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Volume 2658

The 2nd International Conference of Science and Information Technology in Smart Administration (ICSINTESA 2021)

Balikpapan, Indonesia • 20–21 October 2021

Editors • Massila Kamalrudin, Mark Robinson, Mikio Aoyama and Richki Hardi

AIP Conference Proceedings

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AIP Conference Proceedings

Volume 2658

ISBN: 978-0-7354-4290-0

ISSN: 0094-243X

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Conference collection

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Editors

Massila Kamalrudin
Technical University of Malaysia Malacca, Melaka, Malaysia

Mark Robinson
The University of Texas at San Antonio, San Antonio, United States of America

Mikio Aoyama
Nanzan University, Nagoya, Japan

Richki Hardi
Universitas Mulia, Balikpapan, Indonesia

All papers have been peer reviewed.

AIP Publishing

Melville, New York, 2022
AIP Conference Proceedings

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Editors

Massila Kamalrudin
Technical University of Malaysia Malacca
Melaka, 76100
Malaysia

Email: massila@utem.edu.my

Mark Robinson
The University of Texas at San Antonio
Department of Computer Science
UTSA Circle
San Antonio, TX 78249
United States of America

Email: Mark.Robinson@utsa.edu

Mikio Aoyama
Nanzan University
Department of Software Engineering
Aichi, Nagoya, Showa Ward, Yamazatocho
Nagoya
Japan

Email: mikio.aoyama@nifty.com

Richki Hardi
Universitas Mulia
Informatics
Jl. Letjend. TNI. Z.A Maulani No. 9 Damai Bahagia
Balikpapan, East Kalimantan 76114
Indonesia

Email: richki@universitasmulia.ac.id

ISBN 978-0-7354-4290-0
ISSN 0094-243X
Printed in the United States of America

AIP Conference Proceedings, **Volume 2658**
The 2nd International Conference of Science and Information Technology in Smart Administration (ICSINTESA 2021)

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Preface: 2nd International Conference of Science and Information Technology in Smart Administration (ICSINTESA) – 2021

Universitas Mulia, this time is the first time to hold an international ICSINTESA 2021 conference on a virtual basis; this is because the city of Balikpapan is still in a state of the unfinished covid 19 pandemic. Universitas Mulia is still enthusiastic and trying to carry out ICSINTESA 2021. Even though it is still in a pandemic condition, the enthusiasm and desire of researchers to be involved in ICSINTESA Call-for-Papers is increasing.

International Conference ICSINTESA 2021 is a Call-for-Papers seminar aimed at researchers, professionals, and academics to share research results presented in a paper. Universitas Mulia has routinely held this activity since 2018 until now.

We are grateful for the participation of all committees, participants, editors and reviewers in this year's ICSINTESA activity.

The International ICSINTESA 2021 conference invited speakers from the government and academia, including the Minister of Education, Culture, Research and Technology, Nadiem Anwar Makarim, represented by the Directorate General of Higher Education DR. Ir. Paristyanti Nur Wardani.

The second resource person Governor of East Kalimantan DR. Isran Noor, represented by Prof. DR. HM Aswin, M.M. Head of Bappeda of East Kalimantan Province, Mayor of Balikpapan Rahmad Mas'ud S.E., M.E.

Next Prof. DR. Masilla Kamalruddin from the Technical University of Melaka Malaysia, DR. Chiew Kang Leng from University Malaysia Sarawak and Prof. DR. Richardus Eko Indrajit from Pradita University Jakarta.

The Conference proceedings span over 13 topical tracks and hosted contributions on Artificial Intelligence, Big Data, Computer Networks, Computer Science, Digital Forensics and Security, Educational Technology, Information Systems, Machine Learning, Mathematics and Modelling, Natural Science, Pattern Recognition, Science Technology for Society, Software Systems, etc. On this occasion, keynote speakers delivered expert lectures on various recent research fields like Research challenges in Artificial Intelligence & Machine Learning and Blockchain technology. These keynote speakers are from Indonesia and other countries.

There were 29 oral presentations by participants which brought great opportunity to share their research findings. Efforts taken by peer reviewers contributed to improving the quality of papers and provided constructive critical comments; improvements and corrections to the authors are greatly appreciated.

We are thankful to all the authors who submitted papers and their presentations that really made this conference a grand success. Last but not the least; we are thankful for the enormous support of AIP Conference Proceedings in every step of our journey towards success.

