A Member of BAU GLOBAL

IAR International Academy of Rome

UNIVERSITY OF VIENNA

MEDİPOL UNV

KVK

ICoSReSSE

International Conference of Strategic Research on Scientific Studies and Education

10 th

ICoSReSSE

International Conference of Strategic Research on Scientific Studies and Education

FULL TEXTS BOOK

Eds. Ömer Kürşad TÜFEKCİ & Gürkan KALKAN

JUNE 17-18 2019

ROME

ITALY

www.icosresse.com

icosresse@gmail.com



We work with leading authors to develop the strongest academic materials with bringing cutting-edge thinking and best learning practice to a global world.

SRA Academic Publishing
(*Strategic Researches Academy)*

visit us on the World Wide Web at:
www.stracademy.org

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without either the prior written permission of the publisher or a license permitting restricted copying.
All trademarks used herein are the property of their respective owners. The use of any trademark in this text does not vest in the author or publisher any trademark ownership rights in such trademarks, nor does use of such trademarks imply any affiliation with or endorsement of this book by such owners.

Copyright © 2019 by Ömer Kürşad TÜFEKCİ & Gürkan KALKAN

Printed in Rome/Italy

Library of Congress Cataloging-in-Publication Data
International Conference of Strategic Research on Scientific Studies and Education Abstract Book / edited by Ömer Kürşad TÜFEKCİ & Gürkan KALKAN

p. cm.





Scientific Board / Bilim Kurulu

- Prof. Dr. Adela Franzé Mudanó, Universidad Complutense de Madrid, Spain
- Prof. Dr. Ayanniyi Bako Alhassan, University of Wales, United Kingdom
- Prof. Dr. Brian D. Gregory, Franklin University, United States of America
- Prof. Dr. D. Jose María Ruiz Ruiz, Universidad Complutense de Madrid, Spain
- Prof. Dr. Enrique Luque, Universidad Autónoma de Madrid, Spain
- Prof. Dr. Flavia Heloisa Santos, University of Minho, Portugal
- Prof. Dr. George Costa, Democritus University of Thrace, Greece
- Prof. Dr. Jennifer J. Argo, University of Alberta, Canada
- Prof. Dr. Maria Jose Falcon Y. Tella, Complutense University of Madrid, Spain
- Prof. Dr. RADI Mohamed, Université Al-Hussein Bin Talal, Jordan
- Prof. Dr. Ricardo Becerro de Bengoa DPM, Complutense de Madrid, Spain
- Prof. Dr. Wang Huili, Dalian University of Technology, China
- Prof. Dr. Elena A. Makarova, Taganrog Institute of Management and Economics, Russian Federation
- Prof. Dr. Vivien A Beattie, University of Glasgow, United Kingdom
- Prof. Dr. Wayne Evans, Trent University, Canada
- Prof. Dr. George Chiladze, The University of Georgia, Georgia
- Assoc. Prof. Dr. Ayşe Dilek Öğretir Özçelik, Gazi University, Turkey
- Assoc. Prof. Dr. Emrah Atay, Mehmet Akif Ersoy University, Turkey
- Assoc. Prof. Dr. Helen Mallette, Mount Saint Vincent University, Canada
- Assoc. Prof. Dr. Kai-Long Hsiao, Taiwan Shoufu university, Taiwan
- Assoc. Prof. Dr. Kamariah Dola,University Putra Malaysia, Malaysia
- Assoc. Prof. Dr. Kemal Göral, Muğla Sıtkı Koçman University, Turkey
- Assoc. Prof. Dr. Kristin Diehl, USC Marshall School, United States
- Assoc. Prof. Dr. Nurullah Kurutkan, Düzce University, Turkey
- Assoc. Prof. Dr. Omer Kursad Tufekci, Suleyman Demirel University, Turkey
- Assoc. Prof. Dr. Salih Zeki Genç, Çanakkale Onsekiz Mart University, Turkey
- Assoc. Prof. Dr. Umbreen Javaid, University of the Punjab, Pakistan
- Assoc. Prof. Dr. Vijayaletchumy Subramaniam, University Putra Malaysia, Malaysia
- Assoc. Prof. Yaprak I. ÖZDEMİR, Karadeniz Technical University, Turkey
- Assist. Prof. Dr. Ajeet Jaiswal, Pondicherry University, India
- Assist. Prof. Dr. Ashfaque Ahmad Ayah, University of Sargodha, Pakistan
- Assist. Prof. Dr. Assiotis Andreas, University of Cyprus, Cyprus
- Assist. Prof. Dr. Haktan Sevinç, Iğdır University, Turkey
- Assist. Prof. Dr. Jose M. Merigo Lindahl, University of Barcelona, Spain
- Assist. Prof. Melih Onuş, Bartın University, Turkey
- Assist. Prof. Dr. Mohd Shakir, Hamdard Nagar, India
- Assist. Prof. Dr. Nezihe Tüfekci, Süleyman Demirel University, Turkey
- Assist. Prof. Dr. Okan Bütüner, Düzce University, Turkey
- Assist. Prof. Dr. Olcay Kilinç, Mehmet Akif Ersoy University, Turkey
- Assist. Prof. Dr. Wei Li, Frostburg State University, United States of America
- Assist. Prof. Dr. Wenjuan (Wendy) Xu, Frostburg State University, United States of America
- Assist. Prof. Dr. Gülseren Yurcu, Akdeniz University, Turkey
- Dr. Adnan Iqbal, Prince Sultan University Riyadh, Saudi Arabia
- Dr. Chinyere Samuel Ecoma, Veritas University Abuja, Nigeria

- Dr. Dan Ioan Topor, Hyperion University, Romania
- Dr. Fabrizio Rossi, University of Cassino and Southern Lazio, Italy
- Dr. Gary Cokins, Analytics-Based Performance Management LLC, United States of America
- Dr. Georgia Yfantidou, Democritus University of Thrace, Greece
- Dr. Marco Sorrentino, Pegaso Telematic University, Italy
- Dr. Manuel Jaen Garcia, University of Almeria, Spain
- Dr. Muhammed Ali El-Haiji, Liverpool John Moores university, United Kingdom
- Dr. Nkasiobi Silas Oguzor, Omuko-Rivers State University, Nigeria
- Dr. Olena Sokolovska, Research Institue of Fiscal Policy, Ukranie
- Dr. Raj Das, University of Auckland, New Zealand
- Dr. Redd R.J.G. Branner, Franklin University, United States of America
- Dr. Tatiana Danescu, Petru Maiour University, Romania
- Dr. Saheed Ahmad Rufai, University of Lagos, Nigeria
- Dr. Sorin Briciu, 1 Decembrie 1918 University, Romania
- Dr. Sreekanth Rallapalli, Botho University, Africa
- Dr. Vedat Bayraktar, Gazi University, Turkey
- Dr. Veland Ramadani, South East European University, Macedonia
- Dr. Yogita Beri, Banaras Hindu University, India
- Çağatay Ersin, Çankırı Karatekin University, Turkey

Organizing Committee / Düzenleme Kurulu

Doç. Dr. Ömer Kürşad TÜFEKCİ
Dr. Öğr. Üyesi Gürkan KALKAN
Dr. Öğr. Üyesi Ali Barış KAPLAN
Öğr. Gör. Hasan GÖKSU
Öğr. Gör. Murat BAŞ
Öğr. Gör. Leyla AKBAŞ

