LEMBAR

HASI	L PEN	NILAIAN SEJAWAT SI KARYA ILMIAH :	EBID JURI	ANG ATAU <i>PEER REVIEW</i> NAL ILMIAH
Judul Jurnal Ilmiah (Artikel) Jumlah Penulis Status Pengusul Identitas Jurnal Ilmiah	: Pe	reet Mark Detection Usin orang enulis Pertama		spberry PL for Self-Driving System
odilai ililiai	: a. b.	Nama Jurnal Nomor ISSN	; ;	TELKOMNIKA (Q3) Link: https://www.scimagojr.com/journalsearch.php?q=2110025610 1&tip=sid&clean=0 1693-6930 accredited Aby DIKTI, Decree No. 58/DIKTI/Kep/2013
	c. d. e. f.	Vol, No., Bln Thn Penerbit DOI artikel (jika ada) Alamat web jurnal Alamat Artikel	: : : : : : : : : : : : : : : : : : : :	(Terakreditasi Dikti Peringkat 1) Vol. 16 No. 2 April 2018, Hal: 629 - 634 Universitas Ahmad Dahlan Yogyakarta 10.12928/TELOKMNIKA v16i2.4509 http://telkomnika.com/ http://www.journal.uad.ac.id/index.php/TELKOMNIKA/artic">https://goo.gl/wGK2ow
	g.	Terindex	:	c/view/4509/pdf 643 Url Turnitin: (10%) https://goo.gl/kDGheV Indexed by SCOPUS (https://www.scopus.com/sourceid/21100256101?origin=recodpage)
Kategori Publikasi Jurnal Ilmia (beri ✓pada kategori yang tepa	ıh t)	: Jurnal Ilmiah Jurnal Ilmiah		nasional onal Terakreditasi

	Nilai	Nilai Maksimal Jurnal Ilmiah				
Komponen Yang Dinilai	Internasiona	Nasional I Terakreditasi	Nasional Tidak Terakreditasi	Nilai Akhir Yang Diperoleh		
 Kelengkapan unsur isi jurnal (1 	0%) 4,00			3		
Ruang lingkup dan kedalaman pembahasan (30%)	12,00			10		
 Kecukupan dan kemutahiran data/informasi dan metodologi 	12,00			12		
d. Kelengkapan unsur dan kualitat terbitan/jurnal (30%)	12,00			12		
Total = (100%) 36,5 \times 0,6 = 210	40,00			00		

Catatan Penilaian artikel oleh Reviewer:
1. Kesesuaian dan kelengkapan unsur isi jurnal: 161 Jurnal in plah memenuhi keleng
kapan jauking school jurnal ([mah, unjur] jurnal juga telah se suai dan linkron. Judul, abetrah, pen John Lan Sampin hemmpulan 2. Ruang lingkup dan kedalaman pembahasan: lengkap. Nilai = 3
- stand median reduction points and stand
Deen bahasan SIM Jumalini relate lurang terutama Analia
Peen baharan d/m gurnd ini relat luurang terutama Anahin hazi (tangat Minim, pengunan juga netaht Minim. Nilai zo 3. Kecukupan dan kemutakhiran data/informasi dan metodologi: me fo de ya di gurahan dhim puhran ini cahap mutahan, referensi ya tigunahan juga felah menculuppi. Nilai 12. 4. Kelengkapan unsur dan kualitas terbitan: kritar jurnal m relat berhuahtan dan unjur-unjurnya felah lengkap: Cover, pewan relaksian deftor 165 seuma tangkap: Cover, pewan relaksian
3. Kecukupan dan kemutakhiran data/informasi dan metodologi:
Man hela sun this contents mutachtica and se gg a granding
21 Canadan Martin Va Vioninghan
onga telah monowhypi. Milai 12 11 9 11
4. Kelengkapan unsur dan kualitas terbitan:
dan unanc- unantara blat land minoci ili regort por mulita
den dille as a good rengliay: Cover bewan he takes
server sema memenati sparat zurnal climich. Milai =
Semarang,
Review#r 1,

Dr. Iwan Setiawan, ST, MT NIP. 197309262000121001

Unit Kerja: Teknik Elektro FT UNDIP

LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW* KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel) Jumlah Penulis	:		eet N		etect	ion Using	Respber	ry PL for Self-Di	riving System		
Status Pengusul	:	Per	ıulis	Pertan			: TELKOMNIKA (Q3) Link:				
Identitas Jurnal Ilmiah	:	a. Nama Jurnal					https://www.scimagojr.com/journalsearch.php?q=211002561				
		b. Nomor ISSN			1693-6930 accredited Aby DIKTI, Decree No.						
							58/DIKTI/Kep/2013 (Terakreditasi Dikti Peringkat 1)				
		c.		l, No.,	Bln [Γhn	· Vol.	16 No. 2 April 20	18 , Hal : 629 - 634		
		d. e.		nerbit	انا) ام	ka ada)	: Univ	versitas Ahmad Dal 2928/TELOKMNI	KA v16i2.4509		
		f.	Ala	amat w	eb ju	rnal	http	://telkomnika.com/			
			Ala	amat A	rtike	1	: <u>http</u> http	s://goo.gl/wGK2ow ://www.journal.uad	/ .ac.id/index.php/TE	LKOMNIKA/articl	
							e/vio	ew/4509/pdf 643	s://goo.gl/kDGheV		
		g.	Te	rindex			. Inda	and by SCOPIIS			
		<i>J</i>					(http dpag		m/sourceid/211002	56101?origin=recor	
Kategori Publikasi Jurnal Ilm			: [\Box		al Ilmiah I	nternasi	onal			
(beri √pada kategori yang ter	at)			\vee	Jurn	al Ilmiah I al Ilmiah I	Nasional Nasional	Terakreditasi Tidak Terakredit	asi		
Hasil Penilaian Peer Review :			١		Juin			aksimal Jurnal			
							Milai W	Nasional National	Nasional	Nilai Akhir	
Kompo						Interna	sional	Terakreditasi	Tidak	Yang	
Yang Dia	nilai					_	7		Terakreditasi	Diperoleh	
										3	
a. Kelengkapan unsur b. Ruang lingkup dan				0%)		4,0 12,0					
pembahasan (30%)										6/	
c. Kecukupan dan ker data/informasi dan				30%)		12,	00			<i>c</i> /	
d. Kelengkapan unsur						12,0	00			(/	
terbitan/jurnal (30%) Total = (100%)	ó)					40,0	00			7/	
$\frac{36.5 \times 0.6}{36.5 \times 0.6} = 21.9$						40,	-			7/6	
-\ Veresusian den keleng	lan.	an. 11	ทยม	r ici im	rnak	- 4 (olas	- ners	lulvan	, metode,	
Liani on	W/	ella La	De la		000	N/Z	Cooch	julan			
from on	pev				<i>r</i> \vee	0 15	uey w	y acc		They	
b) Ruang lingkup dan ked	alai	nan L	pen	1bahas	an:	1 MG	Las	Cour.	Melana	, 40 -	
b) Ruang lingkup dan kedalaman pembahasan: Washington of Celler washown. I have a tetry Buller In leav First wash defelse. C) Kecukupan dan kemutakhiran data/informasi dan metodologi: 20 1 2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4											
c) Kecukupan dan kemutakhiran data/informasi dan metodologi:											
c) Kecukupan dan kemutakhiran data/informasi dan metodologi: Jafa Dan poulatan Cules Intollier or frejir be degr pel venn y chapin bestr herror on's talkum											
d) Kelengkanan unsur dar	d) Kolongkapan ungur dan kutalitas tarbitas									les	
waiter fe	d) Kelengkapan unsur dan kwalitas terbitan: Walia a Justi kali la								1/		
J. Merra	d) Kelengkapan unsur dan kvalitas terbitan: Waltas forta itan Jagus. Waledah Jiputh kasi len J. Jeval y. Ceralibed tas dilut dan teruseh							All			
& scoper	1	a	3					_			
, ,		`						Semarang, Reviewer 2			

