

Thesis Examination Timetabling using Genetic Algorithm

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Abstract—Thesis examination is one of the requirements to complete a graduation course. At the Department of Informatics Engineering Universitas Surabaya, thesis examination begins with organizing the exam timetable to determine the time, examiner, and room by using traditional scheduling system. The disadvantage of the system is that the process takes a relatively long time, which is influenced by factors such as the lecturer's work schedule and the availability of the room. Program coordinator responsible for the organization of the thesis timetable must perform a thorough analysis so that the schedule does not clash with the teaching schedule and the availability of the room. In addition, the number of lecturers as examiner between one and the other has to be distributed equally. To facilitate the program coordinator, a web-based system using genetic algorithm was developed for the efficiency of thesis examination timetabling. Testing and evaluation process are conducted by taking a random respondent in accordance with the user category. The results show that the system developed can improve the efficiency of time, effort, and cost.

Keywords— Genetic Algorithm, Thesis Examination Timetabling.

I. INTRODUCTION

Thesis is a scientific paper that is made in accordance with the scientific field with the direction of the supervisor as one of the requirements to complete studies in higher education [1]. The results of the thesis will be assessed in front of 4 examiners [2]. Students can take a thesis exam at least 3 months after the submission. Prior to 2011, the department of Informatics Engineering University of Surabaya (Ubaya) opened a thesis exam 5 times each year. This is one of the reasons for the long duration of the student's thesis work because they cannot take the thesis exam even though it is finished. To overcome this, the Informatics Engineering department opens thesis examination schedule on average 10 times each year.

The thesis exam begins with the preparation of the exam schedule which starts with the administrator announcing the thesis exam schedule via a notice board and e-mail to all students who are taking a thesis. Then, the administrator distributes the exam readiness form to the lecturers. Three days later, the administrator will collect the exam readiness form from all lecturers. After that, the administrator will open the exam schedule & room based on the exam readiness form and the availability of room. Lastly, the program coordinator will create examination timetable by determine the examiner according to the exam readiness form between 4 lecturers, the suitability of the scientific

field of each lecturer, and the equal distribution of the number of students examined. Scheduling is the process of allocating resources that aims for a set of tasks to be selected within a certain time frame [3].

A lot of research has been done related to thesis examination timetabling. To overcome the problems related to the preparation of the seminars and thesis examination timetabling in Unikom, Wibawa and Fachrizal in his research has developed an application. The timetabling criteria used are room availability, and time availability from supervisors and candidate examiners [4]. The results of the study indicate that the applications developed can avoid clash of lecturer schedules [4]. The same problem is experienced by Politeknik Negri Malang and STMIK STIKOM Indonesia. A study was developed by Cahyo, Rozi, and Ariyanto to overcome the problems at the Politeknik Negri Malang. The limitation imposed are that the supervisor is not allowed to test the guided student, one of the supervisors must be present when the student who is being guided takes the thesis examination, the examiner lecturer may not test in another room at the same session, and the availability of the room [5]. The results showed that timetabling had met the existing criteria. Whereas to overcome the problems that exist in STMIK STIKOM Indonesia, Budayasa and Dirgayusari develop a scheduling application so that there are no clashes of room and examiners [6].

All research on the existing thesis exam timetabling only uses the criteria of room availability, time availability from the supervisor lecturer and candidate examiners, and avoids any clash of schedules both from the lecturer and the room. There are other criteria that should be taken into account in the thesis exam timetabling as required by the Indonesian government which is not taken into account in the existing research, specifically the minimum requirements for functional positions and the number of examiners [7]. In addition, the existing research also does not take into account the equal distribution of the number of students examined by each lecturer. Therefore, a study was developed on the thesis exam timetabling that added these three criteria.

II. METHODOLOGY

The process of collecting data is done in several steps including observation, interviews to some respondents and taking data from the traditional system of thesis timetabling.

Observation is conducted to get ideas and information related to timetabling system at the department of Informatics Engineering. In addition, interviews with respondents related with the system are also conducted to collect information about problems that arise during timetabling. Respondents for interviews include heads of departments, program coordinators, and administrators who have been managing the thesis examination.

The system is developed using genetic algorithm. The genetic algorithm is an optimization technique based on the principle of natural selection and genetics. This algorithm is a simple and relatively easy to implement [6]. According to Huynh et al., Genetic algorithms have good convergence behavior to solve scheduling problems [8].

III. SYSTEM IMPLEMENTATION

The thesis examination timetabling system is designed to not only meet the needs of the Informatics Engineering department Ubaya, but also to be easy to develop.

A. Data Design

The first design to do is data design. The data for the thesis examination timetabling is designed to integrate with the Academic Information System (SIA) central database owned by UBAYA. This is intended to avoid the occurrence of data redundancy and inconsistency. However, since the scheduling procedure of thesis examination of each study program in Universitas Surabaya varies, not all the required data is available in the central database. The University's SIA database is only used to manage data related to the academic activities of all existing courses at UBAYA which have been standardized equally for all courses.

The data required for the timetabling system taken from the University's SIA database are **mahasiswa** table, **mhsambilmk** table, **skripsikp** table, **skripsikppembimbing** table, **notaupp** table, **notauppdetail** table, **karyawan** table, employment education history (**pe_rwtpendidikan**) table, employment structural history (**pe_rwtstruktural**) table, and **room** table. The **mhsambilmk** table is used to store the list of courses taken by students each semester including thesis. The **skripsikp** and **skripsikppembimbing** tables are used to store thesis and apprentice data from students including their supervisors. While **notaupp**, and **notauppdetail** used to store tuition fees (UPP) payment data which has been done by the students. The **pe_rwtpendidikan** table is used to store lecturer's education history data. This table is used to find out whether a lecturer eligible of examining thesis or whether it is in accordance with the rules of the Higher Education Service. The **pe_rwtstruktural** table is used to determine the lecturer's position related to the rights determination of the system access. The data design for the thesis examination timetable system is described in the form of Entity Relationship Diagram (ERD) which can be seen in Figure 1. Entities representing tables from the University's SIA database are not depicted as a whole in Figure 1, only entities that are directly connected with the additional entity are depicted in Figure 1. The attributes on the **mahasiswa** and **karyawan** entity shown in Figure 1 are the required attributes in the thesis examination timetabling system.