Invited Speakers / Davetli Konuşmacılar

Author(s)	Title
Madhabendra SINHA, Ujjal Protim DUTTA & Partha Pratim SENGUPTA (IN)	TRENDS OF GROWTH, EXPORT AND CO2 EMISSION IN MANUFACTURING SECTOR: AN EMPIRICAL STUDY ON BRICS COUNTRIES
Partha Pratim SENGUPTA & Madhabendra SINHA (IN)	FDI INFLOW AND CURRENT ACCOUNT BALANCE: A VAR ANALYSIS WITH INDIAN DATA
Partha Pratim SENGUPTA, Madhabendra SINHA, Ujjal Protim DUTTA, Partha MUKHERJEE, Lipika KANKARIA. Sanghamitra SENGUPTA & Sneha PANJA (IN)	CGE MODELS IN POLICY DESIGNS FOR ECONOMIC GROWTH AND DEVELOPMENT: IMPLICATIONS FOR TRADE LIBERALIZATION AND FOREIGN INVESTMENT IN INDIA
Partha MUKHERJEE, Madhabendra SINHA & Partha Pratim SENGUPTA (IN)	POTATO PRICE VOLATILITY AND ITS INFLUENCE ON DECISION MAKING PROCESS OF FARMERS: AN EMPIRICAL STUDY IN INDIA
Mariam I. YINUSA, Jolly A. UBOGU &, Collins O. OSAGIE (NG)	THE IMPACT OF ETHICAL SALES BEHAVIOR ON CUSTOMER LOYALTY: A CASE OF NESTLE NIGERIA PLC
Anahit ARAKELYAN, Elen GRIGORYAN, Tatev ZARGARYAN (AM)	THE IMPACT OF STRATEGIES-BASED INSTRUCTION ON EFL LEARNERS' SPEAKING PERFORMANCE
Sebastian MATHAI (IN)	LEVERAGING MODERN KNOWLEDGE DELIVERY SYSTEM
A A L MADHUSHANI (LK)	CHALLENGES OF GOOD GOVERNANCE PRACTICES IN NATIONAL SPORT FEDERATIONS OF SRI LANKA: CURRENT PRIORITIES AND FUTURE INTERVENTIONS
Agha RAPHEAL (TH)	IMPACT OF CLASSROOM MANAGEMENT ON STUDENT BEHAVIOR: A SURVEY OF THE DISRUPTIVE BEHAVIORS OF STUDENTS IN SCHOOLS ACROSS UDON THANI
Tamara A. GEESO (IQ)	QUALITY OF ENVIRONMENTAL POLLUTION COSTS IN PETROLEUM COMPANIES BY APPLICATION ON NORTHERN OIL COMPANY – IRAQ
Elena PAPA (CY)	ONLINE MASTER'S DEGREE IN COMPUTER ASSISTED LANGUAGE LEARNING
Jahari JAINAL (UK)	TEACHERS' CONCEPTIONS AND PRACTICES OF FORMATIVE ASSESSMENT IN SCIENCE IN MALAYSIAN PRIMARY SCHOOL
Ajay KAUSHIK, S. INDU & Daya GUPTA (IN)	OPTIMIZING THE PERFORMANCE OF A WIRELESS SENSOR NETWORK USING MULTI OBJECTIVE BIOGEOGRAPHY BASED OPTIMIZATION
Tajammal ASIF (CY)	INFLATION, FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN PAKISTAN
Nenad KOJIC, Radica KOJIC & Natalija VUGDELIJA (XS)	TRAINING OF SECONDARY SCHOOL TEACHERS IN THE FIELD OF WEB PROGRAMMING
Zaur ALİYEV (AZ)	THE PROBLEMS OF RUSSIA'S SMALL PEOPLES AND THEIR SURVIVAL IN THE GLOBAL WORLD
Elnur SARDAROV (AZ)	THE EFFECT OF ORGANIZATIONAL STRESS ON EMPLOYEE PERFORMANCE; A RESEARCH IN FIVE STAR HOTELS
Elnur SARDAROV (AZ)	HEALTH TOURISM; A RESEARCH ON PETROL BATH TOURISM IN AZERBAIJAN NAFTALAN CITY
Alaa Hassoon Abdulrasool AL-OBAIDI (IQ)	ÇEVRESEL DEĞERLER VE TUTUMLARIN YEŞIL SATIN ALMA DAVRANIŞLARINA ETKISI: IRAK'TA YEŞIL TÜKETIME ILIŞKIN BIR ARAŞTIRMA

