

Training of Trainers (TOT) Data Science for Teaching Doctors

Rinabi Tanamal^{a)}, Felicia Graciella, Michelle Chandra, Trianggoro Wiradinata, Yosua Soekamto

Study Program of Information Systems, Universitas Ciputra Surabaya, Surabaya, Indonesia

^{a)}Corresponding Author: r.tanamal@ciputra.ac.id

Abstract

Due to the rapid development of technology, technology has become very attached to various fields in Indonesia. The health sector is no exception. If more and more data in the health sector is used correctly, it will benefit the world of health and patients. Therefore, a Data Science Training of Trainers activity was held for Doctors by the Profession of Doctors at Universitas Ciputra Surabaya. Activities are carried out by providing materials and working on questions by the doctors involved. Thus, it is hoped that the doctors participating in this activity can give medical literacy knowledge to prospective doctor students at Universitas Ciputra. The results of this TOT evaluation have a positive impact on doctors regarding alternative ways to process the data needed for medical research.

Keywords: Data Science, Medical Literacy, Medicine, TOT Training

INTRODUCTION

The era increasingly developing towards digitalization and modernization makes the existence of data accumulate in large numbers, and the size of its storage is getting bigger. Now, sending data over the internet has become more accessible. The data includes audio, video, images, and text. Due to the advancement of the internet, more and more people are using chat media applications, social media, and meeting platforms. The Covid-19 pandemic in 2020, which began to spread throughout the world, including Indonesia, affected many sectors, including the economic, education, social, and health sectors. Indonesia is one of the many countries in the world that are currently experiencing the COVID-19 pandemic (Tanamal et al., 2022).

In the health sector, quality data, valid data, and consistent data are essential for developing health development before making a decision (Kemenkes RI, 2014). Currently, the growth of global health data is increasing rapidly. In 2013 there were 153 Exabytes of health data; in 2020, it is estimated that there will be 2314 Exabytes of data (Stanford University, 2017).

Not infrequently, piles of medical record data are left unutilized. The use of data used by hospitals and health offices, in general, is only limited to providing data on the number of patients receiving treatment and their illnesses, and reports of their health data, while the pattern of disease tendencies has not been explored to the fullest (Amriana et al., 2019). This data can be used to predict various diseases. Activities in making these predictions have been carried out in various scientific fields, one of which is the field of computer science (Noviandi, 2018). The purpose of this service is to provide an explanation of information technology systems in medicine and the importance of teaching them to medical students.

Because the data in the medical world is so large and complicated, it is included in big data. Processing big data is not easy and requires special knowledge to study data, especially for numerical or quantitative data (Adhisyanda, 2020). This science is called data science. Quoting from geeksforgeeks, Data Science does not stand alone but is supported by several supporting sciences, namely computer science, statistics, and mathematics (*Drew Conway's Diagram of Data Science*, 2021). Data Science also involves data cleaning and formatting as well as data visualization. There are five lifecycle phases in data science: obtaining the data, scrubbing the data, exploring the data, modeling the data, and interpreting the data (Sameera, 2021). Machine learning is a method used to create a program that can learn from data. Machine learning has been used for various purposes, including classifying cancer types (Wiradinata et al., 2021). The medical data will be beneficial if used properly.

METHOD

The phases of the development method that will be carried out include:

- **Preparation phase:** Regarding the growing need for data and information processing that is getting bigger and more abundant, an effective way of processing data is needed to assist doctors' research. From several choices of available methods and tools, it was decided to provide Data Science material.
- **Material explanation phase:** After the introduction of the schedule, the researcher explains material related to data science, which was divided into three areas, namely Basics of data science, basics of regression in machine learning, and basics of classification. Giving material using the interactive learning method, participants can try to answer by filling in the answers on the material sheet that has been given.
- **Hands-On Activity phase:** The Hands-On Activity stage is carried out so that participants can directly practice the materials that the researcher in the previous stage has submitted. The machine learning tool provided by the researcher is Orange Data Mining.
- **Presentation phase:** After conducting the Hands-On Activity session, participants presented the results of the Hands-On Activity work. The presentation aims to make participants better understand how to implement the material in the tools used.
- **Post survey phase:** At this phase, the researcher provides a survey to know how much the material that has been given is understandable, can be helpful for the activities of doctors in their respective fields.
- **Activity Evaluation Phase:** TOT activities with rundown implementation from planning to the post-survey stage. Seeing the broader needs, it is necessary to hold more training using Google Site materials for planning lecture materials for doctors.