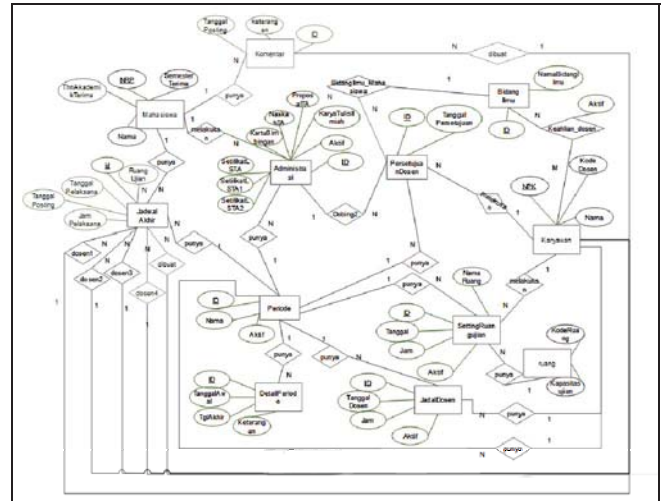


Fig. 1. The ERD of thesis examination timetabling system

Periode and **DetailPeriode** entities are used to store data during the period of thesis exams examination, which includes the period of registration of thesis exam preparation (LSTA), LSTA period, registration and prerequisite file collection period, thesis examination period, and period of thesis revision in accordance with examiner input during thesis examination. **JadwalAkhir** entity is used to store the student thesis examination schedule conducted in the current active exam period and has been verified by the program coordinator. Students that are eligible to take the thesis examination are students who have received approval from the supervisors and meet all requirements. Approval from the supervisor is stored in the **PersetujuanDosen** entity and all administrative requirements of the student applying for the thesis exam are stored in the **Administrasi** entity.

The developed system will automatically attempt to determine which examiners can examine at specified exam time slots and have expertise according to the student thesis topic. The lecturer's time availability slot provided to test the thesis is stored in the entity of the **JadwalDosen** and expertise owned by each lecturer stored in the **BidangIlmu** entity. This entity is required for the scheduling time, the system will automatically as much as possible to find examiners who have expertise in accordance with the thesis topic. The room used for the thesis examination is stored in **SettingRuangUjian** entity. Finally, **Komentar** is used to store comments include criticisms and suggestions from students and responses from examiners.

B. Implementation of Genetic Algorithm

After the data design is completed, then the design process of the thesis examination timetabling is prepared. The process of the thesis exam timetabling starts from setting the thesis exam period and the room that can be used for the thesis exam by the administrator after getting information from the program coordinator. After the administrator has opened the thesis exam registration, the system will automatically notify by email to all students who are taking the thesis and to all the lecturers to fill the exam readiness form.

Students who have finished their thesis can register for a thesis exam followed by uploading all the requested administrative requirements. When a student registers, the system will automatically check the student's tuition payments. If the student has not completed the tuition fee, then the system will automatically refuse the student registration. Furthermore, the system will send notifications to the corresponding supervisors if there are any registered students. The supervisor who gets a notification can approve or reject the students to take the thesis exam if the supervisor feels the student is not yet eligible for the exam. If the supervisor does not approve, then the system will send notification to the student. After the deadline for registration is reached, the administrator will check all the administrative requirements of the student who gets approval from his / her supervisor. Afterwards, the administrator will verify the student who meets the administrative requirements and the system will automatically send notifications to the student. Finally, the system will automatically generate thesis examination timetable with genetic algorithms. The program coordinator is authorized to make changes to the thesis exam schedule generated by the system if needed. The flow of the thesis examination process can be seen in Figure 2.

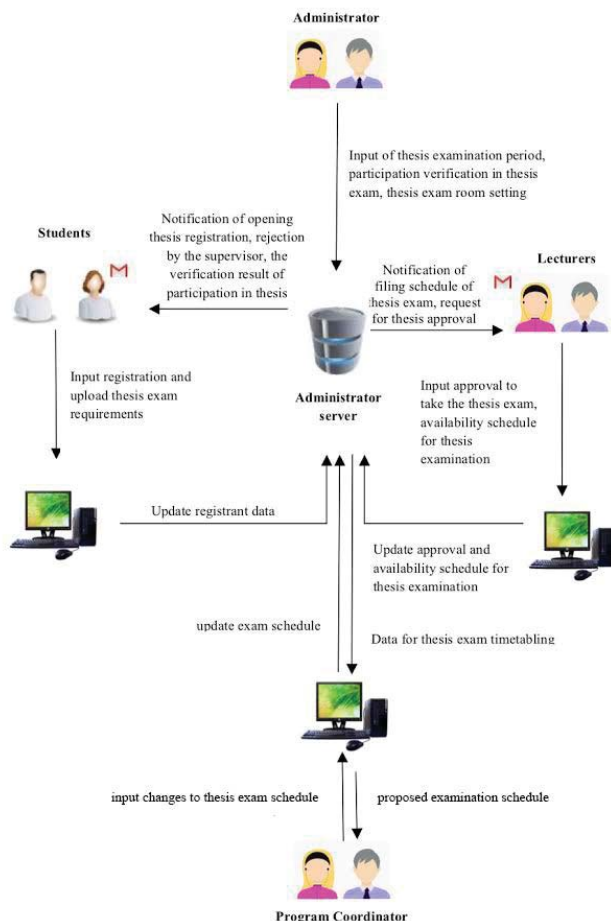


Fig. 2. Thesis examination timetabling flow

The thesis exam timetabling process begins with the exam time and room available according to the schedule of

both supervisors. This is done by randomizing the exam readiness from the supervisors. The results of this randomization are combined with empty exam room dates and hours. Each slot formed represents a chromosome. Once the chromosome is formed, then the selection process is conducted. The selection process is done to determine which chromosome will be used as the parent. In the selection process, the system will give the fitness value on each chromosome. The amount of fitness value depends on the number of scheduled clashes. The clash was calculated from the unavailability of the exam room because it is already being used and the supervisor is already examine at the same time in another room. The greater the number of clashes that occur, the smaller the fitness value and the less likely the chromosome becomes the parent. The fitness value is calculated from the formula: $1/((\text{number of clashes})+1)$. The chromosome chosen to be the parent is 2 pieces of chromosome that has the highest fitness value. After the selection process is done, then do crossover between two parent chromosomes and produce new chromosomes. The new chromosome guarantees no clash in the use of exam room.