10th ICoSReSSE Participants List

- Adela Franzé Mudanó (ES)
- Adem YILMAZ (TR)
- Adnan Iqbal (SA)
- Adnan ÖMERUSTAOĞLU (TR)
- Agha RAPHEAL (TH)
- Ahati Lamue MADHUSHANI (LK)
- Ahmet Bora TARHAN (TR)
- Ajay KAUSHIK (IN)
- Ajeet Jaiswal (IN)
- Alaa Hassoon AL-OBAIDI (IQ)
- ALİ BAYKAN (TR)
- Anahit ARAKELYAN (AM)
- Ashfaque Ahmad Ayah (PK)
- Assiotis Andreas (CY)
- Ayanniyi Bako Alhassan (UK)
- Banu OZKESER (TR)
- Belkıs ÖZKARA (TR)
- Berkan URAL (TR)
- Brian D. Gregory (UM)
- Burçak YAVUZ (TR)
- Büşra GÜMÜŞAY ÖZBEK (TR)
- Cemil SÜSLÜ (TR)
- Chinyere Samuel Ecoma (NG)
- Chris A BUCKLEY (ZA)
- Collins O. OSAGIE (NG)
- Cristina TROIS (ZA)
- D. Jose María Ruiz Ruiz (ES)
- Dan Ioan Topor (RO)
- Daya GUPTA (IN)
- Deniz ÇAKAROĞLU (TR)
- Ebru Gamze IŞIKSAÇAN (TR)
- Elen GRIGORYAN (AM)
- Elena A. Makarova (RU)
- Elena PAPA (CY)
- Elnur SARDAROV (AZ)
- Emel ÖZDEMIR (TR)
- Enrique Luque (ES)
- Erdem GULUMSER (TR)
- Erhan YILDIRIM (TR)
- Fabrizio Rossi (IT)
- Farhad ABDULLAYEV (AZ)
- Fatih BAŞÇİFTÇİ (TR)
- Filiz İlknur CUMA (TR)
- Flavia Heloisa Santos (PT)
- Francesca de PALO (IT)
- Gary Cokins (UK)
- George Chiladze (GE)
- George Costa (GR)
- Georgia Yfantidou (GR)
- GÜLLÜ Merve Esra YILDIRIM (TR)
- Gürkan KALKAN (TR)
- H. Hale KÜNÜÇEN (TR)
- Hacı Ahmet KARADAŞ (TR)
- Hafize PEKTAŞ (TR)
- Hakan ALTIN (TR)
- Handan Deniz BÖYÜKASLAN (TR)
- Hasan BAL (TR)
- Hasan ÖKTEM (TR)
- Helen Mallette (CA)
- İbrahim CENGİZLER (TR)
- İdris ZORLUTUNA (TR)
- İhsan ALP (TR)
- İlkay NOYAN YALMAN (TR)
- İsmail PENBE (TR)
- Jahari JAINAL (UK)
- Jennifer J. Argo (CA)
- Jolly A. UBOGU (NG)
- Jose M. Merigo Lindahl (ES)
- Kai-Long Hsiao (TW)
- Kamariah Dola (MY)
- Kristin Diehl (UM)
- Kürşad GÖV (TR)
- Leyla AKBAŞ (TR)
- Lipika KANKARIA (IN)
- Madhabendra SINHA (IN)
- Manuel Jaen Garcia (ES)
- Marco Sorrentino (IT)
- Maria Jose Falcon Y. Tella (ES)
- Mariam I. YINUSA (NG)
- Mehmet AYAS (TR)
- Mehmet Ensari KALENDEROĞLU (TR)
- Meryem KOYUN (TR)
- Metin ŞENGÜL (TR)
- Mohd Shakir (IN)
- Muhammed Ali El-Haiji (UK)
- Muhammet OKUDAN (TR)
- Mukadder İĞDİ ŞEN (TR)
- Murat ACET (TR)
- Murat BAŞ (TR)
- Müge DEMIR (TR)
- N. Gamze ILICAK (TR)
- Natalija VUGDELIJA (XS)
- Nenad KOJIC (XS)
- Nesli Tuğban YABAN (TR)
- Nkasiobi Silas Oguzor (NG)
- Nuran BAŞOĞLU (TR)
- Olebeng Mpho MACKENZIE (BW)
- Olena Sokolovska (UK)
- Ömer Kürşad TÜFEKCİ (TR)
- Özge DOĞANAY (TR)
- Özge KAPİŞ (TR)
- Özlem Öztürk TEMUR (TR)
- Partha MUKHERJEE (IN)
- Partha Pratim SENGUPTA (IN)
- Pınar UNAL (TR)
- Radi Mohamed (JO)
- Radica KOJIC (XS)
- Raj Das (NZ)
- Redd R.J.G. Branner (UM)
- Ricardo Becerro de Bengoa (ES)
- Sabiha ANNAÇ GÖV (TR)
- Saheed Ahmad Rufai (NG)
- Salih AĞAR (TR)
- Samhatha INDU (IN)
- Sanghamitra SENGUPTA (IN)
- Sebastian MATHAI (IN)
- Selçuk DUMAN (TR)
- Sema ÖZTÜRK YILDIRIM (TR)
- Serkan ATMACA (TR)
- Shashi K. DARGAR (ZA)
- Sırrı AKBABA (TR)
- Sneha PANJA (IN)
- Sorin Briciu (RO)
- Sreekanth Rallapalli (ZA)
- Suheyla KOCAMAN (TR)
- Surabhi SRIVASTAVA,
- Ş. Güzin ILICAK AYDINALP (TR)
- Şebnem ZORLUTUNA (TR)
- Şerife Merve KOŞAROĞLU (TR)
- Şir Muhammed DUALI (TR)
- Tajammal ASIF (CY)
- Tamara A. GEESO (IQ)
- Tatev ZARGARYAN (AM)
- Tatiana Danescu (RO)
- Tuna AKÇAY (TR)
- Tülay UĞUZMAN (TR)
- Ujjal Protim DUTTA (IN)
- Umbreen Javaid (PK)
- Umut BILEN (TR)
- Ümit YILMAZ (TR)
- Veland Ramadani (MK)
- Vijayaletchumy Subramaniam (MY)
- Viranjay M. SRIVASTAVA (ZA)
- Vivien A. Beattie (UK)
- Volkan Soner ÖZSOY (TR)
- Wang Huili (CH)
- Wayne Evans (CA)
- Wei Li (UM)
- Wenjuan (Wendy) Xu (UM)
- Yalçın ŞADİ (TR)
- Yogita Beri (IN)
- Zaur ALİYEV (AZ)
- Zerrin MERCAN (TR)

CONTENTS / İÇINDEKILER

FENER VE MOSKOVA PATRİKLİKLERİ ARASINDA: BİRLEŞİK UKRAYNA ORTODOKS KİLİSESİ SORUNU 1

Şir Muhammed DUALI

İKİ AŞAMALI VERİ ZARFLAMA ANALİZİ MODELLERİ: ÇARPIMSAL VE TOPLAMSAL MODEL 8

Volkan Soner ÖZSOY & Hasan BAL

ÜNİVERSİTEDE ÖĞRENİM GÖREN KIZ ÖĞRENCİLERİN GİRİŞİMCİLİK NİYETLERİNİN BELİRLENMESİ: BİGADİÇ MESLEK YÜKSEKOKULU ÖRNEĞİ 13

Şakir SAKARYA, Ümit YILMAZ & İsmail ÖĞÜTÇEN

HEMATOLOJİK ANALİZLERİN BALIK SAĞLIĞINDA KULLANIMI VE YETERLİLİĞİ 32

İbrahim CENGİZLER, Selçuk DUMAN

HİSSE SENEDİ FİYATLARI İLE ENFLASYON VE FAİZ ORANI ARASINDAKİ NEDENSELLİK İLİŞKİSİ ÜZERİNE BİR ARAŞTIRMA: TÜRKİYE ÖRNEĞİ..... 40

Cemil SÜSLÜ

TÜRKİYE'DE ÇOKLU KANAL TÜKETİCİLERİNİN DAVRANIŞLARINA FİYAT PROMOSYONUNUN ETKİSİ..... 52

Özge DOGANAY, İbrahim KIRCOVA

TURİZM SEKTÖRÜNDE MUTFAK ÇALIŞANLARINDA MESLEK ETİĞİ ÜZERİNE BİR ARAŞTIRMA 74

Öğr. Gör. Mehmet Ensari KALENDEROĞLU

KADININ STATÜSÜNDE ORTAYA ÇIKAN YÜKSELİŞİN SOMUT GÖRÜNÜMLERİ: BİR TÜRK KASABASINDAN ÖRNEKLER 82

Prof. Dr. Tülay UĞUZMAN

LAW NO. 6771 ON THE AMENDMENT TO THE CONSTITUTION OF REPUBLIC OF TURKEY IN THE CONTEXT OF CONSTITUTIONAL DEVELOPMENT PROCESS: PRESIDENTIAL GOVERNMENT SYSTEM 99

