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Preface

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PREFACE

It is our great honor and pleasure to introduce the Proceedings of the 3rd International Conference on Informatics, Engineering, Science, and Technology (INCITEST 2020). The event is valuable and meaningful since it brings together scientists, engineers, researchers, practitioners, students, and civil society organization representatives to nurture research networks between universities and industries. With its main theme on "Humanized Technology, the Digital Journey to Win Competition", this event is expected to serve as a platform of gathering for anyone interested in exploring potential solutions and answering issues and challenges to enter the 5.0 society. Amid the worldwide spread of the novel coronavirus (COVID-19) and the uncertainty surrounding the end of this pandemic, there are several issues we should describe as follows:

1. Universitas Komputer Indonesia (UNIKOM) as the organizer of INCITEST 2020 will hold the conference on 11th June 2020 in an online or virtual format. The organizing committee will manage the conference from our campus which is located in Bandung, West Java Province, Indonesia.
2. In this correlation, we should adhere to the regulation of the government of West Java Province and the government of the Republic of Indonesia which currently is implementing Large-Scale Social Restrictions to reduce the risk of virus transmission. Therefore, the online conference is considered the best way we can do to serve our participants concerning the fact that people safety is second to none. In this condition, there is no specific date deemed safe to which we could postpone the conference until either worldwide travel or crowd-gathering is safe again. We have all put so much effort in preparing the papers, organizing the event, as well as conducting the review process, working on the program, and everything surrounding it that we feel very motivated to pull this through
3. The conference is divided into two sessions: plenary and parallel sessions. In the plenary session, we will use zoom as the media. Besides, to assure the dissemination of the conference to all participants, we will also broadcast the plenary session live using Open Broadcaster Software (OBS) connected to

YouTube live streaming and IG TV. Moreover, we will use live chat on YouTube and Google forms for the discussion session.

4. The plenary session will be chaired by one moderator who will not only be critically summarizing the keynote presentations but also handling participants' enthusiasm in asking any possible questions. In doing so, the participants will be following the conference at their respective personal corners through YouTube live streaming and IG TV.
5. The plenary session will be presented by our keynote speakers in online format (via Zoom) from each country such as Prof. Abdulkareem from Malaysia, Prof. Yuto Lim from Japan, and Irfan Dwi Sumitra, Ph.D. from Indonesia. Each keynote has 45 minutes duration including the discussion session.
6. Following the success of INCITEST 2018 and 2019, the enthusiastic responses to the call-for-papers in the third INCITEST were increasing. More than 450 papers were submitted to the organizing committee from both local and foreign participants. A peer-review process has been conducted to all the articles based on their originality and quality, resulting in 347 accepted papers to be presented.
7. Of 347 accepted papers, 216 of them will be presented via Zoom in the duration of 10 minutes for each paper. Additionally, 129 papers will be displayed in the poster session (the link of the posters will be available on the INCITEST website).
8. The parallel session will be divided into 10 classes; each class will be participated by around 21 to 22 presenters. A parallel session chair will manage the presentation time and discussion session in each class. Each presenter should present their paper within 5 minutes via Zoom. 5 minutes after the presentation will be given to each of them for the discussion session.

We hope that with the above arrangement, we can serve our participants in the best way we could. The conference's success is also due to the hard work of all involved parties. Therefore, the organizing committee would like to express appreciation to all supporters, sponsors, and participants for a great contribution to

the conference's success. Many thanks go as well to all of the reviewers who helped us maintain the quality of manuscripts included in the Proceedings published by IOP. We also express our sincere thanks to the members of the organizing team for their hard work.

Finally, our continuing success of this conference series can be one of indicator that we have through our right pathway to realign technology with the best interests of humanity. We hope this first time experience of the online conference in the 3rd INCITEST will bring fruitful outcomes as well as give the participants great experience in an online conference.

Thank you

Best Regards,

Dr. Poni Sukaesih Kurniati, S.IP, M.Si.
The Chief of the Conference

List of Committees of INCITEST 2020

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Peer review statement

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Peer review statement

All papers published in this volume of *IOP Conference Series: Materials Science and Engineering* have been peer reviewed through processes administered by the proceedings Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

1. Loa

INCITEST
International Conference on Informatics Engineering, Science & Technology

Letter of Acceptance

Paper No.	:	ABS-149
Paper Title	:	ANALYSIS OF EXPERT SYSTEM LUNG DISEASE DIAGNOSIS SYSTEM OF WEB-BASED DISEASE IN CIHAUR PUSKESMAS
Authors	:	Andri Sahata Sitanggang, Albi Alvian Y
Affiliation	:	Universitas Komputer Indonesia

Dear Authors,

I am pleased to inform you that the paper you kindly submitted to the 3rd International Conference on Informatics, Engineering, Science, and Technology (INCITEST 2020) has now been accepted and the first author is invited to present the paper in the conference. Your interest in INCITEST 2020 is very much appreciated. I look forward to meeting you at the conference.