Mutation is done after the selection process. The mutation process is used to improve the fitness value of a gene on a chromosome. Changes in gene values can occur if the gene does not have the id of the exam room so that the system will look for another exam room id that has the same schedule as the availability schedule of the lecturer. Next, the determination of the chair and secretary of the thesis examiner is conducted. Selection of examiners who become chairman and secretary adjusted to the field of science of the thesis topic. After the candidate chairman and secretary selected, the system will match the availability schedule the selected candidate with the thesis examination schedule obtained from the previous process.

The final stage of this process is to determine the number of lecturers as examiners. Eligible candidates are selected based on the minimum number of exam schedules. After determining the chairman and secretary, the proposed thesis examination timetable is formed. Finally, the process of verifying the proposed thesis exam schedule formed by the program coordinator. A verified schedule can not be changed. The flow of thesis examination timetable preparation process can be seen in Figure 3.

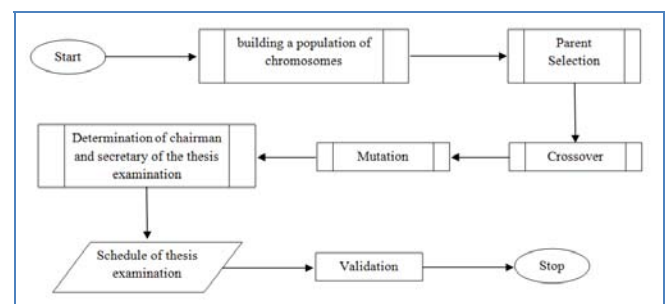


Fig. 3. The Formation Process of Thesis Examination Timetabling using Genetic Algorithm

IV. RESULTS

The design of data that has been made is implemented using phpmymadmin while the design of the process is web-based implemented using the laravel 5.2 framework. An example of the result of the implementation of the thesis exam period setting can be seen in Figure 4. On this page the administrator can set the deadline for each activity stage to take the thesis exam in accordance with the data from the program coordinator. While the example of the page to be filled with the availability of lecturers to examine the thesis can be seen in Figure 5.

Fig. 4. The thesis exam period setting page

Fig. 5. The page to be filled with the availability of lecturers to examine the thesis

After the registration and file collection expires, the administrator will check the administrative requirements of students who have received approval from the supervisors. If all administrative requirements are met, the administrator will verify the student's data. An example of a verification page can be seen in Figure 6. While the sample timetable results can be seen in Figure 7. Figure 7 shows the schedule of 4 students generated by the thesis examination timetable system using genetic algorithm.

Fig. 6. Administrative Requirements Verification Page

Keterangan: Apabila terdapat mahasiswa yang tidak memiliki Kartu dan Sekretaris pengisi diwajibkan karena website ini tidak memunculkan dosen yang memiliki jadwal kegiatan mengajar yang ada.									
NRP	Nama	Tanggal	Jam	Nama Ruang	Anggota 1	Anggota 2	Ketua	Setoran	Bidang Ilmu
6096703	Amelia Winda R	21-09-2016	11.30-13.00	TC 02.02	Susana Limanto	Richard Pramono	Noto Benarikh	Monica Widayati	Sains
6108822	Yonathan Alexander W	23-09-2016	11.30-13.00	TC 02.01	Budi Hartanto	Marcellinus Ferdinand	Susana Limanto	Elvira Tundra	Gama
6108834	Junarko Liberto	16-09-2016	11.30-13.00	TC 02.01	Endah Asmawati	Andre	Richard Pramono	Hendra Dinata	AI
6124026	Florence Irena T	16-09-2016	08.30-10.00	TC 02.01	Bambang Prjambodo	Songko Soeparto	Liara	Elvira Tundra	Sistem Informasi

Fig. 7. Timetable result page

To ensure that the timetabling system of thesis examination that are made is in accordance with the needs of users, then validation is done. Validation is done in 2 ways, i.e comparing the results of theses scheduling exams ever done traditionally with scheduling results generated automatically from timetabling system and conducting interviews with user application respondents [9]. The first validation is done by comparing the result of traditional scheduling of thesis exam in Informatics Engineering Study Program September 2016 and November 2016 periods with result from web-based system. The results of traditional thesis timetabling in Informatics Engineering Program September 2016 period can be seen in Figure 8 and the results of traditional timetabling for November 2016 can be seen in Figure 9. While the timetabling results of the web-based system of September 2016 period can be seen in Figure 10 and the timetabling results of the application period of November 2016 can be seen in Figure 11.

NRP	NAMA	HARI	TGL	JAM	RUANG	ANGGOTA	ANGGOTA	KETUA	SEKRETARIS
6124026	Florence Irena T	Jumat	16/09/2016	08.30-10.00	TC.2.1	187018 - Bambang Prjambodo	211117 - Songko Soeparto, S.Kom.	199913 - Liara, M.Ts.Trch.	203014 - Elvira Tjandra, M.MT.
6108834	Junarko Liberto	Jumat	16/09/2016	11.30-13.00	TC.2.1	201007 - Endah Asmawati, M.Si	208020 - Andre, M.Sc	209023 - Richard Pramono, M.Sc.	210034 - Hendra Dinata, M.Kom
6096703	Amelia Winda R	Rabu	21/09/2016	11.30-13.00	TC.2.2	197030 - Susana Limanto, M.Si	209023 - Richard Pramono, M.Sc	201026 - Noto Benarikh, M.Sc	204027 - Monica Widayati, M.Kom
6108822	Yonathan Alexander W	Jumat	23/09/2016	11.30-13.00	TC.2.1	200046 - Dr. Budi Hartanto, M.Sc.	209345 - Marcellinus Ferdinand S, M.Com	209023 - Richard Pramono, M.Sc.	208020 - Andre, M.Sc.