Ahmet Bora TARHAN, Belgin BÜYÜKBUĞA TARHAN

SIGN LANGUAGE TRANSLATOR USING LSTM FOR HEARING DISABLED PEOPLE ..111

Büşra ALASYA, Özge KAPİŞ, Şevval Ayşe YURTEKİN, Atilla ÖZMEN

BALIKLARDA İSKELET EĞRİLİKLERİ..... 121

Selçuk DUMAN, İbrahim CENGİZLER

HERBİSİTLERİN SUCUL CANLILAR ÜZERİNDEKİ ETKİLERİ..... 127

Selçuk DUMAN, İbrahim CENGİZLER

INTEGRATION OF ICT BASED METHODS IN HIGHER EDUCATION TEACHING OF ELECTRONIC ENGINEERING 133

Shashi K. DARGAR & Viranjay M. SRIVASTAVA

HELEZON KONVEYÖRLERDE GÖRÜLEBİLECEK ÇEŞİTLİ PROBLEMLER VE ÇÖZÜM UYGULAMALARI 144

Özlem Öztürk TEMUR, Mustafa DENKTAŞ

TÜRKİYE'DE ÇOKLU KANAL TÜKETİCİLERİNİN DAVRANIŞLARINA FİYAT PROMOSYONUNUN ETKİSİ 156

Özge DOGANAY, İbrahim KIRCOVA

WORLD OF EARLY ADOLESCENCE IN THE NOVELS VERY FAR AWAY FROM ANYWHERE ELSE AND VOICE WITHIN ME 178

Nuran BAŞOĞLU

DESIGN OF BROADBAND MATCHING NETWORKS VIA CASCADED DIFFERENT-LENGTH TRANSMISSION LINES 200

Metin ŞENGÜL

LIGHT PIPE SUPPORTED ARTIFICIAL INTELLIGENCE BASED TUNNEL LIGHTING 209

Tahsin BOYEKİN, İsmail KIYAK, Farhad ABDULLAYEV

EMISSION PERFORMANCE OF WORLD'S MOST POLLUTED COUNTRIES WITH A NEW ROBUST ALGORITHM 226

İhsan ALP

BALIKLARDA SİRKADİYEN RİTİM VE PİNEAL ORGAN 240

İbrahim CENGİZLER, Miray ETYEMEZ BÜYÜKDEVECİ

DÜNYANIN EN BÜYÜK AR-GE YATIRIM ŞİRKETLERİ ARASINDA TELEKOMÜNİKASYON SEKTÖRÜNÜN ETKİNLİK ANALİZİ 248

Hasan BAL, Volkan Soner ÖZSOY

FESTİVAL ETKİNLİKLERİNİN GÖRÜNÜRLÜĞÜ, BÖLGE TANITIMI ÜZERİNE ETKİSİ: ZEYTİNLİ ROCK FESTİVALİ ÖRNEĞİ 255

Ş.Güzin ILICAK AYDINALP

TÜRKİYE DE Kİ MESLEK YÜKSEKOKULLARININ AŞÇILIK EĞİTİMLERİ ÜZERİNE DEĞERLENDIRME 269

Gürkan KALKAN

RELATIONBETWEEN COMPARATIVE EDUCATION SCIENCES AND COMPARATIVE 276

Filiz İlknur CUMA

HAY YIELD AND FEEDING VALUE OF SELECTED GRASS PEA (*Lathyrus sativus* L.) GENOTYPES IN THE MIDDLE ANATOLIA CONDITIONS OF TURKEY 288

Erdem GULUMSER, Medine COPUR DOGRUSOZ, Ugur BASARAN, Hanife MUT

HERBAGE YIELD AND COMPETITIVE TRAITS OF LEGUME + CEREAL MIXTURES..297

Hanife MUT, Erdem GÜLÜMSER, Uğur BAŞARAN, Medine ÇOPUR DOĞRUSÖZ

MÜHENDİSLİK EĞİTİMİNDE ÜNİVERSİTE- SANAYİ İŞBİRLİĞİNİN ÖNEMİ VE TEKSTİL MÜHENDİSLİĞİ BÖLÜMÜNDE UYGULANAN ÖRNEK BİR STAJ UYGULAMASI.....306

Umut BİLEN

UNDERSTANDING THE IDEOLOGY OF TELEVISION PROGRAMS.....313

Erhan YILDIRIM

DIN 1.2738 PLASTİK KALIP ÇELİĞİNİN KRİYOJENİK İŞLEMİ SONRASINDA OLUŞAN MİKRO YAPI VE SERTLİĞİNİN İNCELENMESİ.....325

Hasan ÖKTEM, İlyas UYGUR, Ece SİMOOĞLU SARI , Burak ÖZTÜRK

BRONZ KATKILI FREN BALATALARININ SÜRTÜNME-AŞINMA DAVRANIŞININ DENEYSEL OLARAK İNCELENMESİ.....338

Hasan ÖKTEM, Hamdi KARAKAŞ, Anıl GÖRGÜN, Yavuz Selim ASLAN, İlyas UYGUR

ORHAN YENİARAS'IN EL TURCO ADLI ESERİNDE TÜRK-İTALYAN DAYANIŞMASININ GÜNÜMÜZE YANSIMALARI 348

ALİ BAYKAN

AISI 1040, AISI 4140, AISI 1140, AISI 8620 Steels in HCl Solution Determination and Comparison of Corrosion Speeds 371

Burak ÖZTÜRK, Hasan ÖKTEM, Emre GÜRÇAY

BİLMECELERİN YENİ İCRA ORTAMLARI: AKILLI TELEFON UYGULAMALARI.....376

Gamze ILICAK

DÜŞÜRÜCÜ TİP DC-DC DÖNÜŞTÜRÜCÜNÜN OPTİMİZE EDİLMİŞ PID KONTROLÜ 393

Yusuf ALTUN, İsmail PENBEGÜLLÜ

EXPERIMENTAL AND NUMERICAL INVESTIGATION OF ULTRASONIC TURNING OF AISI 52100.....400

Salih AĞAR, Nihat TOSUN

AN EXAMINATION OF OECD COUNTRIES IN TERMS OF BASIC MACROECONOMIC VARIABLES BEFORE AND AFTER THE GLOBAL FINANCIAL CRISIS: AN APPLICATION BY MULTIDIMENSIONAL SCALE ANALYSIS 408

Pınar UNAL, Gurkan DOGAC, Magsud GUBADLI

A VIRTUAL REALITY BASED MENTAL THERAPY FOR LEARNING PATIENTS WITH DIFFICULTIES.....427

Fatih BAŞÇİFTÇİ & Abdullah FADHIL

THE BENCHMARK COMPARISON OF RASPBERRY PI 3 MODEL B AND ZERO W MODELS AND A SAMPLE PERSON TRACKING APPLICATION 435

Fatih BAŞÇİFTÇİ & Mevlüt Kağan BALGA

MESLEK YÜKSEKOKULLARINDA AŞÇILIK EĞİTİMİ ALAN ÖĞRENCİLERİN İŞSİZLİK KAYGISI: BİR ARAŞTIRMA.....447

Murat BAŞ

SYNTHESIS AND CHARACTERIZATION OF Fe_3O_4 NANOPARTICLES.....455

Özlem SAVAŞ PEKDUR & Sema ÖZTÜRK YILDIRIM

DENİZ BALIKLARI YETİŞTİRİCİLİĞİNDE FOULİNG SORUNU VE ÇÖZÜM YOLLARI.463

İbrahim CENGİZLER & Selçuk DUMAN

YEMEK FOTOĞRAFI ÇEKİMİNİN TEMEL UNSURLARI.....470

Yasemin DURAN & Gürkan KALKAN

YÜKSEK TEKNOLOJİLİ ÜRÜN İHRACATI, DOĞRUDAN YABANCI SERMAYE YATIRIMLARI, ENERJİ TÜKETİMİ VE KARBON EMİSYONUNUN EKONOMİK BÜYÜME İLE İLİŞKİSİ: BRICS-T ÜLKELERİ ÖRNEĞİ 477