Dr. Wahyudi, S.T., M.T. NIP. 196906121994031001

Unit Kerja: Teknik Elektro FT UNDIP

LEMBAR HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW KARYA ILMIAH: JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)

Street Mark Detection Using Respherry PL for Self-Driving System

Jumlah Penulis

Status Pengusul

Penulis Pertama :

Identitas Jurnal Ilmiah

Nama Jurnal a.

TELKOMNIKA (Q3) Link:

https://www.scimagojr.com/journalsearch.php?q=2110025610

1&tip=sid&clean=0

Nomor ISSN

1693-6930 accredited Aby DIKTI, Decree No.

58/DIKTI/Kep/2013

(Terakreditasi Dikti Peringkat 1)

Vol, No., Bln Thn C.

Vol. 16 No. 2 April 2018 , Hal : 629 - 634 Universitas Ahmad Dahlan Yogyakarta

d. Penerbit

10.12928/TELOKMNIKA v16i2.4509

DOI artikel (jika ada)

http://telkomnika.com/

Alamat web jurnal Alamat Artikel

https://goo.gl/wGK2ow

http://www.journal.uad.ac.id/index.php/TELKOMNIKA/articl

e/view/4509/pdf_643

Url Turnitin: (10%) https://goo.gl/kDGheV

Terindex

Indexed by SCOPUS

(https://www.scopus.com/sourceid/21100256101?origin=recor

dpage)

Kategori Publikasi Jurnal Ilmiah (beri ✓ pada kategori yang tepat)

Jurnal Ilmiah Internasional Jurnal Ilmiah Nasional Terakreditasi

Jurnal Ilmiah Nasional Tidak Terakreditasi

Hacil Danilaian Dage Pavious

Hasii Penilalan Peer Review:	Nilai F		
Komponen Yang Dinilai	Reviewer I	Reviewer II	Nilai Rata-rata
a. Kelengkapan unsur isi jurnal (10%)	3	3	3
b. Ruang lingkup dan kedalaman pembahasan (30%)	10	11	10,5
 Kecukupan dan kemutahiran data/informasi dan metodologi (30%) 	12	U.	11,5
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12	1/	145
Total = (100%)	37	36	3615

Reviewer 2

Dr. Wahyudi, S.T., M.T. NIP. 196906121994031001

Unit Kerja: Teknik Elektro FT UNDIP

Reviewer

Semarang,

Dr. Iwan Setiawan, ST, MT NIP. 197309262000121001

Unit Kerja: Teknik Elektro FT UNDIP

5/2/2019 Vol 16, No 2



TELKOMNIKA

felecommunication, Computing, Electronics and Control 884: 1663-6860, e-1884: 2202-8283



forestition. The Cause by Kinfeey of Paper thy Technology and Plighar Leutschm, Republic of Postnesis, Grende Rock (1908–1908).

HOME ABOUT USER HOME SEARCH CURRENT ARCHIVES

ANNOUNCEMENTS

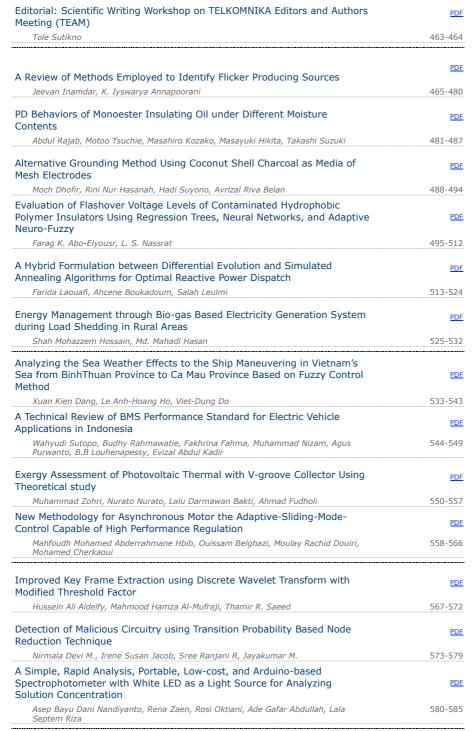
Home > Archives > Vol 16, No 2

Vol 16, No 2

April 2018

DOI: http://dx.doi.org/10.12928/telkomnika.v16i2

Table of Contents



USER You are logged in as...