Fig. 8. Traditional Timetabling Results September 2016 Period

NRP	NAMA	HARI	TGL	JAM	RUANG	ANGGOTA	ANGGOTA	KETUA	SEKRETARIS
6128009	Ono Mawati K.W	Jumat	16/11/2016	08.30-10.00	TC.2.1	197030 - Susana Limanto, M.Si	210134 - Tjara Adhita, M.Ts.Trch.	Richard	Benarikh
6128017	David Nugroho J	Senin	21/11/2016	08.30-10.00	TC.2.1	204027 - Endah Asmawati, M.Si	209345 - Marcellinus Ferdinand S, M.Com	Liara	Benarikh
6124054	Yuni Riziana	Selasa	22/11/2016	10.00-11.30	TC.2.1	200017 - Ghani Trensia Akbar, M.Kom	199020 - Fika Dwi Hartono, M.Ts.	Liara	David
6124015	Yulanda Satrio	Rabu	23/11/2016	08.30-10.00	TC.2.1	199013 - Liara, M.Ts.Trch.	204027 - Richard Pramono, M.Sc	Endah	Benarikh
6137006	Randy Gunawan	Rabu	23/11/2016	11.30-13.00	TC.2.1	187018 - Bambang Prjambodo, M.MT.	210034 - Hendra Dinata, M.Kom	Noto	Tjandra
6096703	Hicky Saben	Rabu	23/11/2016	11.30-13.00	TC.2.1	199013 - Liara, M.Ts.Trch.	209345 - Marcellinus Ferdinand S, M.Com	Liara	Benarikh
6124084	Adhithul Hidayat	Kamis	24/11/2016	08.30-10.00	TC.2.1	200017 - Ghani Trensia Akbar, M.Kom	187018 - Bambang Prjambodo, M.MT.	Liara	Benarikh
6128007	Andhy Nivisa B.S	Kamis	24/11/2016	13.00-14.30	TC.2.1	204027 - Endah Asmawati, M.Si	209345 - Marcellinus Ferdinand S, M.Com	Andre	Benarikh
6128050	Yusra Septia N	Jumat	25/11/2016	10.00-11.30	TC.2.1	199013 - Liara, M.Ts.Trch.	210134 - Tjara Adhita, M.Ts.Trch.	Benarikh	Benarikh
6094072	Aminda Anggah Gunawan P	Jumat	25/11/2016	13.00-14.30	TC.2.1	201026 - Noto Benarikh, M.Sc	191007 - Endah Asmawati, M.Si	Ida	Dinata

Fig. 9. Traditional Timetabling Results November 2016 Period

Keterangan: Apabila terdapat mahasiswa yang tidak memiliki Kartu dan Sekretaris pengisi diwajibkan karena website ini tidak memunculkan dosen yang memiliki jadwal kegiatan mengajar yang ada.									
NRP	Nama	Tanggal	Jam	Nama Ruang	Anggota 1	Anggota 2	Ketua	Setoran	Bidang Ilmu
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6108834	Junarko Liberto	16-09-2016	11.30-13.00	TC 02.01	Endah Asmawati	Andre	Richard Pramono	Hendra Dinata	AI
6124026	Florence Irena T	16-09-2016	08.30-10.00	TC 02.01	Bambang Prjambodo	Songko Soeparto	Liara	Elvira Tundra	Sistem Informasi

Fig. 10. Web-based Timetabling System Results September 2016 Period

NBP	Nama	Tanggal	Jam	Ruang	Anggota 1	Anggota 2	Ketua	Subketua
6137006	Rendy Gunawan	18-11-2016	08.30-10.00	TC 02.01	Bambang Priambodo	Hendra Dinita	Tertza Adella	Elysa Tiandra
6124054	Fony Ratiana	22-11-2016	10.00-11.30	TC 02.01	Dikani Trenea Albari	Filtri Dwi Kartikasari	Susana Lianto	Njoto Benarkah
6098014	Ricky Salim	23-11-2016	13.00-14.30	TC 02.01	Liuna	Daniel Samsanto	Joko Siswanto	Endah Amawati
6128017	Daniel Nagraho J	23-11-2016	11.30-13.00	TC 02.01	Monica Widiaari	Frankiska Liliana	Njoto Benarkah	-
6128950	Ivana Septa N	23-11-2016	08.30-10.00	TC 02.01	Liuna	Melissa Angga	Bambang Priambodo	Richard Pramono
6134035	Yulanda Sutarso	23-11-2016	08.30-10.00	TC 02.01	Liuna	Richard Pramono	Melissa Angga	Bambang Priambodo
6124064	Miftahul Hidayah	24-11-2016	08.30-10.00	TC 02.01	Dikani Trenea	Bambang Priambodo	Hendra Dinita	Richard Pramono
6128067	Rendy Novian BS	24-11-2016	13.00-14.30	TC 02.01	Monica Widiaari	Marcellinus F	Andre	Joko Siswanto
6094072	Amanda Anugrah Gunawan P	25-11-2016	13.00-14.30	TC 02.01	Njoto Benarkah	Endah Amawati	Dikani Trenea Albari	Elysa Tiandra
6138069	Erlin Iswari K.W	25-11-2016	10.00-11.30	TC 02.01	Susana Lianto	Tertza Adella	Marcellinus Ferdinand Sucidi	Liuna

Fig. 11. Web-based Timetabling System Results November 2016 Period

The second validation is done by asking respondents to try the web-based system that has been made in accordance with their respective permissions and then interviewed related to the benefits and problems surrounding the execution of the thesis exam. Respondents consist of administrators, 10 students who will take the thesis exam, 2 program coordinators, and 5 lecturers. Particularly the program coordinator, in addition to attempting web-based systems and interviews, was also asked his opinion regarding the results of traditional scheduling and web-based systems because these two types of respondents usually handle traditional thesis exam timetabling. The validation result states that the students are greatly helped by the registration feature because they do not need to come directly to the department to register or request approval to take the exam to the supervisor, so they can save the time. The administrator is helped because there is no need to spread the exam readiness form one by one to the lecturers so that it can save costs, no need to schedule time and exam room so that it can save time and effort, and can immediately check the completeness of student requirements without needing to find the file first so it can save energy. Moreover, program coordinators are helped because no need to do the traditional timetabling. The lecturers are helped because they can fill in the form of schedule availability and give approval to take the thesis exam anywhere and anytime.