İlkay NOYAN YALMAN

LIGHT PIPE SUPPORTED ARTIFICIAL INTELLIGENCE BASED TUNNEL LIGHTING

Tahsin BOYEKİN, İsmail KIYAK, Farhad ABDULLAYEV

Abstract For the purpose of the illumination, being projected correctly and energy-saving comes to the fore in the applications performed recently. Especially in places such as tunnels and underpasses, the transition to different light environments distorts the driver's view and it is important to cause accidents. With this work; It is aimed to prevent temporary visual impairment in the driver and to save energy due to the difference in brightness of the two environments when entering from the outside to the tunnel. The designed system uses artificial intelligence for more efficient lighting, modeled on Matlab and results obtained by using real data. All components are controlled by artificial intelligence and the sun's rays are used at the highest level. According to this, light pipes and artificial lighting hybrid lighting system were used in the entrance threshold section lighting of the tunnel. According to the simulation and research results, it is understood that entering the new environment with the same luminous flux and color temperature as the abandoned environment when passing to different environment is very important in minimizing the temporary vision problems. In addition, daylight and light pipe efficiency of the analysis made according to the tunnel entrance in the spring months for about 25% and summer months can be saved by about 43% energy can be predicted.

Key words: *artificial ıntelligence, tunnel lighting, light pipes, led armature*.

Introductıon

Nowadays, lighting is very important. Lighting, which is generally used for safety and comfort, has become integrated with our lives. One of the areas where lighting is most needed is the tunnels. Lighting in tunnels is a necessary for life and property safety. But it requires a rather difficult and complex design. The beginning of the modern development of artificial intelligence systems can be attributed to the mid-50s. This has been facilitated by a program called "LOGIC-THEORETIC" to prove theorems in sentence calculations developed by A. Newell. These studies form the basis of research in the field of Artificial Intelligence and have been linked to the development of problem solving programs based on the use of various heuristic methods and rules. Heuristic scanning (evristika) - a set of logical techniques and methodological rules, theoretical research and truth-finding, is a method of finding evidence. Intuitive rules are informal rules used to increase the effectiveness of a search on a particular topic. At the same time, this problem-solving method is “generally” for human thought; this is characterized by the fact that there are algorithm predictions, of the solution by verifying them later. [1-4] The heuristic method was compared with the algorithmic (procedural) method used in the computer; this was interpreted as the mechanical application of a particular sequence of steps and, as a determinant, gave the correct answer. This interpretation of heuristic methods to solve the problem led to the emergence and spread of the term in artificial intelligence. The most important problem in these studies is the optimal distribution of functions between natural and artificial intelligence and the regulation of the dialogue between man and machine. The first intellectual tasks to be solved with the help of computers, logic games (checkers, chess), was the proof of theorems. Partitions covered by artificial intelligence: proof of theorems; Games; Pattern Recognition; To decide; Adaptive programming; Write machine music; Natural data processing; Learning networks (neural networks); Verbal conceptual learning. [5-8] Advanced technologies based on artificial intelligence include artificial boundary networks and evolutionary calculations. Artificial neural networks. Development of real-time learning and classification algorithms, natural language processing, image, speech and signal recognition as well as intelligent user interface models continue to be created. Major practical problems solved by artificial neural networks include financial forecasts, data extraction from data, diagnostics of systems, monitoring of network activities and encryption of data. In recent years, intensive research has been done for effective methods to synchronize the operation of neural networks in parallel devices. Evolutionary calculations. The development of the evolutionary computing area (EH, autonomous and adaptive behavior of computer applications and robotic devices) has been primarily influenced by investments in nanotechnology. EHs affect the practical problems of self-assembly, self-configuration and self-

restoration of systems consisting of several nodes running simultaneously. It is also possible to implement scientific developments in the field of digital vending. [9-10]

In the tunnel lighting, the driver is expected to continue with safe and comfortable driving quality. For this reason, all tunnels are illuminated at a certain rate at night and in daytime when there is more than the critical length in daylight, so as not to decrease the quality of driving. In tunnels that are shorter than the critical length, the tunnel exit which is illuminated by daylight when viewed from the braking distance to the tunnel entrance covers most of the field of view. The critical length is generally around 40 meters. Daytime lighting is not required in these tunnels. In tunnels with more than critical length, lighting consisting of five parts (Figure 1) is used to adapt the eye to light change. These; the approach zone (outer region), the threshold zone, the transition zone, the inner zone and the exit zone. [11-16, 18, 19]. Especially on sunny days, the brightness levels should be calculated well in order not to change the vision of the driver passing from light to dark environment. The glare levels that need to be formed in the tunnel depend on the outer region glow. The outer region glow changes at any time depending on the sun's rays. We can calculate the brightness of the outer region according to the equation in (1.1), at any time. [11-13, 16, 18]

$$L20=.Lc+.Lr+.Le+.Lth \quad (1.1)$$

The outer region is calculated based on the glow threshold region. The threshold area must be calculated according to the braking distance. The braking distance depends on many factors. We can summarize this with the equation in (1.2). [17, 18]

$$FM=u.t0+u22.g.(fs) \quad (1.2)$$

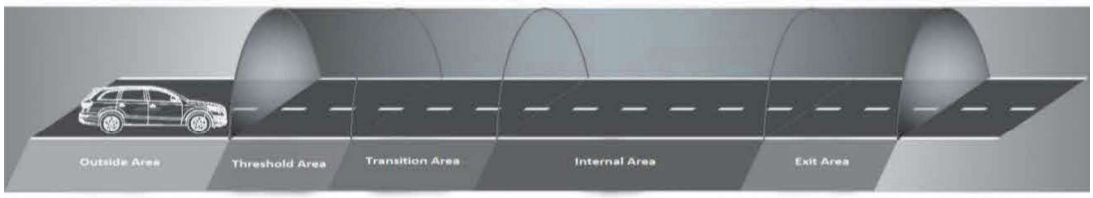


Figure 1: Regions in tunnel lighting

t0 is the parameters related to human, and f is the parameters related to vehicle and road conditions. As with all engineering calculations, calculations are usually required based on the worst conditions.

Table 1 shows the overall ratios between the threshold area and the outer region. These ratios vary depending on the type of lighting. There are usually two types of illumination in the tunnel lighting, opposite and symmetrical.

Table 1: Recommended Lth / L20 ratios due to braking distance [16]

	Symmetrical lighting system (L/Ev≤0.2)	Opposite Directional Lighting System (L/Ev≥0.6)
Brake Distance (m)	**K=Lth/L20**	**K=Lth/L20**
60	0.05	0.04
100	0.06	0.05
160	0.1	0.07

The parameters in equation (1.1) for the calculation of the external region glow according to the location of the tunnel are summarized in Table 2. As it is understood from the table, there are many details in the calculation of luster and it has to be calculated. There are some generalizations because these accounts cannot be made in any position and conditional.