Bandung, April 2020

Dr. Poni Sukaesih Kurniati, S.IP, M.Si.
Chief of The Conference

2. Daftar isi

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Published online: 05 August 2020

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M I Mutakin

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M R Fachrizal, J C Wibawa and Z Afifah

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Analysis of Expert System Lung Disease Diagnosis System of Web-Based Disease in Cihaur Puskesmas

A S Sitanggang, A D Damarullah and Wartika

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Analysis of Expert System Lung Disease Diagnosis System of Web-Based Disease in Cihaur Puskesmas

IOP Conf. Series: Materials Science and Engineering **879** (2020) 012065 doi:10.1088/1757-899X/879/1/012065

Analysis of Expert System Lung Disease Diagnosis System of Web-Based Disease in Cihaur Puskesmas

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Abstract. One of the causes of death in humans is lung disease, namely cancer. Data from the Indonesian Cancer Information & Support Center (CISC) shows lung cancer is the number one cancer killer with a total of 14 percent of cancer deaths. The death rate due to lung cancer in Indonesia even reaches 88%. That must be considered to be one of human efforts in maintaining health in the lungs. Handling that can be done is to check early to be able to avoid or treat the lung disease. The existence of an expert system provides a solution to overcome this. Expert system is a computer system that stores knowledge, facts, reasoning and experience from an expert that is used to solve problems in a particular field, especially for lung disease. The purpose of this research is to design an expert system of web-based lung disease diagnosis that can help the public to carry out consultations about lung disease anywhere without having to come directly to the hospital or puskesmas /clinic. The method used is descriptive method and action. In designing the expert system, the method used is the method of object-oriented approach and prototype development method. With this expert system, it will be easier for the public to obtain information about lung disease, help the public and doctors to diagnose lung disease, and help doctors supervise the treatment of patients and the public.

1. Introduction

Tuberculosis (TB) or Cancer is a major global health problem as a leading cause of death for millions of people every year worldwide after the Human Immunodeficiency Virus (HIV). World Health Organization (WHO) data in 2014 showed that Tuberculosis (TB) and Cancer killed 1.5 million people in the world. Technology in the form of an expert system that can be used as a tool that can help the public in preventing the occurrence of diseases of the lungs and how to deal with it if someone is experiencing the disease[1][2]. Expert system is an Artificial Intelligence program that combines knowledge base with inference engine. This is a part of high-level specialized software, which seeks to duplicate the functions of an expert in a particular field of expertise, especially in medicine. The expert system can be used to predict lung disease in order to find out how to diagnose lung disease in humans so appropriate treatment can be carried out in accordance with the characteristics of the disease found in the child [3].

Some research has been done in making a system aimed at diagnosing lung disease, namely research with an expert system of diagnosing lung disease in children. This study is a research that makes an expert system using the Dempster Shafer method. Research with this method produces a mathematical theory for proof based on belief functions and plausible reasoning, which is used to combine separate pieces of information (evidence) to calculate the likelihood of an event [3]. However, a research is carried out only on objects of research of children and is limited to one place of research conducted at one hospital, whereas for lung disease that occurs not only among children,

mostly suffered by adults, and is required application socialization to the public as an early prevention that can be done independently. Other research is an evaluation model of information services hospital[3]. This research resulted in an information system that covers all services provided by the hospital to patients with lung disease. This system greatly facilitates scheduling, patient tracking, film maintenance and tracking, coding, reporting results, and creating accounts/bills[3]. However, the system used only covers hospital administration activities or focuses on patient care and does not provide direct treatment services for lung disease. To support this research, one of the basics in creating a model / application that can be used by this study is an expert system for identifying lung diseases in humans using Visual Basic 6.0 programming. This research provides technical references in making applications, namely the algorithmic method used in making modules/application functions and report forms used as information media. However, using an application requires some additional resources such as a laptop or computer. To complete this research, we need an application that is tailored to the needs of the public. Applications made accessible to the public as an information center[4], especially for handling lung diseases. The application used is a web-based, so that the public can access anywhere, anytime, and anyone without having to have the problem of costs in handling this disease.