After comparing the results of traditional scheduling and web-based systems, the program coordinator stated that the scheduled results that have been developed already meet the timetabling criteria. In addition, this system it is very useful to avoid the occurrence of timetabling errors like the same 2 lecturers assigned to examine 2 different students at the same time or errors in taking into account the requirements of the Higher Education Service.

V. CONCLUSIONS AND RECOMMENDATION

A web-based thesis exams timetabling system was developed to help alleviate the task of the program coordinator in drafting a thesis exam timetable that usually takes a lot of time for having to do a lot of checking [9]. The web-based system developed can generate a thesis exam timetable proposal automatically by taking into account all the requirements set in the department of Informatics

Engineering Ubaya. The requirements set in the preparation of the thesis examination in Informatics Engineering Ubaya are the availability of room, the schedule provided by the lecturer, the minimum requirements for functional positions that must be possessed by the examining lecturer, the number of examiners, the suitability of the scientific field of examiners with the thesis topic of the students tested and the equalization of the number of student being examined for every lecturer.

For students, the application is useful to improve the efficiency of time in the process of submission to take the thesis exam. Students do not need to come to the study program to seek supervisory approval, to submit the thesis exam requirements file, or to see announcements related to thesis exam timetable. In addition, the application is also useful for administrators to improve the efficiency of time and energy, because they no longer need to distribute lecturers' exam readiness form to each lecturer, no need to schedule time and exam room, and can directly check the completeness of the student requirements file without the need to search the file. The lecturers are also helped because there is no need to be pursued by students who want to get approval for thesis exams and can fill out the lecturers' exam readiness form and give their approval to take the thesis exam anywhere and anytime. Therefore, it can be concluded that the system developed can improve the efficiency of time, effort, and cost from various parties. For the future, applications can be developed in the direction of mobile so that it suits the current conditions, in which almost everyone has mobile devices.

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Session : Parallel Session 01
Location : Room 5 - The Denpasar Ball Room
Moderator : Dr. Sri trusta Sukaridhoto
Date : Monday, October 29th, 2018
Track : Knowledge Base and Engineering
Topic : E1

Time	ID Paper	Title	Author(s)
11.00-11.15	1570477748	Physical Exercise for The Elderly People using Kinect Technology	Intan Irnanda (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia); Fadilah Fahrul Hardiansyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
11.15-11.30	1570477750	Thesis Examination Timetabling using Genetic Algorithm	Susana Limanto (University of Surabaya, Indonesia); Tyrza Adelia (Universitas Surabaya, Indonesia); Njoto Benarkah (Universities Surabaya, Indonesia)
11.30-11.45	1570483453	Integrated Robotics Architecture with Kansei Computing: Proposal and Initial Prototype	Yoshiko Itabashi (Keio University, Keio Research Institute at SFC, Japan); Yasushi Kiyoki (Keio University, Japan)
11.45-12.00	1570483861	Message Passing Support for FLoW Microkernel	Ivan Pandu Setiawan and Sri trusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia)
12.00-12.15	1570483944	Development and Performance Testing of FLoWRTOS with Random Case: 3 Main Processes on The Head System of T-FLoW Robot	Agung Pambudi (Politeknik Elektronika Negeri Surabaya, EEPIS Robotics Research Center); Dadet Pramadihanto (PENS, Indonesia); Dimas Pristovani Riananda (Electronics Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia)

Session : Parallel Session 01
Location : Room 6 - The Jembrana Room
Moderator : Dr. Iwan Syarif
Date : Monday, October 29th, 2018
Track : Computational Intelligence
Topic : F1

Time	ID Paper	Title	Author(s)
11.00-11.15	1570477153	Estimation of A 3D Object Pose Using The Single Flexible Template	Dewi Mutiara Sari (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Vina Wahyuni Eka Putranti (MJIIT - Universiti Teknologi Malaysia, Malaysia)
11.15-11.30	1570477452	A Physical and Emotional Distance Calculation Method for Searching and Recommending Sightseeing Spots in Tour-Semantic Space	Kaito Kikuhara and Yasushi Kiyoki (Keio University, Japan)
11.30-11.45	1570477550	Pattern Recognition based on Probabilistic Neural Network for Motorcycle Oil Fault Diagnosis	Faisa Lailiyul Mutho'affifah, Zaqiatud Darojah and Endah Suryawati Ningrum (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.45-12.00	1570481261	Neural Networks Algorithm to Inquire Previous Preeclampsia Factors in Women with Chronic Hypertension During Pregnancy in Childbirth Process	Muhlis Tahir (Politeknik Elektronika Negeri Surabaya, Indonesia); Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Iwan Syarif (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
12.00-12.15	1570482628	Evaluation of Scholarly Performance Student Using Multi-Criteria Decision-Making with Objective Weight	Masna Wati and Niken Novirasari (Universitas Mulawarman, Indonesia); Herman Pakpahan (University of Mulawarman, Faculty of Computer Science and Information Technology (CSIT), Indonesia)

Session : Parallel Session 01
Location : Room 7 - The Tabanan Room
Moderator : Dr. Ali Ridho Barakbah
Date : Monday, October 29th, 2018
Track : Intelligent Multimedia Systems
Topic : G1

Time	ID Paper	Title	Author(s)
11.00-11.15	1570483063	3D Inventory Information System Game Technology Laboratory Using Structure Sensor	Agus Prastyo and Mohamad Safrudin (PENS, Indonesia); Artiarini Nurindiyani (Lecturer, Politeknik Elektronika Negeri Surabaya, Indonesia)
11.15-11.30	1570483463	Gesture 3D Modeling for Traditional Javanese Dance	Artiarini Nurindiyani (Lecturer, Politeknik Elektronika Negeri Surabaya, Indonesia); Fardani Annisa Damastuti (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.30-11.45	1570483782	Implementation of Facial Expression Recognition System For Selecting Fashion Item Based on Like and Dislike Expression	Lutfiyatul Anas and Nana Ramadijanti (Politeknik Elektronika Negeri Surabaya, Indonesia); Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.45-12.00	1570486246	First Person Shooter VR based Game On 10 November 1945 With Motion Controller	David Abdillah, Kholid Fathoni and Fahim Bagar (Politeknik Elektronika Negeri Surabaya, Indonesia)
12.00-12.15	1570483821	A Mental Health Database Creation Method with 2-Phase Correlation Computing	Venera Raneva (Keio University, Faculty of Media and Governance, Japan); Yasushi Kiyoki (Keio University, Japan)