- sumardi1968My JournalsMy Profile
 - Log Out

ICW-TELKOMNIKA

2019 ICW-TELKOMNIKA International Conference

JOURNAL METRICS



• Author Guideline • Editorial Boards • Reviewers • Online Submissions • Abstracting and Indexing • Publication Ethics • Visitor Statistics • Contact Us

JOURNAL HARDCOPY

Order journal prints (hardcopy) <<click in here>>



PDF

Design of Negative Resistance Oscillator with Rocord Low Phase Noise

5/2/2019 Vol 16, No 2

Ayoub Malki, Jamal Zbitou, Larbi El Abdellaoui, Mohamed Latrach, Abdelali Tajmouati, Ahmed Errkik	586-593
Design and Analysis of Ku/K-band Circular SIW Patch Antenna using 3D EM-based Artificial Neural Networks	PDF
Mohammed Chetioui, Abdelhakim Boudkhil, Nadia Benabdellah, Nasreddine Benahmed	594-599
Design MIMO 1x8 Antenna for Future 5G Applications	PDF
Yusnita Rahayu, Muhammad Rifqy Asrul, Tulus Rahayu	600-605
A Specific Routing Protocol for Flying Adhoc Network Bashir Olaniyi Sadiq, Adewale Emmanuel Adedokun, Mohammad Bashir Mu'azu, Yusuf	PDF 606-617
Abubakar Sha'aban Varying Effects of Temperature and Path-length on Ozone Absorption	PDF
Cross-Section Enenche Patrick, Michael David, A.O. Caroline, Mohd Haniff Ibrahim, Sevia Mahdaliza Idrus, Tay Ching En Marcus	618-623
	PDF
Towards Improving Road Safety using Advanced Vehicular Networks Wajeb Gharibi, Nasrullah Armi	624-628
najec orienta) recentariam	02.1.020
Street Mark Detection Using Raspberry PI for Self-Driving System	PDF
Sumardi Sumardi, Muhammad Taufiqurrahman, Munawar A Riyadi	629-634
Accumulator Charging Control with Piezoelectric Based on Fuzzy Algorithm	PDF
Scheduling Iswanta Iswanta Wahuu Sari Asustiningsih Faaris Mujaahid Behmansuah	
Iswanto Iswanto, Wahyu Sari Agustiningsih, Faaris Mujaahid, Rohmansyah Rohmansyah, Aris Budiman	635-640
Multivariable Parametric Modeling of a Greenhouse by Minimizing the Quadratic Error	PDF
Mohamed Essahafi, Mustapha Ait Lafkih	641-647
Control Synthesis for Marine Vessels in Case of Limited Disturbances	PDF
Mikhail Smirnov, Maria A. Smirnova	648-653
Implementation of Controlled Robot for Fire Detection and Extinguish to Closed Areas Based on Arduino	PDF
Ihsan A. Taha, Hamzah M. Marhoon	654-664
Breast Mass Segmentation Using a Semi-automatic Procedure Based on Fuzzy C-means Clustering	PDF
Moustapha Mohamed Saleck, Abdelmajid El Moutaouakkil, Mohammed Moucouf, Maksi Bouchaib, Hani Samira, Jamaldine Zineb	665-672
Bayesian Segmentation in Signal with Multiplicative Noise Using Reversible Jump MCMC	PDF
Suparman Suparman, Michel Doisy	673-680
Error Performance Analysis in Underwater Acoustic Noise With Non-Gaussian Distribution	PDF
Nor Shahida Mohd Shah, Yasin Yousif Al-Aboosi, Musatafa Sami Ahmed	681-689
Identification of Canaries Bird's Chirp Quality Using Statistic Analysis, Sound Analysis and Fuzzy Mamdani Method	PDF
Suhartono Suhartono	690-702
	PDF
Predicting the Spread of Acacia Nilotica Using Maximum Entropy Modeling Budi Arif Dermawan, Yeni Herdiyeni, Lilik Budi Prasetyo, Agung Siswoyo	703-712
The Effects of Segmentation Techniques in Digital Image Based Identification of Ethiopian Coffee Variety	PDF
Abrham Debasu Mengistu	713-717
Quality Translation Enhancement Using Sequence Knowledge and Pruning in Statistical Machine Translation	PDF
Media A. Ayu, Teddy Mantoro, Jelita Asean	718-727
	PDF
Improved Routing Protocol in Mobile Ad Hoc Networks Using Fuzzy Logic Seyed Amin Hosseini Seno, Ali Abdi Seyedkolaei	728-738
Real Time Face Recognition Based on Face Descriptor and Its Application I Gede Pasek Suta Wijaya, Ario Yudo Husodo, I Wayan Agus Arimbawa	PDF 739-746
	/ 33- /40
Motion Detection and Clustering Using PCA and NN in Color Image Sequence	PDF
Mourad Moussa, Nesrine Bdioui, Ali Douik	747-754

5/2/2019 Vol 16, No 2

Biometrics Authentication of Fingerprint with Using Fingerprint Reader and Microcontroller Arduino