RESULTS And DISCUSSION

The Training of Trainers with Doctor Profession on Data Science was held on August 4, 2022 at the computer laboratory at Universitas Ciputra Surabaya. The table below contains a timeline of activities that have been carried out.

Table 1. Timeline of Training of Trainers Teaching with Doctor Profession in Data Science

No	Day, Date	Time	Activity
1.	Thursday, August 4th, 2022	08.00-15.00 WIB	<ul style="list-style-type: none">● Preparation of equipment at the activity site● Opening activities● Presentation of the data science material● Hands-On Activity Session● Presentation of participants● Closing of activities● Documentation

Implementing the Training of Trainers for Lecturers with the Doctor Profession in Data Science begins with preparing the required equipment, namely computer equipment and the Orange Data Mining application.

The event was opened by the Dean of the UC School of Information Technology and doctors' representatives from the participants. After the opening, the event continued with the presentation of material about data science, presented by Mr. Trianggoro. During the material session, participants were accompanied by a team of researchers on duty.

Then participants were directed to conduct a Hands-On Activity session to try to apply the material that had been presented in the Orange Data Mining application. During the Hands-On Activity session, the participants were very enthusiastic and had a broad sense of curiosity, so during session, there were many discussions between participants and researchers. At the end

session, representatives of the participants were asked to present the results of the Hands-On Activity that had been done in front of the lab. Then, it continues with the closing and documentation of the activities that have been held.

CONCLUSIONS AND RECOMMENDATIONS

Implementing the Training of Trainers for Lecturers with the Doctor Profession on Data Science has been carried out smoothly and has received positive responses from the activity participants. Some of the activities that have been carried out are:

- Giving Materials to Lecturers with a Medical Profession
- Hands-On Activity with a Lecturer on the Medical Profession
- Presentation by Lecturer on the Medical Profession

Based on the series of activities carried out, it is hoped that it will benefit many parties, both for universities implementing community service and for lecturers in the medical profession. They will be able to share medical literacy knowledge with students so that the decision-making process can be more targeted with accurate and qualified data.

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APPENDIX



Figure 1. Giving Presentation to Audience



Figure 2. Class Ambience During Data Science Explanation



Figure 3. Hands On Tutorial During Class Exercise

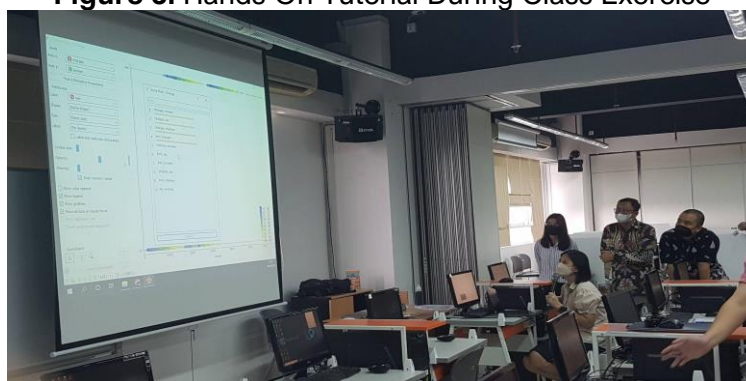


Figure 4. Participants are presenting their findings.



Figure 5. Trainer and Trainee End Class Moment.