Therefore, from some of the research studies above, an approach/method/system that can be adapted to the development of technology and public needs is needed. This study aims to produce an expert system using web programming languages. The application of this expert system will make the public aware of the importance of lung health and make it easier for the public to get information without having to come to a lung specialist (expert). The creation of this system is expected to provide enough information for users to ensure that users have lung disease or not. This system is also expected to help the work of experts or doctors in diagnosing lung disease, provide sufficient information for patients before consulting with experts, and can oversee the treatment carried out by patients, so that these patients can make maximum treatment and healing.

2. Method

In building a system to support this research, we used descriptive research methods and actions. The depiction of the method can be seen in Figure 1.

Figure 1. Method[5].

In this study the primary data source was obtained from direct observations and interviews with the UPTD Puskesmas Cihaur, while the secondary data were documents at the UPTD Puskesmas Cihaur relating to the research conducted.

2.1 Primary Data Sources

Primary Data is the data in the form of text from interviews and obtained through interviews with informants who are being sampled in their research. The primary data source of this study was obtained from observations and interviews from the UPTD Puskesmas Cihaur [5].

2.2 Observation

Observation activities include systematic recording of events, behaviors, objects seen, and other things needed to support the research being carried out. In this study, researchers conducted direct observations at UPTD Puskesmas Cihaur [5][6].

2.3 Interview

Interview is a way of collecting data by conducting questions and answers to informants related to the research. In this study, we conducted interviews with parties in the Cihaur Health Center UPTD. The list of questions asked is as follows[6], what is the patient's procedure for examining doctors? What are the diseases related to the lungs? What are the symptoms associated with lung disease? How to deal with lung disease? What medicines must be consumed? [7].

2.4 Secondary Data Sources

Secondary data is data that is already available and can be obtained by researchers by reading, seeing, and listening. In this study, secondary data obtained from the UPTD Cihaur Health Center is a brief historical document, vision and mission, job description, lung disease case finding data, lung disease data, and their symptoms and treatment.

2.5 Approach Method

In this study the system approach method used is the object approach method using use case diagrams, use case scenarios, activity diagrams, sequence diagrams, class diagrams, deployment diagrams, and component diagrams as a tool in designing the system created.

2.6 Systems Development Method

For the method of system development using the prototype development method and can be seen in Figure 2.

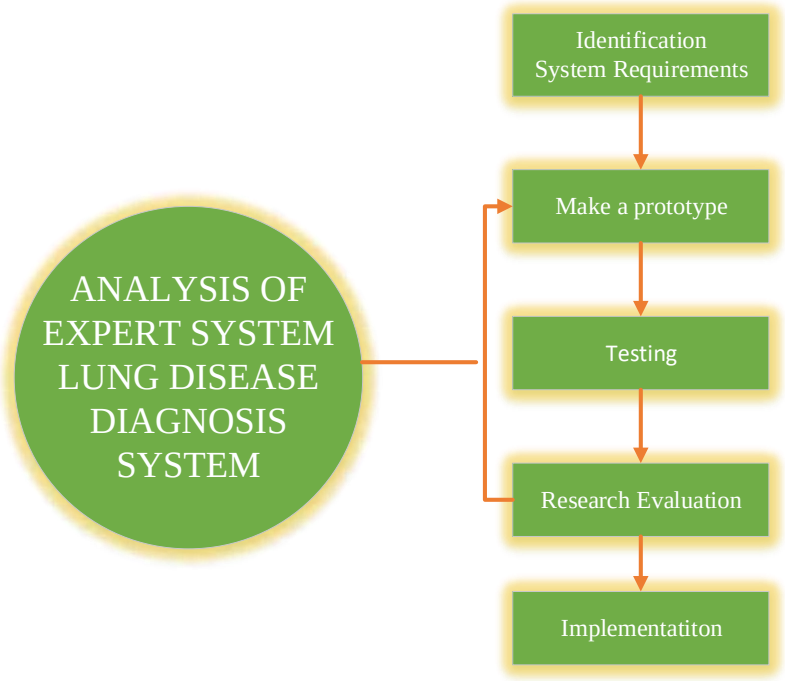

Figure 2. Systems Development Method[8]**.**

In applying this research, we used the prototype development method. The prototype used makes it easy for people to use the application. Where with prototype can be evaluated repeatedly until the application has been able to meet the needs of the public in the treatment of lung disease. The following are activities carried out in accordance with the method of developing a prototype:

2.7 Identify system requirements.

Identification of needs is done in 3 stages, namely interviews, observation, and gathering documentation. This is done with the aim that the system being built can be adjusted to the data collection done. And the data collected is used as a tool for analysis and testing of the system[9].