Session : Parallel Session 01
Location : Room 8 - The Klungkung Room
Moderator : Dr. Achmad Basuki
Date : Monday, October 29th, 2018
Track : Applied-Computing Sciences
Topic : H1

Time	ID Paper	Title	Author(s)
11.00-11.15	1570487337	A Composition-Based Image Retrieval Method for Environment-Visualization with Images and Spatio-Temporal Information	Yuka Toyoshima (Keio University, Japan); Yasuhiro Hayashi (Musashino University, Japan); Yasushi Kiyoki (Keio University, Japan)
11.15-11.30	1570489021	Facial Expression Recognition System for Analysis of Facial Expression Changes When Singing	Aditya Wardana (PENS, Indonesia); Nana Ramadijanti (Politeknik Elektronika Negeri Surabaya, Indonesia); Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.30-11.45	1570482379	Secure Attribute-Based Encryption With Access Control to Data Medical Records	Novi Fitri (Politeknik Elektronika Negeri Surabaya, Indonesia); M. Udin Harun Al Rasyid and Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)
11.45-12.00	1570483258	A Context-based Knowledge Acquisition System for Understanding Relations between Endangered Species and Daily Phenomena	Sari Inoue, Shiori Sasaki and Yasushi Kiyoki (Keio University, Japan)
12.00-12.15	1570483558	Application For Rehabilitation Of Fine Movement On Hand For Post-Stroke Patients Using Myo Armband	Muhammad Widodo and Moh. Zikky (Politeknik Elektronika Negeri Surabaya, Indonesia); Artiarini Nurindiyani (Lecturer, Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 02
Location : Room 5 - The Denpasar Ball Room
Moderator : Dr. Shiori Sasaki
Date : Monday, October 29th, 2018
Track : Knowledge Base and Engineering
Topic : E2

Time	ID Paper	Title	Author(s)
16.00-16.15	1570483819	A Regional-Diversity- Corresponding Real Estate Information Search & Evaluation System	Haruki Honda and Shiori Sasaki (Keio University, Japan); Yasuhiro Hayashi (Keio University, Graduate School of Media and Governance, Japan); Yasushi Kiyoki (Keio University, Japan)
16.15-16.30	1570486596	Making Short Movie using 3D Professional Camera	Hestiasari Rante and Fardani Annisa Damastuti (Politeknik Elektronika Negeri Surabaya, Indonesia); Dadet Pramadihanto (PENS, Indonesia); Muhammad Ali Akbar (Politeknik Elektronika Negeri Surabaya, Indonesia)
16.30-16.45	1570486819	A Multi-dimensional Visualization Method for Disaster Analysis on 5D World Map System	Asako Uraki, Shiori Sasaki and Yasushi Kiyoki (Keio University, Japan)
16.45-17.00	1570487204	Identification of Poisonous Fungi Basidiomycota Macro Based on Mobile Device Using Neural Network	Meilani Wulandari (Politeknik Elektronika Negeri Surabaya, Indonesia); Entin Martiana Kusumaningtyas (Politeknik Elektronika Negeri Surabaya(PENS)-Indonesia, Indonesia); Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia)
17.00-17.15	1570487308	Heart Abnormalities Detection Through Iris Based on Mobile	Febriana D. Kusuma (Politeknik Elektronika Negeri Surabaya, Indonesia); Entin Martiana Kusumaningtyas (Politeknik Elektronika Negeri Surabaya(PENS)-Indonesia, Indonesia); Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 02
Location : Room 6 - The Jembrana Room
Moderator : Dr. Ryosuke Konishi
Date : Monday, October 29th, 2018
Track : Computational Intelligence
Topic : F2

Time	ID Paper	Title	Author(s)
16.00-16.15	1570483257	Indonesian Vehicle License Plate Number Detection using Deep Convolutional Neural Network	Hasan Imaduddin, Muhamad Khoirul Anwar and Muhammad Ilham Perdana (Politeknik Elektronika Negeri Surabaya, Indonesia); Indra Adji Sulistijono (Politeknik Elektronika Negeri Surabaya (PENS), Electronics Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Anhar Risnumawan (Politeknik Elektronika Negeri Surabaya, Indonesia)
16.15-16.30	1570483543	Estimating Adaptive Individual Interests and Needs Based on Online Local Variational Inference for a Logistic Regression Mixture Model	Ryosuke Konishi and Fumito Nakamura (Generic Solution Corporation, Japan); Yasushi Kiyoki (Keio University, Japan)
16.30-16.45	1570483565	Automatic Breast Tumor Segmentation Using Hierarchical K-means on Mammogram	Nana Ramadijanti, Farida Husna and Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia)
16.45-17.00	1570483902	Semantic Video Recommendation System Based on Video Viewers Impression From Emotion Detection	Darari Nur Amali and Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia); Adnan Rachmat Anom Besari (Politeknik Elektronika Negeri Surabaya (PENS), Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Dias Agata (Politeknik Elektronika Negeri Surabaya, Indonesia)
17.00-17.15	1570483932	Synthesis of Neural Oscillator based Dynamic Rhythmic Generation in Quadruped Robot Locomotion	Azhar Aulia Saputra and Naoyuki Kubota (Tokyo Metropolitan University, Japan)

Session : Parallel Session 02
Location : Room 7 - The Tabanan Room
Moderator : Dr. Yasuhiro Hayashi
Date : Monday, October 29th, 2018
Track : Intelligent Multimedia Systems
Topic : G2