Sodium vapor lamps are generally used in tunnel lighting. However, with the developing technology, these lamps are replaced by LEDs. Due to the increase in color back efficiency, it has brought comfort in lighting. In addition, the operating and maintenance costs have decreased and the service life of the tunnels has been reduced due to the long service life. The LEDs are easy to control and can be dimmed by remote monitoring and control and offer energy saving and comfort. In order to use energy efficiently in the tunnel lighting, lighting control should be done well except for the use of LED luminaires. Along with the developing technology, artificial intelligence control mechanisms can be used for this purpose. [11]

Table 2: Sky, road and ambient glow values depending on the driving direction [16]

Driving direction	Lc (kcd/m2)	Lr (kcd/m2)	Le (kcd/m2)				
			Rocks	Buildings	Snow	Meadow	
East West	12	4	2	6	10(vertical)	15 (horizontal)	2
North	16	5	1	4	5 (vertical)	15 (horizontal)	2
South	8	3	3	8	15 (vertical)	15 (horizontal)	2

In this study, high efficiency artificial intelligence control system design has been the subject of this study. In addition, light pipes were added to this system and energy savings were increased, day and day were used by natural light and light pipes. The radiation data from the sun were transferred to the artificial intelligence-based control mechanism with sensors and the dimmable LED lamps were modeled on Matlab.

Light Pipes (Light Tubes)

Light pipes are structures consisting of mirrors with high reflectance ratio. The light pipes discovered in the 1980s are still in the process of expansion. However, it has become a center of attention and has been used as an artistic lighting for the purpose of energy saving in the offices of some big firms. Light pipes are basically two kinds of artificial light (LED) welded and natural light (solar) welded. In this study, natural light source light pipes are included. [20]



Figure 2: Sunlight pipe [22]

The light pipes consist of three main sections as shown in Figure 2. The first is a transparent dome, which collects the sun's rays from every angle and has a high light transmission. Second, the silver-aluminum alloy tube with a high reflection rate. The third is the lenses that distribute the light from the projection tube. [21-22]

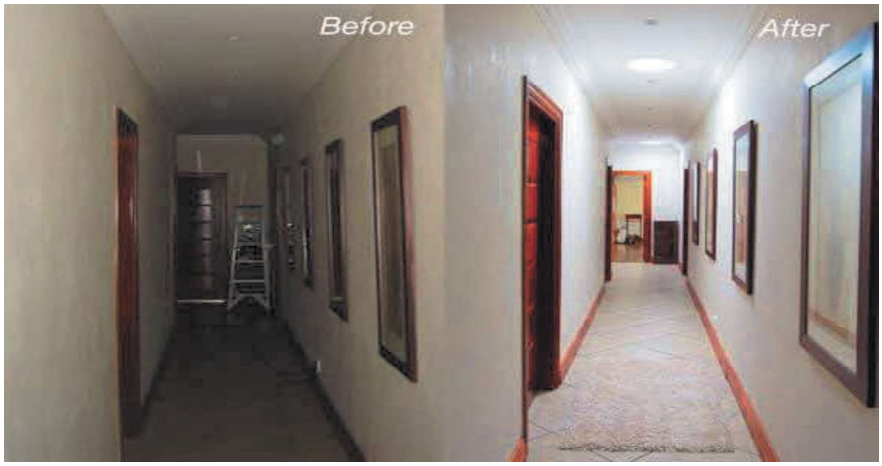


Figure 3: Brightness levels before and after the light tube of a corridor [23]

Natural light-borne light pipes deliver natural light to the non-penetrating areas of the sun by transmitting the sun's rays to a certain distance (Figure 3). This is very important in terms of both health and comfort. It also saves energy spent on lighting. Light pipes can be used very efficiently especially in areas with flat and thin roofs such as factories, warehouses and hypermarkets (Figure 4-source solatube). Light pipes have cool lighting because they only transmit light. This reduces the cooling load by around 15% during the maximum cooling time. [20-23]



Figure 4: Light pipes used in the factory [12]

The efficiency of the light pipes is inversely proportional to their length. For this reason, they provide more effective illumination in short-distance applications between transparent dome and lens. Many companies, by considering this situation, generally produce less than 8 meters of sunlight pipes. Light pipes can be combined with artificial lighting to provide energy saving and comfort. When such systems are controlled by artificial intelligence, efficiency in lighting is maximized.

Artificial Neural Networks (ANN)

Artificial neural networks are one of the artificial intelligence techniques that mimic the work of the human brain. Artificial intelligence, human-specific thinking, comparison, analysis and decision-making functions such as a machine to be given.

Table 3: Terminology of neural system according to artificial neural network model

Neural system	Artificial neural network
Neuron	Processing element
Dendrite	Collection Function
Cell body	Activation Function
Axon	Output Element
Synapse	Weights

Table 3 shows the terminology of the nervous system according to the artificial neural network model. Artificial neural network; it has features such as learning, working with incomplete data, using multiple variables and parameters, non-linearity, error tolerance and flexibility. Thanks to these, operations that cannot be performed with linear logic can be easily done with ANN. The general architectural structure of the ANN is shown in Figure 5. [24-31]

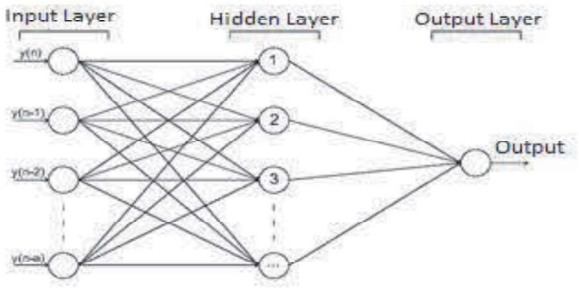


Figure 5: Single-layer artificial neural network general architecture

Since the information in the ANN is kept at the weights of the nerves, determining these weights is the most important point. Because this information is stored across the entire network, the weight value of a node alone is unimportant. The process for obtaining these weights is called “training of the network”. This is the most important feature of ANN. The system is trained with the available

data and ready to solve the problem. The higher the amount of data used in education, the more accurate the network results. [24-31]

$$y=w.x+b \qquad (3.1)$$

Perceptron is known as the smallest part of the artificial neural network. (3.1) is expressed in the equation. Perceptron was first described by Frank Rosenblatt in 1957. The error function of the system in ANN is calculated as in equations 3.2 and 3.3. [25]

$$E=q=1NE(q) \qquad (3.2)$$

$$E(q)=12j=1pOj4(q) - Yj(q)2 \qquad (3.3)$$

The fault function ⧫E, ∂Ewi is the gradient E at wi.The aim here is to find the w coefficient at the point where the error is at least. [15]

$$y(x1,x2)=K1.F1+K2.F2+ . . . . +K8.F8+K9.F9K1+K2+ . . . . +K8+K9 \qquad (3.4)$$

$$y(x1,x2)=N1.F1+N2.F2+ . . . . +N8.F8+N9.F9 \qquad (3.5)$$

In order to calculate the system output value, normalization outputs and system output functions are multiplied as in the equations 3.4 and 3.5 and the obtained product results are collected. [15]

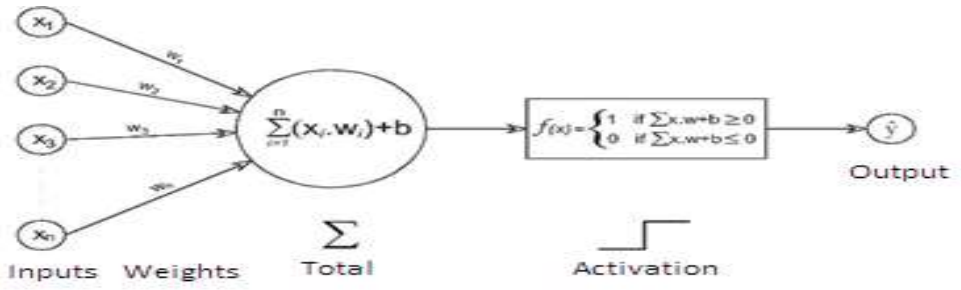


Figure 6: Structure of neuron in artificial boundary network

As indicated in the relation between Figure 6 and Equation (3.1), the inputs are multiplied by the weights of Artificial Nerve Network and learned by collecting the results. Briefly, the artificial neural network infrastructure that we can express in this way is made easy by many software like Matlab.