Get along with this seminar activity, we hoped it can be an active effort of higher education to underpin Indonesia in confronting the increasing information technology development. We wish the technology advance is able to help human life be more effective, and efficient but still humanist.

Best wishes
Chairman of ICSINTESA 2021
Richki Hardi

The 2nd International Conference of Science and Information Technology in Smart Administration (ICSINTESA 2021)
AIP Conf. Proc. 2658, 010001-1–010001-1; https://doi.org/10.1063/12.0012564
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American Institute of Physics

H-INDEX

80

PUBLICATION TYPE

Conferences and Proceedings

ISSN

0094243X, 15517616

COVERAGE

1973-1978, 1983-1984, 1993, 2000-2001, 2003-2022

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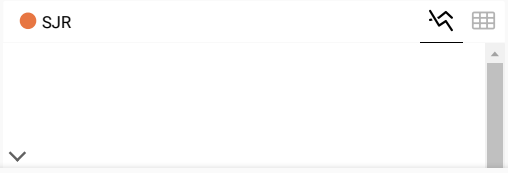

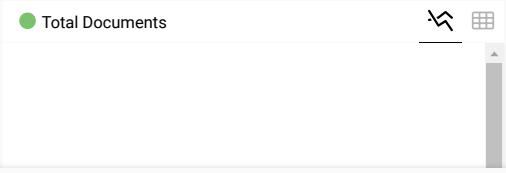

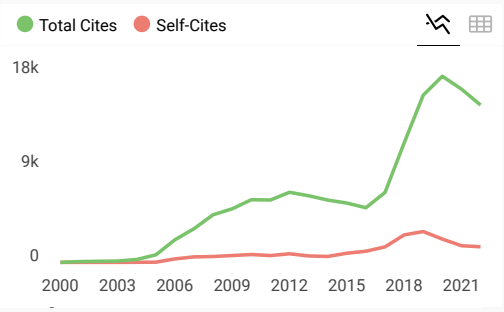

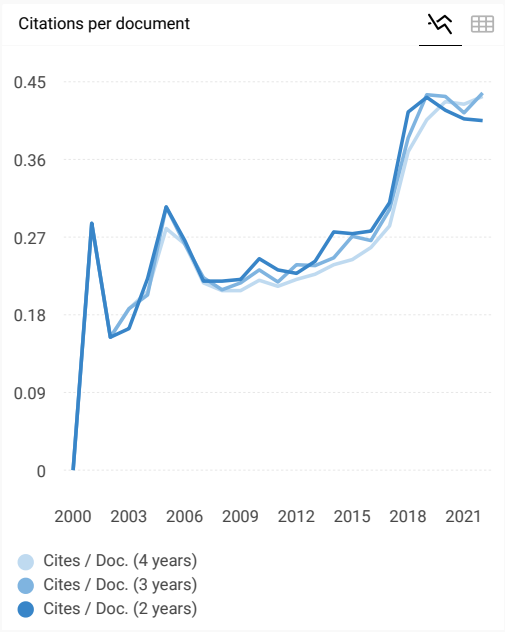

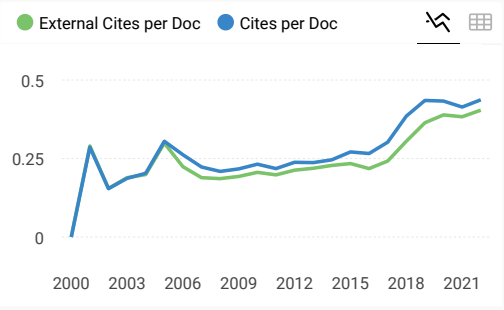

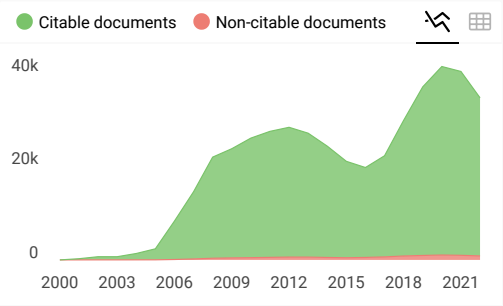

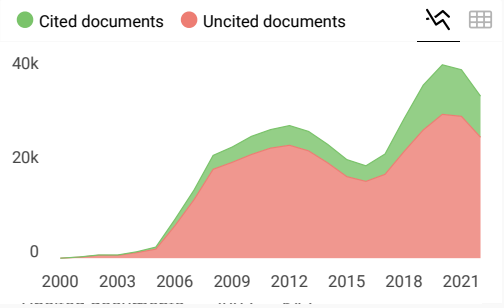

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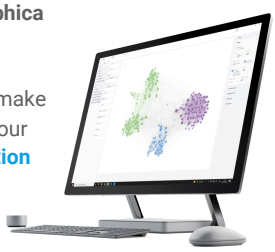