Time	ID Paper	Title	Author(s)
16.00-16.15	1570483904	Moving Object Velocity Detection Based on Motion Blur on Photos Using Gray Level	Julio Dwicahya and Nana Ramadijanti (Politeknik Elektronika Negeri Surabaya, Indonesia); Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)
16.15-16.30	1570483938	Mobile Visual Programming Apps for Internet of Things Applications based on Raspberry Pi 3 Platform	Ricky Setiawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Adnan Rachmat Anom Besari (Politeknik Elektronika Negeri Surabaya (PENS), Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Iwan Kurnianto Wibowo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Muh Rifqi Rizqullah (Politeknik Elektronika Negeri Surabaya, Indonesia); Dias Agata (Politeknik Elektronika Negeri Surabaya, Indonesia)
16.30-16.45	1570485245	Jamarat Ritual Simulation with Myo Armband for Precise Throws Speed	Iqbal Sabilirasyad (University of Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Moh. Zikky and Rizky Yuniar Hakkun (Politeknik Elektronika Negeri Surabaya, Indonesia)
16.45-17.00	1570487286	3D Visualization and Emerge 3D Model Human Body of Javanese Dance	Fardani Annisa Damastuti (Politeknik Elektronika Negeri Surabaya, Indonesia); Artiarini Nurindiyani (Lecturer, Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 02
Location : Room 8 - The Klungkung Room
Moderator : Dr. Riyanto Sigit
Date : Monday, October 29th, 2018
Track : Applied-Computing Sciences
Topic : H2

Time	ID Paper	Title	Author(s)
16.00-16.15	1570483666	Implementation of Microservice Architectures on SEMAR Extension For Air Quality Monitoring	Yohanes Panduman and Mochamad Rifki UIil Albaab (Politeknik Elektronika Negeri Surabaya, Indonesia); Adnan Rachmat Anom Besari (Politeknik Elektronika Negeri Surabaya (PENS), Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia); Anang Tjahjono (Pens, Indonesia)
16.15-16.30	1570483733	Segmentation of Liver Using Abdominal CT Scan to Detection Liver Disease Area	Faizatul Himmah and Riyanto Sigit (Politeknik Elektronika Negeri Surabaya, Indonesia); Tri Harsono (Electronics Engineering Polytechnic Institute of Surabaya, Indonesia)
16.30-16.45	1570483750	Design and Implementation of Middleware System for IoT Devices based on Raspberry Pi	Muh Rifqi Rizqullah (Politeknik Elektronika Negeri Surabaya, Indonesia); Adnan Rachmat Anom Besari (Politeknik Elektronika Negeri Surabaya (PENS), Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Iwan Kurnianto Wibowo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Ricky Setiawan (Politeknik Elektronika Negeri Surabaya, Indonesia); Dias Agata (Poiliteknik Elektronika Negeri Surabaya, Indonesia)
16.45-17.00	1570483831	Strip Test Analysis Using Image Processing for Diagnosing Diabetes and Kidney Stone Based on Smartphone	Goestom Budianto (Politeknik Elektronika Negeri Surabaya, Indonesia); Tri Harsono (Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Heny Yuniarti (Politeknik Elektronika Negeri Surabaya, Indonesia)
17.00-17.15	1570483924	Fetal Head and Femur Detection from USG image to Estimate Gestational Age	Khusnul Danny Rahayu and Riyanto Sigit (Politeknik Elektronika Negeri Surabaya, Indonesia); Dias Agata (Poiliteknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Room 3 - The Denpasar Ball Room
Moderator : Dr. Takafumi Nakanishi
Date : Tuesday, October 30th, 2018
Track : Applied-Computing Sciences
Topic : C3

Time	ID Paper	Title	Author(s)
10.30-10.45	1570483941	Development of an e-Coin System for managing user's learning progress on different e-learning applications	Kohei Kamimura, Kazuki Naganuma and Kosuke Takano (Kanagawa Institute of Technology, Japan)
10.45-11.00	1570484636	Text Steganography on Sundanese Script using Improved Line Shift Coding	Henning Titi Ciptaningtyas (Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Indonesia); Radityo Anggoro (Institut Teknologi Sepuluh Nopember, Kumamoto University, Indonesia); Muhsin Fadhillah (Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Indonesia)
11.00-11.15	1570484670	Mobile Learning Media for Computer Science Course	Edy Budiman, Novianti Puspitasari, Masna Wati, Haeruddin Haeruddin, Joan Angelina Widians and Andi Tejawati (Universitas Mulawarman, Indonesia)
11.15-11.30	1570485895	Developing Web-Based English Reading-Aloud Practice App with Dictation Method Using Speech Recognition Technology	Aliv Faizal Muhammad (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Akhmad Alimudin (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.30-11.45	1570486209	Media-driven Real-time Content Management Framework and its Application to In-Class Thinking Support System	Takafumi Nakanishi (International University of Japan, Center for Global Communications(GLOCOM)/Musashi no University, Japan); Kyohei Matsumoto (GLOCOM, International University of Japan, Japan); Toshitada Sakawa (Sakawa Co., Ltd., Japan); Kengo Onodera (TerraLin Create Co., Ltd., Japan); Shinichiro Orimo and Hiroyuki Kobayashi (Hirayama Elementary School, Hino City, Japan)

Session : Parallel Session 03
Location : Room 4 - The Denpasar Ball Room
Moderator : Dr. M. Udin Harun Al Rasyid
Date : Tuesday, October 30th, 2018
Track : Applied-Computing Sciences
Topic : D3

Time	ID Paper	Title	Author(s)
10.30-10.45	1570486437	Visualization of Gathering Sources of News by Journalist	Hestiasari Rante, Muhammad Agus Zainuddin, Fardani Annisa Damastuti and Mudli'ul Wahdaniyah (Politeknik Elektronika Negeri Surabaya, Indonesia)
10.45-11.00	1570486532	Auto Cropping For Application of Pancreas Abnormality Detection In Order To Recognize Diabetes Mellitus Through Iris Based on Mobile Devices	Entin Martiana Kusumaningtyas (Politeknik Elektronika Negeri Surabaya(PENS)-Indonesia, Indonesia); Ali Ridho Barakbah (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.00-11.15	1570486835	Brain Tumor Segmentation to Calculate Percentage Tumor Using MRI	Annisa Wulandari, Riyanto Sigit and Mochamad Mobed Bachtiar (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.15-11.30	1570486989	Learning Batik through Gaming	Hestiasari Rante (Politeknik Elektronika Negeri Surabaya, Indonesia); Mohamad Saifrodin (PENS, Indonesia)
11.30-11.45	1570487055	Anomalous Data Detection in WBAN Measurements	M. Udin Harun Al Rasyid and Fajar Setiawan (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Isbat Uzzin Nadhori (Politeknik Elektronika Negeri Surabaya - Indonesia, Indonesia); Amang Sudarsono (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Ni'am Tamami (Politeknik Elektronika Negeri Surabaya, Indonesia)