There is no single method or architecture in the ANN. There are architectures varying according to the problem to be solved. [25-27]

Artificial Intelligence Based Tunnel Lighting Model

Since tunnel lighting constitutes an important part of the total energy consumption, energy saving becomes one of the obligatory areas. But, the driver should be at the forefront of comfort and especially safety. For this purpose, a tunnel illumination based on artificial intelligence and solar light pipes was modeled on Matlab program. Actual measurement values were obtained for the artificial intelligence training data used on the model in Matlab.[32-33]

Project Information

The designed tunnel lighting model is located in the threshold zone, which is the entrance part of the tunnel where light pipes can be used. Light pipes that illuminate the threshold area of the tunnel by collecting and transmitting the rays coming from the sun during the day are supported by LED luminaires and a safe and efficient lighting system has been created. This system is controlled by artificial intelligence and instantly adjusts the light intensity to be the most efficient and safe in the direction of the data coming from the sensors. This process is done by controlling the light intensity of LEDs according to the light coming from the sunlight and light pipes. The calculations were made considering that the entrance of the tunnel was in the south direction. In this model, luminaires are preferred at an artificial light of 4000 K with a temperature of 160 lm / W, 230 W of power and a luminous flux of 36000 lm. The light pipe has a width of approximately 50 cm and has a maximum length of 9 meters. Matlab 2018b was used as an application program.

Project Draft

All the arrival angles of the sun's rays are considered and measured by sensors. In the light of these data, the trained artificial intelligence controls the system. This system is designed to have the image in Figure 7. The sun's rays support the illumination by entering the tunnel from the tunnel entrance and the light pipes to a certain distance. In this study, there are 3 separate light pipes and 3 separate LED luminaires in 3 separate sections. LED luminaires are controlled separately depending on the light input from the tunnel entrance and light pipes.

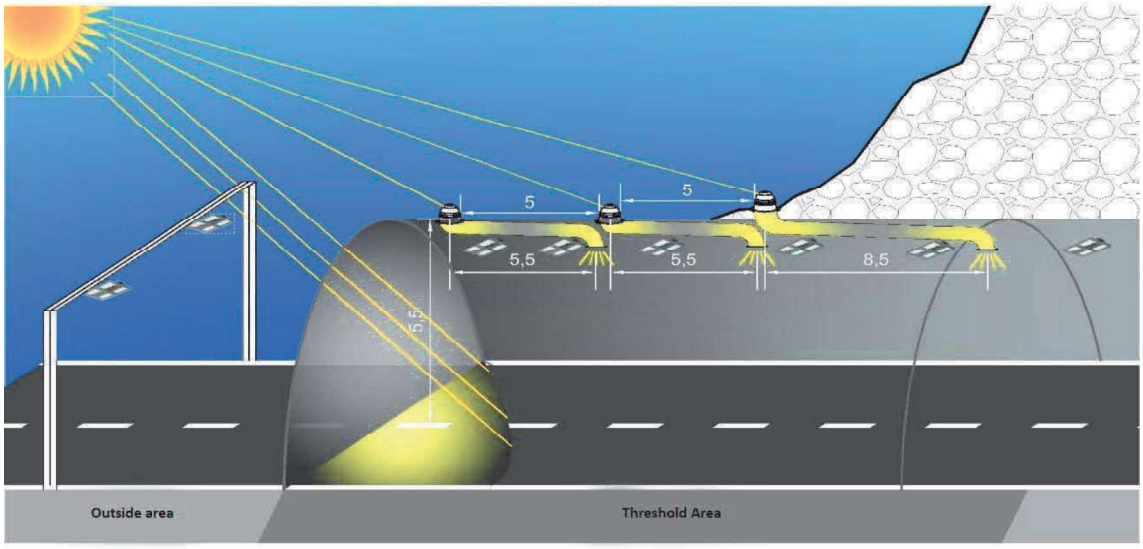


Figure 7: Drafting of the project (lengths are given in meters.)

Matlab Application

"Nntool" lab command is used to model the designed system on Matlab. This command opens the window in Figure 8. Firstly, the existing data is added to Matlab using "New data" or "Import" options. Options include input, target, output. If we want to add the data to which we added, we need to select this option. Usually 80% of the data is used for training and 20% for testing. Network design and network are created from the "networks" tab. When creating a network, the number of layers, the number of neurons, and similar information must be entered as appropriate to the project.

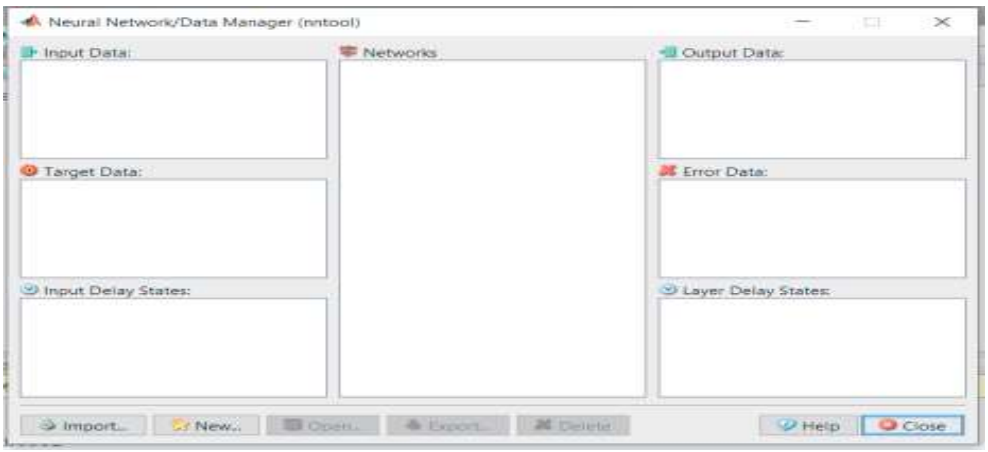


Figure 8: Matlab "nntoll" tab

In the window of Figure 8, after all inputs are made and the network is created, training process is started. The training process can be stopped in an iteration that we have determined, or it can be stopped by the user during the training if it is considered adequate. When the training process is over, errors and successes are shown proportionally. The results are shown graphically according to demand. In this study, the data were presented as a 206x3 matrix. The data used here is divided into 3 sections (Figure 9). There will also be 3 exits.