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Android Based Remote Driving for Real Time Vehicle Monitoring

Agustinus Noertjahyana[1, a)] Lily Puspa Dewi [1, b)] Justinus Andjarwirawan [1,c)] and Nico Gufron [1,d)]

Author Affiliations
[1]*Petra Christian University*
jl. Siwalankerto 121-131 Surabaya , Indonesia

Author Emails
[a)] agust@petra.ac.id
[b)] lily@petra.ac.id
[c)] justin@petra.ac.id

Abstract. At this time, where internet connections are increasingly being used to support daily life, they are also widely used to monitor events. It is inseparable from every incident that occurs in transportation facilities, including motorbikes or cars. To be able to monitor every incident that occurs when using a vehicle, this study applies an Android-based DVR application that is equipped with GPS, speedo meter and Live Streaming. It is hoped that with this application, users can record videos and take photos accompanied by the location and description of each incident. In addition, the live streaming feature can help other users to join by entering the channel name. The tests carried out show that the live streaming feature can be implemented properly using each channel.

INTRODUCTION

Vehicles have now become an important need for humans to carry out daily activities. Many functions of the vehicle in supporting human activities such as transportation of goods and traveling from one place to another. It is also easier for the public to get a Driving License (SIM) with online services. This of course also has an impact on the increasing number of vehicle drivers passing on the highway.

Problems arise when more and more novice drivers often ignore road rules, such as speed limits and traffic signs. Based on data taken from the Korlantas Polri, it is stated that the number of accidents is increasing day by day due to the carelessness of drivers, especially exceeding the speed limit. This is common among teenagers who have just received a Driving License.

For this reason, by utilizing Digital Video Recorder technology, many parents monitor the speed of vehicles driven by teenagers while on the highway. However, there are limitations when using DVR devices, the difficulty of conducting real-time monitoring due to limited access to DVRs that are currently widely sold in the market.

There are many benefits of DVR when applied in many ways, one example is the car DVR, which is an onboard camera that can record continuously, by installing it on the dashboard of the vehicle or on the rear windshield of the vehicle. The main use of a car DVR is that it can be used as evidence in the event of an accident and the driver is innocent. The image recording process will take place continuously while the vehicle is being driven, and the results of video recording depend on the quality of the DVR camera used and the recording time depends on the memory capacity of the DVR device.

The limitation that most complained about was the difficulty in supervising the speed of the vehicle from the supervised driver, in this case, it could be a child or a driver on goods transport services. For this reason, considering

the sophistication of current cell phone cameras, which are generally of good quality and with GPS and data access features, the idea of using a cell phone as a DVR is one of the most suitable alternatives to overcome the limitations of a car DVR.

In this study, we will try to use a cellphone to be used as a DVR as well as a remote live streaming, so it is hoped that it can replace the role of a car DVR in conducting vehicle surveillance, as well as speed monitoring by utilizing the GPS feature of the cellphone.

Applications developed using Android-based mobile phones are currently widely used by people from young to old, so it is hoped that this application can bring more benefits.

With the live streaming feature and being able to record along the way, and can be accessed by more than 1 person, it is possible for parents to supervise teenagers and transportation business owners can also carry out direct supervision of the driver.

THEORY

DVR is an electronic device capable of recording video in digital format and stored in disk drives, USB flash drives, SD memory cards, and other storage areas. DVR is also known as PVR (Personal Video Recorder). (Engelbert et al., 2011). The recorder is connected to a media input device, such as a satellite or cable box and television, this unit is a large storage unit with file management software and a remote control for recording an event. (Apriyani et al., 2020)

GPS is a satellite-based navigation owned by the United States government and operated by the United States Air Force. GPS is ubiquitous in society in various forms of application. GPS is a hardware and software technology that continues to become more accessible and affordable for consumers, with multiple GPS receivers. The use of GPS in forestry has been hampered by the challenges of receiving and maintaining adequate satellite reception due to canopy and landform interference. (Han, 2016)