v	
Magdin Martin, Koprda Štefan, Ferenczy Ľubor	755-765
Dranath, Exhibitian Dagician Cunnatt Cystem Based on Wah Application	PDF
Property Exhibition Decision Support System Based on Web Application Violitta Yesmaya, Angry Ronald, Monica Hidajat	766-770
Personal Security Tracking based on Android and Web Application	PDF
Angry Ronald, Violitta Yesmaya, Muhammad Danaparamita	771-775
	<u>PDF</u>
File Reconstruction in Digital Forensic	776 704
Opim Salim Sitompul, Andrew Handoko, Romi Fadillah Rahmat	776-794
Trend of NFC Technology for Payment Transaction	PDF
Edi Purnomo Putra, Fifilia Fifilia, Hanny Juwitasary	795-802
Occionand Archeire of a Broadcast National Union Legisla Commentation	PDF
Design and Analysis of a Broadcast Network Using Logical Segmentation Anyasi Francis, Uzairue Stanley, Enehizena O.N., Victor Matthews Olu, Amaize Peter,	803-810
Nsikan Nkordeh	
	<u>PDF</u>
Research on 4-dimensional Systems without Equilibria with Application	
Ruibin Hao, Lequan Min, Hongyan Zang	811-826
Tast and Accurate Spelling Correction Using Trie and Damerau-levenshtein Distance Bigram	PDF
Viny Christanti M., Rudy Rudy, Dali S. Naga	827-833
Data Cleaning Service for Data Warehouse: An Experimental Comparative Study on Local Data	PDF
Arif Bramantoro	834-842
Contance Extraction Recod on Contance Distribution and Part of Cheech	
Sentence Extraction Based on Sentence Distribution and Part of Speech	PDF
Fagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna	PDF 843-851
agging for Multi-Document Summarization	
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah	
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad	843-851
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech	843-851 PDF
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the	843-851
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm	843-851 PDF 852-861
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi	843-851 PDF 852-861
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Igmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation	843-851 PDF 852-861 PDF 862-867
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi	843-851 PDF 852-861 PDF 862-867
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU	843-851 PDF 852-861 PDF 862-867 PDF 868-875
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Oriver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem	843-851 PDE 852-861 PDE 862-867 PDE 868-875
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed	843-851 PDE 852-861 PDE 862-867 PDE
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput	843-851 PDE 852-861 PDE 862-867 PDE 868-875 PDE 876-882
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Igmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation	843-851 PDE 852-861 PDE 862-867 PDE 868-875
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Igmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 883-888
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Oriver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Igmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Kalman Filter Estimation of Impedance Parameters for Medium	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 883-888 PDF
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Igmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Kalman Filter Estimation of Impedance Parameters for Medium Transmission Line	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 883-888 PDF 889-899
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Oriver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Igmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Kalman Filter Estimation of Impedance Parameters for Medium	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 883-888 PDF
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Kalman Filter Estimation of Impedance Parameters for Medium Transmission Line Siti Nur Aishah Mohd Amin, Hamzah Ahmad, Mohd Rusllim Mohamed, Mohd Mawardi	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 883-888 PDF 900-908
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Kalman Filter Estimation of Impedance Parameters for Medium Transmission Line Siti Nur Aishah Mohd Amin, Hamzah Ahmad, Mohd Rusllim Mohamed, Mohd Mawardi Saari, Omar Aliman Reduced-reference Video Quality Metric Using Spatio-temporal Activity Information	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 889-899 PDF 900-908
Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Decure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Densor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Calman Filter Estimation of Impedance Parameters for Medium Transmission Line Siti Nur Aishah Mohd Amin, Hamzah Ahmad, Mohd Rusllim Mohamed, Mohd Mawardi Saari, Omar Aliman Reduced-reference Video Quality Metric Using Spatio-temporal Activity Information Farah Diyana Abdul Rahman, Ahmad Imran Ibrahim, Dimitris Agrafiotis	843-851 PDE 852-861 PDE 862-867 PDE 868-875 PDE 876-882 PDE 883-888 PDE 889-899 PDE
Tagging for Multi-Document Summarization Agus Zainal Arifin, Moch Zawaruddin Abdullah, Ahmad Wahyu Rosyadi, Desepta Isna Ulumi, Aminul Wahib, Rizka Wakhidatus Sholikah Driver Behaviour State Recognition based on Speech Norhaslinda Kamaruddin, Abdul Wahab Abdul Rahman, Khairul Ikhwan Mohamad Halim, Muhammad Hafiq Iqmal Mohd Noh Secure E-voting System by Utilizing Homomorphic Properties of the Encryption Algorithm Rifki Suwandi, Surya Michrandi Nasution, Fairuz Azmi Sensor Fusion Algorithm by Complementary Filter for Attitude Estimation of Quadrotor with Low-Cost IMU A. Noordin, M. A. M. Basri, Z. Mohamed Tree Physiology Optimization in Constrained Optimization Problem A. Hanif Halim, I. Ismail Finite Element Simulation of Microfluidic Biochip for High Throughput Hydrodynamic Single Cell Trapping Amelia Ahmad Khalili, Mohd Ariffanan Mohd Basri, Mohd Azhar Abdul Razak Fuzzified Single Phase Automatic Sequential Reactive Power Compensation with Minimized Switches K. Shashikumar, C. Venkataseshaiah, K. S. Sim Kalman Filter Estimation of Impedance Parameters for Medium Transmission Line Siti Nur Aishah Mohd Amin, Hamzah Ahmad, Mohd Rusllim Mohamed, Mohd Mawardi Saari, Omar Aliman Reduced-reference Video Quality Metric Using Spatio-temporal Activity Information	843-851 PDF 852-861 PDF 862-867 PDF 868-875 PDF 876-882 PDF 889-899 PDF 900-908

TELKOMNIKA Telecommunication, Computing, Electronics and Control ISSN: 1693-6930, e-ISSN: 2302-9293
Universitas Ahmad Dahlan, 4th Campus, 9th Floor, LPPI Room
Jl. Ringroad Selatan, Kragilan, Tamanan, Banguntapan, Bantul, Yogyakarta, Indonesia 55191
Phone: +62 (274) 563515, 511830, 379418, 371120 ext. 4902, Fax: +62 274 564604



This work is licensed under a <u>Creative Commons Attribution-NonCommercial 4.0 International License</u>.

5/2/2019 Vol 16, No 2

01655327

View TELKOMNIKA Stats



TELKOMNIKA



ABOUT USER HOME SEARCH ARCHIVES ANNOUNCEMENTS

Home > Vol 16, No 2 > Sumardi

Street Mark Detection Using Raspberry PI for Self-Driving System

Sumardi Sumardi, Muhammad Taufiqurrahman, Munawar A Riyadi

Abstract

Self driving is an autonomous vehicle that can follow the road with less human intervention. The development of Self driving is an autonomous vehicle that can follow the road with less human intervention. The development of self driving utilizes various methods such as radar, lidar, GPS, camera, or combination of them. In this research, street mark detection system was designed using webcam and raspberry-pi mini computer for processing the image. The image was processed by HSV color filtering method. The processing rate of this algorithm was 137.98 ms corresponding to 7.2 FPS. The self-driving prototype was found to be working optimally for "hue" threshold of 0-179, "saturation" threshold of 0-30, and "value" threshold of 200-255. Street mark detection has been obtained from the coordinates of street mark object which had range 4-167 on x axis and 4-139 on y axis. As a result, we have successfully built the street mark detection by COG method more effectively and smoothly in detection in comparison with Hough transform method.

Keywords

street mark detection; HSV color filtering; self-driving car;

Full Text:

PDF

DOI: http://dx.doi.org/10.12928/telkomnika.v16i2.4509

Article Metrics

Abstract view: 51 times

PDF - 53 times

Refbacks

There are currently no refbacks.

Copyright (c) 2018 Universitas Ahmad Dahlan

TELKOMNIKA Telecommunication, Computing, Electronics and Control

ISSN: 1693-6930, e-ISSN: 2302-9293 Universitas Ahmad Dahlan, 4th Campus, 9th Floor, LPPI Room

Jl. Ringroad Selatan, Kragilan, Tamanan, Banguntapan, Bantul, Yogyakarta, Indonesia 55191 Phone: +62 (274) 563515, 511830, 379418, 371120 ext. 4902, Fax: +62 274 564604



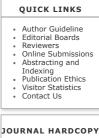
© S NO STATE OF THE STATE OF TH

01655328

View TELKOMNIKA Stats









Street Mark Detection Using Raspberry PI for Self-driving System

Sumardi*, Muhammad Taufigurrahman, Munawar A Riyadi

Department of Electrical Engineering Diponegoro University Jln. Prof. Sudharto, Tembalang, Semarang, Indonesia *Corresponding author, e-mail: sumardi.undip@gmail.com

Abstract

Self driving is an autonomous vehicle that can follow the road with less human intervention. The development of self driving utilizes various methods such as radar, lidar, GPS, camera, or combination of them. In this research, street mark detection system was designed using webcam and raspberry-pi mini computer for processing the image. The image was processed by HSV color filtering method. The processing rate of this algorithm was 137.98 ms correspondinig to 7.2 FPS. The self-driving prototype was found to be working optimally for "hue" threshold of 0-179, "saturation" threshold of 0-30, and "value" threshold of 200-255. Street mark detection has been obtained from the coordinates of street mark object which had range 4-167 on x axis and 4-139 on y axis. As a result, we have successfully built the street mark detection by COG method more effectively and smoothly in detection in comparison with Hough transform method.