2.8 Make Prototype.

This stage consists of 3 stages, namely creating a database design. The purpose of this design is to build tables that will be connected with the application being built. The table created is used for data storage, as a process of processing application functions and report processing. The second is to make interface design; it is intended to describe the process in general as to what applications will be built. At this stage it can be tailored to the needs of users. In this case the user is the public and doctors. Third is making the program code to build application functions into the interface that has been made[9].

2.9 Testing

Testing that is applied in this stage uses black box testing, including testing functions, interfaces, inputs, processes, and application output in accordance with the required specifications. As for the testing plan conducted, among others[9][10] such as login form, List Form, Disease Addition Form, Symptom Add Form, Drug Add Form, Rule Add Form, Consultation Form, Prescription Add Form, Development Form, Edit Functions, Delete Function, and Output.

2.10 Research Evaluation

For this stage an evaluation is carried out by applying it to the public or at the place where the research is conducted. Each public will be given an application that can be accessed. Therefore, the use can be done directly. Evaluation is given through a questionnaire that is given with a number of questions related to the application function applied. The public can provide criticism and suggestions for existing applications. Therefore, the input provided by the public is used as a benchmark in further application improvements.

2.11 Implementation

After passing the testing process and the application can run well. Then the application can be applied by the public.

3. Results and Discussion

Based on the problems that occur, the plan described is carried out with several considerations as shown below at Figure 3.

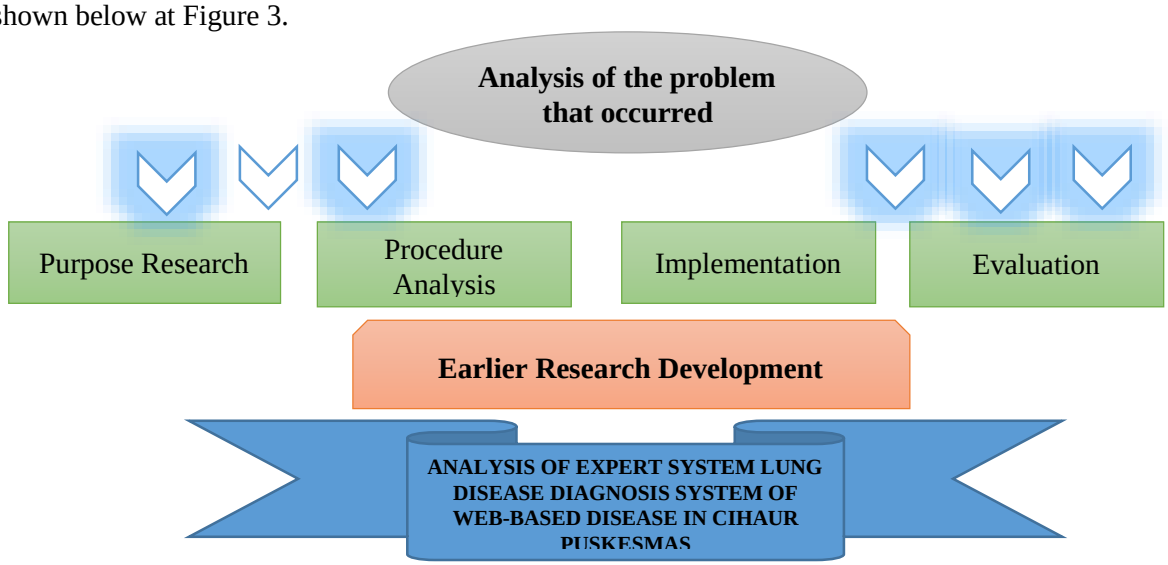

Figure 3. Result And Discussion[5].

3.1 Purpose Research

After determine the problems that occur, this study has the following uses for helping doctors to carry out checks regarding lung disease, helping patients to find out the type of illness suffered, its causes, and how to treat it, and increase public knowledge about lung disease as a medical support for puskesmas.

3.2 Procedure Analysis

The procedure that runs the patient must come first to the health centre to do the examination, the patient goes to the counter to register, after that only checked by the doctors and the results of the examination by the doctors given to the counter. To describe it can be seen in Figure 4.