Speedometer or speed meter is a measurement tool that measures and displays the instantaneous speed of a vehicle. Now deployed in all motor vehicles, speedometers became available as an option in 1900, and as standard equipment from 1910 onwards. (Han, 2016)

Speed is an important piece of information that is necessary for the driver in the right way. In addition to visual, auditory, and vestibular cues, the speedometer on the dashboard provides accurate speed readings to the driver, and provides assistance to the driver, so that the driver can accurately assess the speed at which they are traveling. (Wang et al., 2015)

Streaming is a technology for playing video or audio files directly or with a recorder from a server machine (webserver). In other words, video files that are on the server machine or server computer can be directly executed and played by the client while the request process is done so that the client does not need to spend so much time downloading the video and audio files. (Noertjahyana et al., 2019)

To apply video streaming to the network, it is necessary first to calculate the available bandwidth, to support data transmission. Bandwidth is an important parameter for streaming on a network. The greater the available bandwidth, the better the quality of the displayed video. (Jumisko-Pyykkö et al., 2013)

Agora.io is a global real-time service provider for video and audio. The main technology is a real-time communication or Real Time Communication (RTC), which uses real-time voice and video services and online broadcasts to create a scenario like offline communication. (Wisnu & Barja, 2021)

SYSTEM DESIGN

The DVR application developed in this study aims to record along the journey and can track the driver through the speedometer. So, the driver can be reminded when driving at a speed more than normal. All events that occur while the vehicle is running will be recorded according to the existing memory storage capacity of the device. With the help of the Google Maps feature, the application can track the driver's location in real time and the driver can use Google Maps to get to the destination quickly and well-directed.

Drivers can use the app to record trips, and capture important events on the way, and with live streaming, other people who have the right and can log into the system will be able to see the driver's camera. For example, the driver's parents can supervise their child who is driving a vehicle. There is a live streaming feature using a smartphone, so when the driver starts driving the vehicle can press the start button which aims to start recording. The recording quality

depends on the smartphone used for recording, as well as the length of the recording time depending on the available smartphone memory capacity. Video files can be saved in date and time format. Results Photos and Videos will be saved in different folders, to make it easier to find photos and videos. This application allows the device to be remote through selecting the same channel. So that parents can monitor their children through the channels that have been set. The channel selection process at the beginning of the application can be seen in Figure 1.

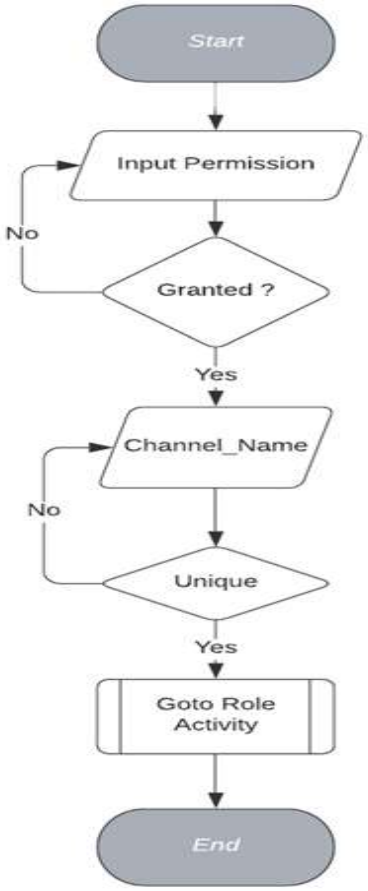

Fig. 1. Channel Selection Diagram

The next stage is the main stage of the application, namely the process of selecting a role activity. In the process of selecting this role activity there are 3 activities, namely: Broadcaster, Audience and DVR. Broadcaster if the user wants to record through the application, while Audience if the user wants to see the broadcaster's display. In the DVR option, the user can record every event that occurs in the storage memory. This process can be seen in Figure 2.