Keywords: Street mark detection, HSV color filtering, COG, Self-driving car.

Copyright © 2018 Universitas Ahmad Dahlan. All rights reserved

1. Introduction

Self-driving is one type of car control that enables to drive with less human intervention. Self driving is helpful, for example when the driver suffers certain conditions that need to relinquish the steer, for injuries or fainting etc. The development of self-driving research is predicted to be complete and ready to be implemented in 2023 [1]. Development of the research on autonomous driving car has been done in many ways. The researches in self driving were conducted in various focus either in actual realization [2] or prototype scaled [3]. Several methods for collision avoidance applied lidar or camera [2],[4], while it could also included mini computer like raspberry pi which can process the image [4]. Moreover, there are various image processing for pattern recognition method like in filtering image, hough method, and determining the tracking references [5-7]. In terms of driving guidance, several methods has been developed, including the use of marked and unmarked lanes [8-11].

The usage of street mark for guidance is popular, e.g in [10],[12]. The road mark detection in [12] was using a camera processing images. They used Intel processor T5750 2.0 GHz clock speed that has processing time below 14 ms for single processing. However, they faced obstacles in determining the boundary line in unfavorable turn conditions. Although it could be overcome by applying either a spline or set of line to approximate lane border, but the turning road was hard to detect because they used Hough transform. The usage of a mini computer for image processing is preferred for effective dimension, cost, and performance according to Ujainiya et al [4].

To that extend, we conduct research on self-driving which can detect lane of the road or the street mark. We propose a design of 1:10 scale prototype of self-driving car with image processing from camera in raspberry pi 2. The purpose from this research is to deploy street mark detection method for self-driving sistem in the prototype. It determines the coordinate by COG (Center of Grafity) method of detection area in filtered image result acquired by single camera as was used in [12]. This paper does not pay attention to the illumination effect [7], but only specify the filter parameters with HSV method to detect street marks.

630 ■ ISSN: 1693-6930

2. Research Method

The street mark detection system design is based on the specification for self-driving system. The self-driving system requires street mark detection system that uses a vision sensor for autonomous car tracking system. Specifications to be achieved by prototype of self driving system, namely:

- a. using small dimension hardwares as a prototype with the 1:10 scale car and the maximum weight of 3 kg.
- b. able to see and capture the image from the camera in real time and can be repeated continuously.
- c. able to detect the street mark as white color around the black track.
- d. able to detect coordinates of street mark from the filtered images.

This project is built using mini computer raspberry pi 2 that has compact size, light weight and a 1GB RAM, quad-core processor. This computer is capable to process the image to detect the street mark. To detect street mark, raspberry pi 2 as mini computer must have a particular model of image processing that can perform color filtering. This project uses OpenCV as an image processing library to run HSV color filtering method. The prototype of designed autonomous car is shown in Figure 1.



Figure 1. Autonomous car prototype

Raspberry pi should be capable to take pictures from camera, run the library OpenCV for color filtering process, perform coordinate calculation and send data through serial. These tasks are done automatically and repeatedly using python programming. OpenCV is an image processing library that can perform color filtering process. The method used is HSV color filtering based on RGB color space, which is simpler than CMYK. HSV color filtering method has a color space that is mapped with 3 components: Hue, saturation, and value. The threshold is determined on the color space to detect the street mark of the surrounding environment.

Street mark detection system was developed using python programming language on a mini computer raspberry pi. The algorithm and flowchart for detection system is shown in Figure 2, consisting of the following tasks:

- a. Take pictures
- b. Separate components of HSV
- c. Thresholding
- d. Total the results thresholding HSV color space
- e. object detection
- f. Calculate the coordinates of the object
- g. Send the data via the serial

Figure 3 shows five windows for HSV color filtering in street mark detection that are Hue Filter as shown in Figure 3.a, Saturation Filter as shown in Figure 3.b, Value Filter as shown Figure 3.c which feature trackbar to set variable threshold minimum and maximum of each component filtering. The windows also show the results of each filter for hue, saturation, or value. Window in Figure 3.d shows results from the amount of the three processes hue,

saturation, and value to the results of the final filter that determines the HSV object is detected or not.

Once the object can be detected from HSV filter, then it performs the calculation of the coordinates of the detected object. Coordinate data then will be sent to the another controller (microcontroller) via serial communication. Figure 3.e shows the result of street mark tracked from the original image which was taken by the camera with the addition of a square shape at the origin of the object being detected in calculated coordinates.

The car prototype was designed with camera which have window view on yellow area as in Figure 4. The prototype has blank spot in front of it, up to 23.3 cm and has 40 degres of horizontal visibility. According to [11] [12], the captured image is obtained from light reflection to camera lens that is proportional with the distance. Therefore, the point coordinates is detected by obtaining the center of detection area with geometry method. The coordinate point (x,y) is obtained by calculating the center of gravity in the object detections with X0=M10/M00 and y0=M01/M00 [13]. Some results of the object detection and COG point are shown in Figure 5. The image is streamed directly, and the COG is simultaneously calculated. As a result, the self driving car can adjust the coordinate of street to follow it.

