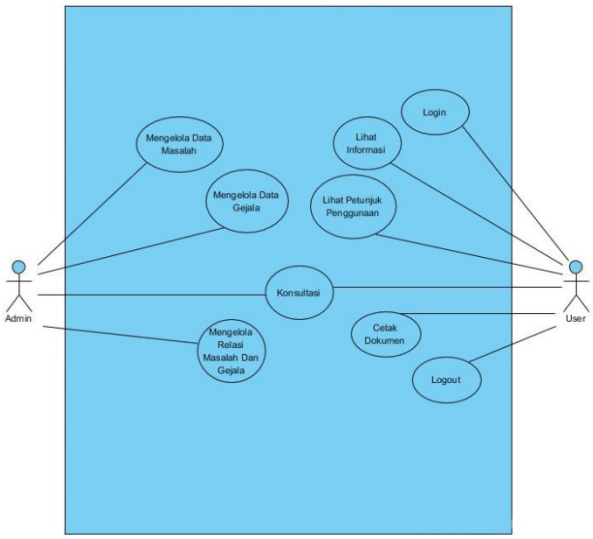

Figure 1. Use Case Expert System Diagram

Based on the Use Case diagram above, there are:

1. A system that includes all expert system activities
2. Actors who carry out activities in the system are: Admin and User
3. Nine use cases that can be carried out by these actors include: Login, View Information, See User Instructions, Consultation, Print Documents, Logout, Manage Data Problems, Manage Data Symptoms, Manage Relationships Problems and Symptoms.

Following is the Activity Diagram of Expert System Damage Diagnosis on DSLR Cameras:

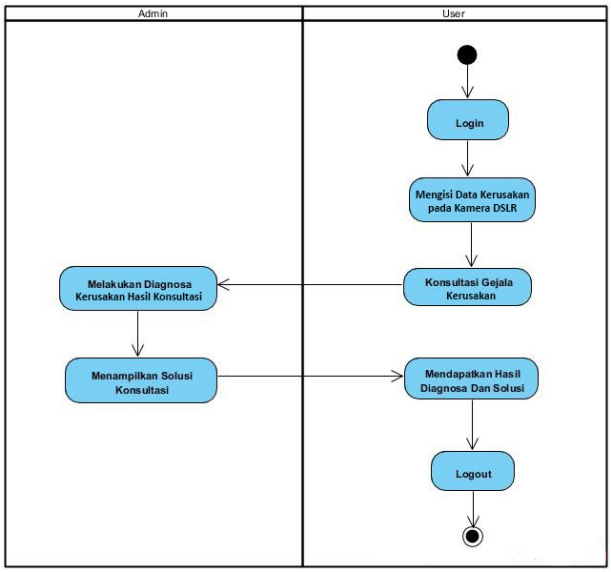

Figure 2. Expert System Activity Diagram

Based on the proposed Activity Diagram there are:

1. One Initial Node, object that starts
2. Two Vertical Swimlane, namely Admin and User
3. Seven Activity, Shows how each interface class interacts with each other One Final Node, the object that is terminated

3. Findings

3.1 Problem

The use of digital cameras today is no longer a scourge for ordinary people in the accompaniment of current technological developments. But the problems encountered when using a camera for beginners are very worried, because they do not know the correct procedures for using a camera, especially with DSLR lens. Many ordinary people when faced with the problem of camera damage will be more likely to resell it without knowing the problem and looking for a solution. So from this expert system will help diagnose users when faced with these problems. This system can identify 9 common problems with DSLR cameras. Here are some identification of the problems that usually occur in DSLR cameras: Damage to the lens, sensor, LCD, Flash, memory, to problems that cause DSLR cameras to die completely.

3.2 Research Implementation

The following is a collection of information used for this expert system research, the types of damage problems in DSLR cameras are shown in table 1, the general symptoms of damage in DSLR cameras in table 2, solutions for handling damage to DSLR cameras in table 3, and the relationship problems, symptoms, and solutions to damage to DSLR cameras in table 4.