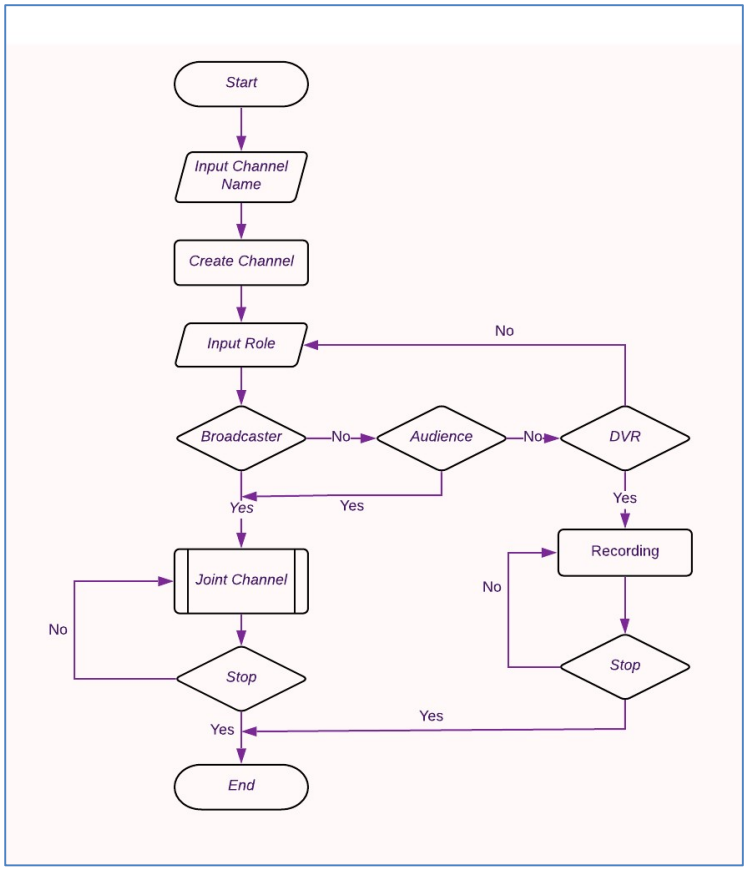

Fig 2. Role Activity Diagram

IMPLEMENTATION

The implementation of the application will be tested on an Android-based smartphone. The type of smartphone that will be used as a device for testing the application is the Samsung S7 Edge. The Start page of the application from seen in Figure 3.

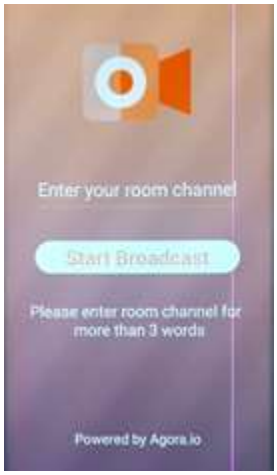

Fig 3. Main Program

When the user starts the application, there will be a choice of Broadcaster, Audience and DVR. If the user selects Broadcaster, then the user can do a live stream, just by entering the channel name that matches what they want. This

feature will take place when the user is logged in on the Live Streaming page. Users with broadcaster roles have the right to switch front or rear cameras, mute the sound but keep the live stream running. The quality of the live stream depends on the user's internet speed. If the Broadcaster chooses a stream resolution of 1280 x 720, then the audience will try to adjust to the same resolution at the same speed and bitrate. This live streaming test is shown in Figure 4. Testing the live streaming feature is divided into 3 categories: Good, Moderate and Poor. Good, if the video quality is smooth and not broken. Moderate, if the video quality is smooth but a little bit delay. Poor, if the video quality is not good. The test results can be seen in Table 1.

Fig 4. Broadcaster Role

Resolution	***Delay (seconds)***	***FPS* (*Frames Per Second*)**	***Bitrate* (*kbps*)**	***Publish Live Streaming (Upload speed) / Broadcaster***	***View Live Streaming* (*Download speed*) / *Audience***	**Information**
320 x 240	1	15	200	60 kbps – 90 kbps	75 kbps – 85 kbps	Moderate
480 x 360	1	30	980	130 kbps – 160 kbps	135 kbps – 150 kbps	Moderate
640 x 360	1	30	1.200	160 kbps – 180 kbps	160 kbps – 185 kbps	Moderate
640 x 480	1	30	1.500	190 kbps – 210 kbps	190 kbps – 245 kbps	Moderate
960 x 720	2	30	2.760	300 kbps – 415 kbps	250 kbps – 280 kbps	Good
1280 x 720	2	30	3.420	350 kbps – 500 kbps	250 kbps – 270 kbps	Good

CONCLUSION

From the discussion that has been carried out in this study, conclusions can be drawn:

- The application can display videos well at a high-resolution of 1280 x 720.
- By utilizing agora.io, the application can be accessed together by utilizing the channel.

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