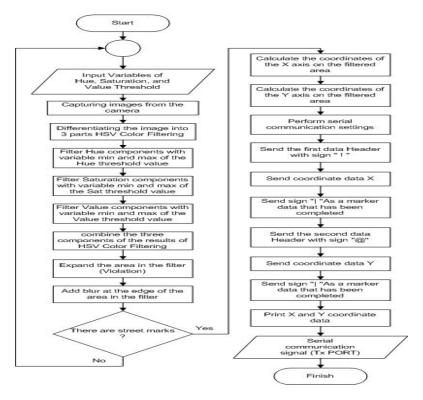


Figure 2. Flowchart of street mark detection system

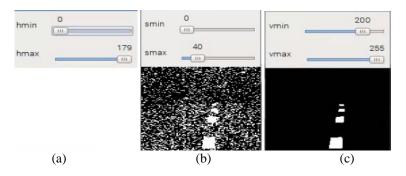


Figure 3. The interface of color filtering process in street mark detection System

632 ■ ISSN: 1693-6930

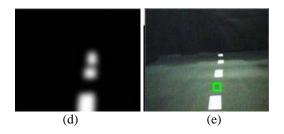


Figure 3. The interface of color filtering process in street mark detection System

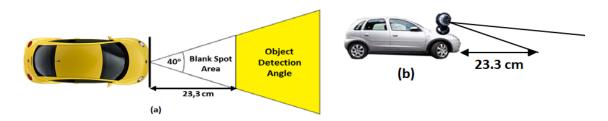


Figure 4. Detection areas in autonomous car prototype: (a) top view, (b) side view

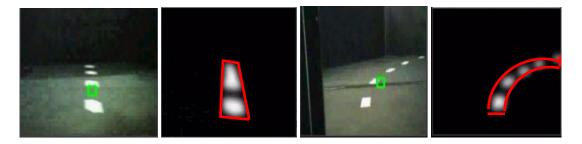


Figure 5. Detection areas and COG coordinates

3. Results and Analysis

3.1. Color Filtering Test

The digital image processing was built on Raspberry pi 2 based on python programming language and OpenCV library. To obtain the capabilities of color filter process, testing of color filtering was performed. The test was purported to detect the presence of white street mark from black background. The testing was done by calibrating the threshold of color filtering component (i.e hue, saturation, and value) in the image color space to the HSV color distribution method. This test also pay attention to the influence of the intensity of light or illumination provided at the time of testing color filtering. Illumination received by the camera affects the outcome of images that can change the color space coordinates so that the threshold filtering colors used might not be correct.

The image data is based on the input camera and color-filtered with HSV method. Trackbar is designed to be used in the calibration process of threshold filtering components of hue, saturation, and value. Data width of 8 bits was applied with value of 0 as minimum value and value of 255 as the maximum value that represents the coordinates based on the hue, saturation, and value of a color. In the OpenCV library, saturation and value is represented by 0 as the minimum and 255 as the maximum. The maximum value of saturation is the clear colors of red, green, or blue. Conversely, for smaller saturation value, the color is faded to whitey of the original color of red, green, or blue. Meanwhile, for the greater detected color value, the colors are bright, while small value turn to black.

The filter components of hue represent the coordinates of the original color of red, green, or blue to blend them in accordance with the 3D color space diagram. A mix of red,

green, and blue (RGB) values are represented in degree circle of 0-360 degrees. The range of hue value is represented by the value 0 as a minimum value and a maximum value 179. Trackbar is used in process color filtering. The variable of threshold hue filtering has a range of values from 0-179. The variable of saturation filtering has a range value of 0-255. Filtering and variable threshold value has a value range of 0-255.

a. Hue Filtering

The testing process is done by changing the hue filtering threshold value on the trackbar. Testing is done by finding the threshold value of the minimum to maximum and from maximum to minimum.

Table 1. The Result of Hue Threshold Calibration

Calibration	Min.Value	Max. Value	White Object	Black Object
Minimal to maximal	0	74	Not Detected	Detected
Maximal to minimal	78	179	Detected	Not Detected

Table 1 reveals the threshold filtering component for color hue. It can bee seen that the detection of black and white in hue component is not significant. This is because black and white are not basic colors, but a mixture of red, green, or blue. Black and white are valid on the value of any hue.

b. Saturation Filtering

Saturation testing process filtering is done by changing the threshold value on the trackbar. Testing is done by finding the threshold value of the minimum to maximum and from maximum to minimum. is input from a video camera in real time on the testing process filter saturation. From the testing of threshold filtering for component color saturation as seen in Table 2, the test shows that images of black color can be detected at maximum saturation threshold values and white color detection with minimal saturation threshold value.

Table 2. The Result of Saturation Threshold Calibration

Calibration	Saturation (min)	Saturation (max)	White Object	Black Object
Minimal to maximal	0	30	Detected	Not Detected
Maximal to Minimal	25	255	Not Detected	Detected

c. Value Filtering

The testing process value filtering is done by changing the threshold value on the trackbar. Testing is done by finding the threshold value of the minimum to maximum and from maximum to minimum. From the testing of threshold value for component color filtering as shown in Table 3, it is found that black color can be detected at a minimum value threshold value and the white color detection threshold value maximum value.

Table 3. The Result of Value Threshold Calibration

Value of min	Value of max	White Object	Black Object
0	203	Not Detected	Detected
200	255	Detected	Not Detected
	0	max 0 203	max 0 203 Not Detected

3.2. Test of object coordinate detection

Test of object coordinate detection is performed to check the ability of the system in detecting the presence of objects in the form of street mark based on the coordinates of the camera image filter. Coordinates are obtained from central point on the object of filtered area marked by a green square shape. Coordinate values of the x-axis and y-axis is 0 or minimal in the upper left corner in the image received by the camera. The test data corresponding to coordinate detection is shown in Table 4, while the reference coordinate axes x and y axis (0,0)

634 ■ ISSN: 1693-6930

is the upper left pixel of the image. This is the image modeled into a matrix of pixels possessed. The resolution used is 240x240 so that the maximum value of the x-axis is 240. In testing the value of the x-axis and y-axis maximum value is only about 160 for detecting a form of data taken is the center of the object. While the process of detection of the pixel area is limited to a minimum value to avoid detection of noise.

Table 4. The Result of coordinates object detection calibration

Calibration	X Value	Y Value	X position	Y position
1	94	86	Center	Center
2	167	70	Right	Center
3	7	73	Left	Center
4	98	4	Center	Тор
5	89	139	Center	Bottom
6	4	6	Left	Top
7	166	129	Right	Bottom

4. Conclusion

The street mark detection has been successfully built in Raspberry-pi 2 and can detect street marks and determining the tracking coordinate with COG method. Processing rate of this algorithm which runs on 900MHz quad-core ARM Cortex A7 is 136.48 ms or 7.2 FPS. The results of HSV threshold in calibration process is hue max=179, hue min=0, saturation max=30, saturation min=0, Value max=255, and the value min=200. The threshold value can detect a street marked with the coordinates with a range of 4-167 on the x axis and 4-139 on the y-axis. Set point of coordinates were obtained with calculation of COG point of filtered detected area in (X,Y). The street mark detection can provide prediction of the street mark in front either in straight lane or in turning lane.