Session : Parallel Session 03
Location : Room 5 - The Denpasar Ball Room
Moderator : Dr. Tessy Badriyah
Date : Tuesday, October 30th, 2018
Track : Knowledge Base and Engineering
Topic : E3

Time	ID Paper	Title	Author(s)
10.30-10.45	1570488512	Virtual Hand: VR Hand Controller Using IMU and Flex Sensor	Hilman Mochamad, Dwi Kurnia Basuki and Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia)
10.45-11.00	1570488578	Implementation of Enterprise Resource Planning Development In Cosmetic Company Cosme Centre Surabaya	Kholid Fathoni and Festy Fildia Siswanto (Politeknik Elektronika Negeri Surabaya, Indonesia); Jauari Hasim (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
11.00-11.15	1570489120	IUGR (Intra Uterine Growth Restriction) Diagnosis on the Pregnancy using Naive Bayes method	Tessy Badriyah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Nadia Savitri (Politeknik Elektronika Negeri Surabaya, Indonesia); Umi Saadah (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
11.15-11.30	1570472822	An Incremental Episodic Memory Framework for Robot Sensorimotor Map Building	Wei Hong Chin and Azhar Saputra (Tokyo Metropolitan University, Japan); Yuichiro Toda (Okayama University, Japan); Naoyuki Kubota (Tokyo Metropolitan University, Japan)
11.30-11.45	1570475293	Visualization of Time Series Change on GDP Per Electricity by Provinces in Indonesia	Yukari Shiota (Gakushuin University, Japan); Alfian Presekal (Universitas Indonesia, Indonesia); Riri Fitri Sari (University of Indonesia, Indonesia)

Session : Parallel Session 03
Location : Room 6 - The Jembrana Room
Moderator : Dr. Bima Sena Bayu Dewantara
Date : Tuesday, October 30th, 2018
Track : Computational Intelligence
Topic : F3

Time	ID Paper	Title	Author(s)
10.30-10.45	1570485825	Detection of Oil Condition on Motorcycle Based on Sound Signal Analysis	Febrina Syafitri, Endah Suryawati Ningrum and Zaqiatud Darojah (Politeknik Elektronika Negeri Surabaya, Indonesia)
10.45-11.00	1570486495	Faster R-CNN Implementation Method for Multi-Fruit Detection Using Tensorflow Platform	Hasan Basri (Politeknik Elektronika Negeri Surabaya, Indonesia); Iwan Syarif (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia); Sritrusta Sukaridhoto (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.00-11.15	1570489024	Early Warning and IoT-based Reporting System for Mobile Trash Bin Robot Application	Kisron Kisron and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Fernando Ardilla (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
11.15-11.30	1570477465	Tracks Record's Behaviour of Virtual Tawaf Simulation using A* Algorithm and RVO Sensor	Moh. Zikky (Politeknik Elektronika Negeri Surabaya); M Jainal Arifin and Kholid Fathoni (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.30-11.45	1570477773	Developing Automatic Action Camera Holder using 3D Anaglyph for Creating 3D Video	Ragil Tawakal (Politeknik Elektronika Negeri Surabaya, Indonesia); Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia); Akemad Ragel and Nur Wulandari (Politeknik Elektronika Negeri Surabaya, Indonesia)
11:45 - 12:00	1570481487	An Implementation of Data Exchange in Environmental Monitoring Using Authenticated Attribute-Based Encryption with Revocation	Munysi Munysi (Universitas Muhammadiyah Banjarmasin, Indonesia); Amang Sudarsono and M. Udin Harun Al Rasyid (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Session : Parallel Session 03
Location : Room 7 - The Tabanan Room
Moderator : Dr. Tri Harsono
Date : Tuesday, October 30th, 2018
Track : Applied-Computing Sciences
Topic : G3

Time	ID Paper	Title	Author(s)
10.30-10.45	1570487088	Cloud Satellite Image Segmentation using Meng Hee Heng K-Means and DBSCAN Clustering	Nailus Sa'ada, S (Politeknik Elektronika Negeri Surabaya, Indonesia); Tri Harsono (Electronics Engineering Polytechnic Institute of Surabaya, Indonesia); Achmad Basuki (Politeknik Elektronika Negeri Surabaya, Indonesia)
10.45-11.00	1570487138	Fuzzy Logic and Exponential Smoothing for Mapping Implementation of Dengue Haemorrhagic Fever in Surabaya	Muhammad Mufid (Electronic Engineering Polytechnic Institute of Surabaya (EEPIS), Indonesia); Nilla Saginta Putri (Politeknik Elektronika Negeri Surabaya, Indonesia); Arna Fariza (Politeknik Elektronika Negeri Surabaya, Indonesia); Muarifin M (Politeknik Elektronika Negeri Surabaya, Indonesia)
11.00-11.15	1570487144	Visual-based trash detection and classification system for smart trash bin robot	Irfan Salimi and Bima Sena Bayu Dewantara (Politeknik Elektronika Negeri Surabaya, Indonesia); Iwan Kurnianto Wibowo (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
11.15-11.30	1570488408	Online Video Conference System Using WebRTC Technology for Distance Learning Support	Akhmad Alimudin (Politeknik Elektronika Negeri Surabaya, Indonesia); Aliv Faizal Muhammad (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia)
11.30-11.45	1570488452	Distribution System for Perishable Farming Product	Isbat Uzzin Nadhori (Politeknik Elektronika Negeri Surabaya - Indonesia, Indonesia); Ahmad Syauqi Ahsan (Politeknik Elektronika Negeri Surabaya, PENS, Indonesia)
11.45-12.00	1570488583	Gas Billing System based on Automatic Meter Reading on Diaphragm Gas Meter with Email Notification	Fuad Irhandi Wiratama, Moch Syaifuddin, Iwan Kurnianto Wibowo and Fernando Ardilla (Electronic Engineering Polytechnic Institute of Surabaya, Indonesia); Andi Purnomo (PT. Citra Nusantara Energi, Indonesia)



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CERTIFICATE OF PARTICIPATION

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Susana Limanto | Njoto Benarkah | Tyrza Adelia

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