Table 1. Problems with DSLR Cameras

Kode	Masalah
M01	Kerusakan Lensa
M02	Kerusakan Tombol Navigasi
M03	Kerusakan Flash
M04	Kerusakan Sensor
M05	Kerusakan Memori
M06	Kerusakan LCD
M07	Kerusakan Tombol Scroll
M08	Kerusakan Tombol Speed
M09	Mati Total

Table 2. Symptoms of Damage to DSLR Cameras

Kode	Gejala
G01	Diafragma Tidak Jalan
G02	Motor AF Tidak Jalan
G03	Death Pixel
G04	Gambar Tidak Terekam
G05	Hasil Gambar Tidak Tajam
G06	Kurangnya Voltase Baterai
G07	LCD Bergaris
G08	Baterai Drop
G09	Ada Bercak Di Sensor
G10	AF Mati
G11	Gambar Bernoda
G12	Hasil Gambar Gelap Setengah
G13	Mainboard Basah
G14	Kamera Meminta Restart Berulang-ulang
G15	Shutter Speed Tidak Berfungsi
G16	Rana Terus Terbuka dan Tidak Mau Menutup Lagi
G17	Zoom Tidak Berfungsi

Table 3. Solution to Handling Damage to DSLR Cameras

Kode	Solusi
S01	Tutup Diafragma Pada Ukuran Paling Kecil
S02	Ganti Kabel Fleksibel

S03	Aktifkan Fitur Mirror Lock
S04	Bersihkan Bagian Tembaga Kartu Memori Dengan Penghapus Pensil
S05	Ganti Kartu Memori
S06	Kosongkan Daya Baterai, Lalu Charge Dengan Tegangan 7.3-7.4 Volt
S07	Ganti Charger
S08	Ganti Baterai
S09	Panaskan IC COF pada LCD dan Cobalah Untuk Menekan-nekannya
S10	Aktifkan Fitur Sensor Cleaning
S11	Ganti Shutter Unit
S12	Keluarkan Baterai dan Kartu Memori, Keringkan Kamera Dengan Hair Dryer
S13	Bersihkan Gear Berwarna Merah Pada Bagian Bawah Kamera
S14	Ganti Kabel Ribbon
S15	Bawa Ke Tukang Reparasi/Servis Kamera

3.3 Display Program

A. Initial Menu Display

Figure 3. Initial Menu Display

In Figure 3, this is the initial display when the user uses this application, which is designed for experts and users can be separated in the dashboard menu.

B. Login Menu Display

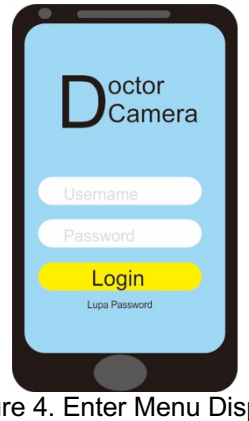

Figure 4. Enter Menu Display

Figure 4 is designed for users to enter this system according to the account they have created. Equipped with a forgotten password feature.

C. Registration Menu Display

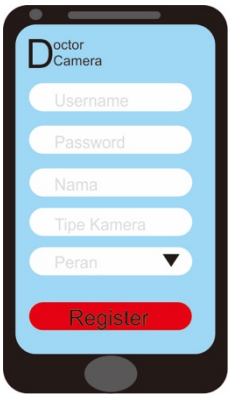

Figure 5. Display the Account Registration Menu

In this picture, it is designed for new users who do not yet have access and accounts which fill in the account username, password, full name, camera type and what role in this system.

D. Main Menu Display

Figure 6. Main Menu Display

This main performance provides features where there is an expert menu which can be a

solution for our problems, a question menu for us to share with other users, and there are tips and tutorials for maintaining and using a good and correct camera, not only that users can trade and buy used cameras.

4. Conclusion

1. There are still many ordinary DSLR camera users who do not know which parts of the camera are actually damaged, so many of them directly take the camera to the repair shop that will cause the camera user will spend a significant amount of money due to lack of knowledge of the owner the camera itself.
2. The expert system was created as a tool in diagnosing damage to a DSLR camera based on the symptoms seen on the DSLR camera.
3. This expert system is useful to help and facilitate ordinary and professional DSLR camera users in obtaining damage information on the camera by providing "first aid" solutions, alternatives, and final solutions and conclusions from any damage to DSLR cameras.

References

The main references are journals and proceeding. All references should be to the most pertinent and up-to-date sources. References are written in APA style. Each citation should be written in the order of appearance in the text. Please use a consistent format for references – see examples below:

If your references are from journal articles:

[1] Widayanto, A., Pratmanto, D., & Musyaffa, S. T. SISTEM PAKAR DIAGNOSA KERUSAKAN KAMERA DSLR BERBASIS ANDROID.

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