References

- S. Devitt, S. Flannery, G. Locraft, A. Wood, K. Weiss, and A. Schenker. Autonomous Cars Self-Driving the New Auto Industry Paradigm, Morgan Stanley, 2013:1-109
- [2] H. Cho, Y. Seo, B. V. K. V. Kumar, and R. R. Rajkumar. A Multi-Sensor Fusion System for Moving Object Detection and Tracking in Urban Driving Environments, IEEE International Conference on Robotics & Automation, Hongkong, 2014: 1836–1843.
- [3] Mohomed, Iqbal. Self-driving Lego Mindstorms Robot, Proc. Python in science Conf. (SCIPY), 2012.
- [4] Ujjainiya, Lohit, M. K. Chakravarthi. Raspberry-Pi Based Cost Effective Vehicle Collision Avoidance System Using Image Processing, *ARPN J. Eng. Appl. Sci*, 2015; 10(7)
- [5] P. Zhao, J. Chen, Y. Song, X. Tao, T. Xu, and T. Mei. Design of a Control System for an Autonomous Vehicle Based on Adaptive-PID, *Int. J. Adv. Robotic Syst.*, INTECH, Rijeka, 2012;9(44)
- [6] Tekalp, A. Murat. Digital video processing. Prentice Hall Press, 2015.
- [7] J. M. Alvarez and A. M. Lopez. Road detection based on illuminant invariance, *IEEE Trans. Intelligent Transportation Systems*, 2010.
- [8] T. Kuhnl dan J. Fritsch. Visio-spatial road boundary detection for unmarked urban and rural roads, in IEEE Intelligent Vehicles Symposium Proceedings, 2014: 1251–1256.
- [9] D. Ponsa, J. Serrat, A. M. López. On-board image-based vehicle detection and tracking, *Trans. Inst. Meas. Control*, 2011; 33(7) 783–805
- [10] S. F. X. Bayerl, T. Luettel, H. Wuensche. Following Dirt Roads at Night-Time: Sensors and Features for Lane Recognition and Tracking, Proceedings IEEE/RSJ International Conference on Intelligent Robots and Systems, 2015; 117–122.
- [11] Stein, Gideon P., Ofer Mano, and A. Shashua, *Vision-based ACC with a Single Camera: Bounds on Range and Range Rate Accuracy*, IEEE IV2003 Intelligent Vehicles Symposium, USA, 2003.
- [12] Buczkowski, M. and Stasinski, R., Automatic Lane Detection, PWT 2012, Poznan, 2012
- [13] Ardeshir, A, Image Registration: Principles, Tools and Methods, Springer, London, 2012.



Sumardi Sumardi <sumardi.undip@gmail.com>

Fwd: [TELKOMNIKA] Editor Decision

Muhammad Taufiqurrahman <taufiqurr.muhammad@gmail.com> Kepada: Sumardi Sumardi <sumardi.undip@gmail.com> 3 Mei 2019 00.34

----- Forwarded message ------

From: Assoc. Prof. Dr. Tole Sutikno <tole@journal.uad.ac.id>

Date: Tue, Sep 5, 2017, 10:01 PM Subject: [TELKOMNIKA] Editor Decision

To: Muhammad Taufigurrahman <taufigurr.muhammad@gmail.com>

Cc: Sumardi Sumardi <sumardi.undip@gmail.com>, Munawar Agus Riyadi <munawar@undip.ac.id>

Mr. Muhammad Taufiqurrahman:

We have reached a decision regarding your submission to TELKOMNIKA (Telecommunication Computing Electronics and Control), "STREET MARK DETECTION USING RASPBERRY PI FOR SELF-DRIVING SYSTEM".

Mr. Muhammad Taufiqurrahman:

We have reached a decision regarding your submission to TELKOMNIKA (Telecommunication Computing Electronics and Control), "STREET MARK DETECTION USING RASPBERRY PI FOR SELF-DRIVING SYSTEM".

Our decision is to: Revisions required before review by external reviewers Please prepare your revised paper perfectly consider the guide. Please get take a look at: http://goo.gl/FiPFbF

In preparing your revised paper, you should pay attention to:

- 1. An Introduction should contain the following three parts:
- (a) Background: Authors have to make clear what the context is. Ideally, authors should give an idea of the STATE-OF-THE ART of the field the report is about.
- (b) The Problem: If there was no problem, there would be no reason for writing a manuscript, and definitely no reason for reading it. So, please tell readers why they should proceed reading. Experience shows that for this part a few lines are often sufficient.
- (c) The Proposed Solution: Now and only now! authors may outline the contribution of the manuscript. Here authors have to make sure readers point out what are the novel aspects of authors work.

Authors should place the paper in proper context by citing relevant papers. At least, 5 references (recently journal articles) are used in this section.

- 2. Results and discussion section: The presentation of results should be simple and straightforward in style. You should improve your analyzing and also present the comparison between performance of your approach and other researches. Results given in figures should not be repeated in tables. This section report the most important FINDINGS, including results of analyses as appropriate. It is very important to prove that your manuscript has a significant value and not trivial.
- 3. Please ensure that: all references have been cited in your text; Each citation should be written in the order of appearance in the text; The references must be presented in numbering. The references must be integrated also with not less than two papers published on:
- TELKOMNIKA TCEC at http://journal.uad.ac.id/index.php/TELKOMNIKA
- IAES Journals (You can find the issued at: http://iaesjournal.com, please use "Search Paper" facility in right top side of the website)
- Indonesian Journals at http://journal.portalgaruda.org/index.php/eei
- IAES Section Journals at http://section.iaesonline.com/index.php/ijeei

4. Relation of Tables or Figures and Text

Because tables and figures SUPPLEMENT the text, all tables and figures should be referenced in the text. Authors also must explain what the reader should look for when using the table or figure. Focus only on the important point the reader should draw from them, and leave the details for the reader to examine on her own.

Figures:

- a. All figures appearing in article must be numbered in the order that they appear in the text. (Figures are placed after they are cited in your text)!!
- b. Each figure must have a caption fully explaining the content
- c. Figure captions are presented as a paragraph starting with the figure number i.e. Figure 1, Figure 2, etc.
- d. Figure captions appear below the figure
- e. Each figure must be fully cited if taken from another article
- f. all figures must be referred to in the body of the article

Tables:

- a. Material that is tabular in nature must appear in a numbered captioned table.
- b. All tables appearing in article must be numbered in the order that they appear in the text. (Tables are placed after they are cited in your text)!!c. Each table must have a caption fully explaining the content with the
- table number i.e. Table 1, Table 2, etc.
- d. Each column must have a clear and concise heading
- e. Tables are to be presented with single horizontal line under: the table caption, the column headings and at the end of the table.
- f. All tables must be referred to in the body of the article
- g. Each table must be fully cited if taken from another article

You should submit your revised paper through our online system within 8 weeks. Then, your revised paper will be reviewed by external reviewers for acceptance or rejection.