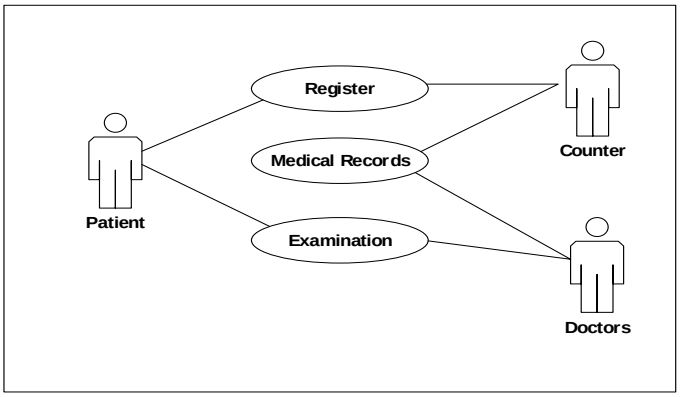

Figure 4. Use case in Progress.

3.3 Actor Definition and Descriptions.

The actors involved are the patient, the ticket window, and the doctor. These actors were directly involved in conducting the examination that occurred at the Cihaur Puskesmas. Table 1 shows the definition of the actor of the running system.

Table 1. Actor Definition and Descriptions.

No	Actor	Description
1	Patient	The person doing the examination.
2	Counter	The duty is to carry out patient administration services.
3	Doctors	Section in charge of carrying out examination of the disease.

3.4 Use case Definition dan Description.

The functions contained in the examination process that occurs after the patient has a lung disease. This function is based on procedures/systems that are running at the Cihaur Puskesmas. Table 2 shows the definition of the use case of the running system.

Table 2. Use case Definition dan Description.

No	Use case	Description
1	Register	Registration is the process of patients registering to do the examination.
2	Examination	The process of examination of the disease experienced by patients by doctors.
3	Medical records	The process of recording the disease and symptoms suffered by the patient.

3.5 Implementation

The implementation phase is the application of the system design that has been created and the system is ready to be put in place and operated [11][12]. The software used to implement the system is as follows web browser, Operation System, and Hardware, use a Pentium 4 minimal processor, RAM minimal 512 MB, hardisk minimal 250 GB.

3.6 Previous research

To complement the current research, some guidance is needed in developing the system that has been carried out by other studies, so that researchers can now maximize the functions built specifically to make tracking systems. (Table 3).

Table 3. Previous Research

Name of Researcher	Titles	Function	Problems
Sri Rahayu	Sistem Pakar Diagnosa Penyakit Paru-Paru Pada Anak Dengan Metode Dempster-Shafer.	Generate an application using the Dempster-Shafer method, where the method is used as a recommendation in the management of lung disease in children.	Symptoms arising from lung disease are only based on age in children which is likely to be different from adults. The number of diseases studied is only limited to 5 types of lung disease,
Eli Rosmita Ritonga, Muhammad Dedi Irawan	Pengembangan Model Sistem Informasi Rumah Sakit Pada Instalasi Radiologi Rawat Jalan Untuk Mendukung Evaluasi Pelayanan Di Rumah Sakit Paru Dr. Ario Wirawan Salatiga.	Generate an administrative handling service application for lung disease services,	Limited to administrative activities, no information on handling lung disease is given to the public.
Andri Saputra	Sistem Pakar Identifikasi Penyakit Paru-Paru Pada Manusia Menggunakan Pemrograman Visual Basic 6.0.	Generates a desktop-based expert application,	Requires resources in implementing the application. So, it cannot be accessed by all groups of people.

Moreover, the previous research provides the need for applications that will be made for the public, puskesmas, clinics, and doctors. From the applications that are made can be added functions that have not been provided so that the handling of lung disease can be prevented properly.

3.7 Evaluation

Based on the description of the running system, the running system can be evaluated using table 4.

Table 4. Evaluation

No	Problems	Part	Proposed
1	Less of lung specialist.	Doctors.	Make a consultation menu on the application that can help doctors or the public in diagnosing lung disease.
2	Less of awareness and knowledge of lung disease.	Public.	Create an information menu that can provide knowledge about lung disease.

No	Problems	Part	Proposed
3	There is no media used for recording medical records for doctors.	Public	Make a medical record menu that can record patient examination results.
4	Lack of supervision of treatment carried out to the patient.	Patient/ patients, puskesmas, clinics, doctors.	Create a medical record menu that can be used as a media for monitoring patient medication.

4. Conclusion

With this application that is the consultation menu, it will help doctors and the public in diagnosing lung disease. Therefore, the public can find the information related to the lung disease that is being suffered based on the symptoms experienced and provide knowledge about lung disease to public.

Acknowledgment

Thank you to the Puskesmas Cihaur which has given time in cooperation for making this application and the Universitas Komputer Indonesia who have supported this research activity.

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