Thank you

Best Regards, Tole Sutikno Editor-in-Chief, tole@journal.uad.ac.id

Reviewer F:

Ethics (Plagiarism, Fraud, Other ethical concerns)

- If you suspect that an article is a substantial copy of another work, please let the editor know, citing the previous work in as much detail as possible.
- It is very difficult to detect the determined fraudster, but if you suspect the results in an article to be untrue, inform it
- Has there been a violation of the accepted norms in the ethical?

Please provide your detailed comments to the Author(s) on the following.

Lack of previous work study

Structure and Presentation (Layout and format, Title, Abstract, Introduction, Method, Results and Discussion, Conclusion, Language)

- Authors are required to adhere to the journal's Guide for Authors, which includes manuscript presentation.
- Does Title clearly describe the article? Does Abstract reflect the content of the article? Are the equations, figures and tables in this journal style, clear, relevant, and are the captions adequate?
- Does Introduction section describe what the author hoped to achieve accurately, and clearly state the problem being investigated? Normally, the introduction should summarize relevant research to provide context, and explain what other authors' findings, if any, are being challenged or extended. It should describe the experiment, the hypothesis(es) and the

general experimental design or method.

- Method section: does the author accurately explain how the data was collected? Is the design suitable for answering the question posed? Is there sufficient information present for you to replicate the research? Does the article identify the procedures followed? Are these ordered in a meaningful way? If the methods are new, are they explained in detail? Was the sampling appropriate? Have the equipment and materials been adequately described? Does the article make it clear what type of data was recorded; has the author been precise in describing measurements?
- Results and Discussion section: This is where the author(s) should explain in words what he/she/they discovered in the research. It should be clearly laid out and in a logical sequence. You will need to consider if the appropriate analysis has been conducted. Are the statistics correct? Are the claims in this section supported by the results, do they seem reasonable? Have the authors indicated how the results relate to expectations and to earlier research? Does the article support or contradict previous theories?
- Conclusion section: Interpretation of results should be included in this section. Does the conclusion explain how the research has moved the body of scientific knowledge forward?
- If an article is poorly written due to grammatical errors, while it may make it more difficult to understand the science, you should bring this to the attention of the editor.

Please provide your detailed comments to the Author(s) on the following.

Mathematical fundamental needs to be added more

The environment used to conduct the reaserach must be addressed more

Previous Research

If the article builds upon previous research does it reference that work appropriately? Are there any important works that have been omitted? Are the references accurate? Do authors place the paper in proper context by citing relevant papers?

Please provide your detailed comments to the Author(s) on the following.

The paper needs to cite more on previous paper/work on the same topic

Originality, contribution and technically sound: Does the paper contain an original contribution to the field? Is the article sufficiently novel and interesting to warrant publication? Does it add to the canon of knowledge? Does the article adhere to the journal's standards? Is the research question an important one? Is the paper technically sound?, Is the paper well written (clear, concise, and well organized)?

Please provide your detailed comments to the Author(s) on the following.

The paper needs a major revision especially on the previous works study and the declaration of the environment used to conduct the research

TELKOMNIKA (Telecommunication Computing Electronics and Control) http://www.journal.uad.ac.id/index.php/TELKOMNIKA



Sumardi Sumardi <sumardi.undip@gmail.com>

Re: [TELKOMNIKA] Submission Acknowledgement

Tole Sutikno <tole@journal.uad.ac.id>

4 Januari 2018 17.57

Kepada: Muhammad Taufiqurrahman <taufiqurr.muhammad@gmail.com>, Sumardi Sumardi <sumardi.undip@gmail.com>

Muhammad Taufiqurrahman:

It is my great pleasure to inform you that your paper "STREET MARK DETECTION USING RASPBERRY PI FOR SELF-DRIVING SYSTEM" has been ACCEPTED and will be published on the TELKOMNIKA Telecommunication Computing Electronics and Control (ISSN 1693-6930, SCOPUS indexed journal). Congratulations!

In order to cover part of the publication cost, each accepted paper will be charged:

Publication Fee: USD 265 (or IDR 2500K for Indonesian Authors)

This charge is for the first 8 pages, and if any published manuscript over 8 pages will incur extra charges USD 50 (or IDR 500K for Indonesian Authors) per page

The payment should be made by bank transfer (T/T):

Bank Account name (please be exact)/Beneficiary: ANTON YUDHANA

Bank Name: Bank Central Asia (BCA)

Branch Office: Kusumanegara

City: Yogyakarta Country :Indonesia

Bank Account #: 8465023984 SWIFT Code: CENAIDJAXXX

SWIFT Code: CENAIDJAXXX Cell. Phone: +6285746722592

or through PayPal (as alternative of bank transfer) to email: tole@ee.uad.ac.id

Your paper will be scheduled for forthcoming issue. Please pay the publication fee as soon as possible (within 3 weeks). If you need more time, please send a request to this email. We can give you 5 weeks at the most.

Then, please submit your final paper & payment receipt to this email

I look forward for your response

Sincerely yours, Tole Sutikno Editor-in-Chief, TELKOMNIKA

Bank's detailed address : Bank BCA Kusumanegara Jl. Kusumanegara No. 18

City: Yogyakarta

Province: D.I. Yogyakarta (DIY)

Country :Indonesia Post Code: 55165

Indonesia, Phone:+62 274 418896

The Beneficiary's address:
Kampus 3 Universitas Ahmad Dahlan
Jln. Prof. Soepomo, Janturan
City: Yogyakarta

Province: D.I. Yogyakarta (DIY)

Post Code: 55164 Country: Indonesia On Tue, Sep 20, 2016 at 3:20 PM, Tole Sutikno <tole@journal.uad.ac.id> wrote: | Muhammad Taufigurrahman:

Thank you for submitting the manuscript, "STREET MARK DETECTION USING RASPBERRY PI FOR SELF-DRIVING SYSTEM" to TELKOMNIKA (Telecommunication Computing Electronics and Control). With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Manuscript URL:

http://journal.uad.ac.id/index.php/TELKOMNIKA/author/submission/4509

Username: taufiqurr

If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

Tole Sutikno

TELKOMNIKA (Telecommunication Computing Electronics and Control)

TELKOMNIKA (Telecommunication Computing Electronics and Control) http://www.journal.uad.ac.id/index.php/TELKOMNIKA