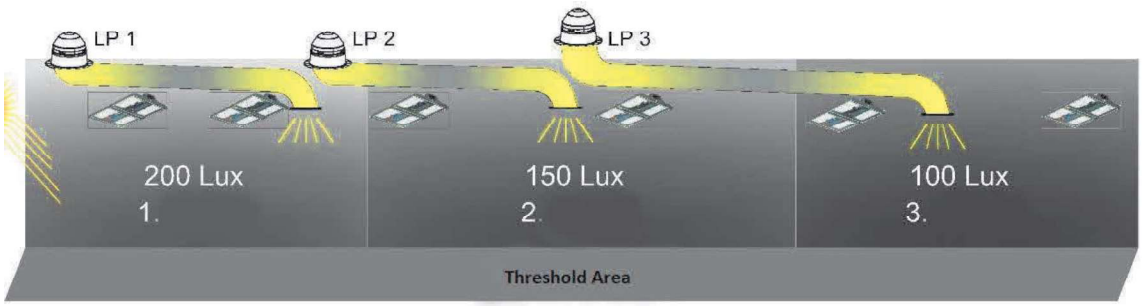


Figure 9: Sections for Matlab implementation

The first section consists of the sun's rays and reflections from the tunnel entrance and the sensor data of the beams from the LP1. The second and third sections consist of the sensor data of the beams from LP2 and LP3, respectively. Furthermore, according to this data, the dim values for each LED fixture group are set to 1 to 10. All this data, which is saved in the excel file which is a part of Table 4, is taken from this file with the following commands and transferred to Matlab workspace as matrix. Then training with these data was completed.

```
LP1=xlsread('ann_database',7,'C46:C251');
LP2=xlsread('ann_database',7,'D46:D251');
LP3=xlsread('ann_database',7,'E46:E251');
Dim1=xlsread('ann_database',7,'F46:F251');
Dim2=xlsread('ann_database',7,'G46:G251');
Dim3=xlsread('ann_database',7,'H46:H251');
Data_input=[LP1 LP2 LP3];
Data_target=[Dim1 Dim2 Dim3];
```

Table 4: An image from the excel file containing the data

Time	Sun	LP_1	Sun+LP_1	LP_2	LP_3	Dim_1	Dim_2	Dim_3	Ref_1	Ref_2	Ref_3	LED_1	LED_2	LED_3
04:25	14,59	18,967	33,557	18,2375	16,049	9	9	9	200	150	100	166,443	131,7625	83,951
04:30	16,84	21,892	38,732	21,05	18,524	9	9	9	200	150	100	161,268	128,95	81,476
04:35	18,65	24,245	42,895	23,3125	20,515	8	9	8	200	150	100	157,105	126,6875	79,485
04:40	20,67	26,871	47,541	25,8375	22,737	8	9	8	200	150	100	152,459	124,1625	77,263
04:45	22,81	29,653	52,463	28,5125	25,091	8	9	8	200	150	100	147,537	121,4875	74,909
04:50	24,53	31,889	56,419	30,6625	26,983	8	8	8	200	150	100	143,581	119,3375	73,017
04:55	26,62	34,606	61,226	33,275	29,282	7	8	8	200	150	100	138,774	116,725	70,718
05:00	27,51	35,763	63,273	34,3875	30,261	7	8	7	200	150	100	136,727	115,6125	69,739
05:05	28,62	37,206	65,826	35,775	31,482	7	8	7	200	150	100	134,174	114,225	68,518
05:10	29,53	38,389	67,919	36,9125	32,483	7	8	7	200	150	100	132,081	113,0875	67,517
05:15	30,94	40,222	71,162	38,675	34,034	7	8	7	200	150	100	128,838	111,325	65,966
05:20	31,61	41,093	72,703	39,5125	34,771	7	8	7	200	150	100	127,297	110,4875	65,229

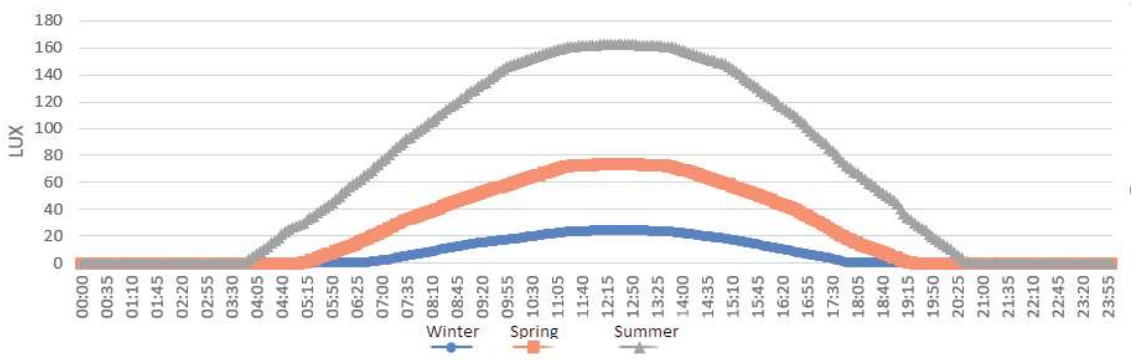


Figure 10: Average Lux values by seasons

Figure 10 shows the average daily lux values taken every 5 minutes according to the seasons. Figure 11 shows the results of the training. After a successful training process, we can input new data from the simulation tab and get new outputs. In this study, 24 hour data taken every 5 minutes in 3 different seasons were added and Dim values of the LEDs were obtained by the trained network.

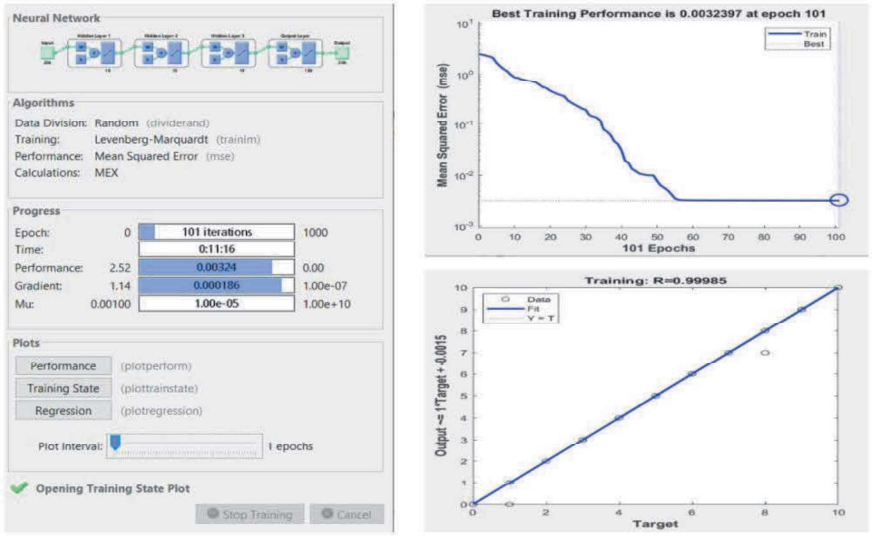


Figure 11: Matlab "nntool" training window, training regression and performance graphs

It was understood that the ANN was designed by controlling the results and working with a very high efficiency. Dim values of 1 to 10 in the output data are transferred to the Matlab workspace field and shown on the graph in Figure 12 with the command "plot". Some of the LEDs do not work at certain hours, as can be seen from these dim values of the summer season. This explains that the designed system saves energy.

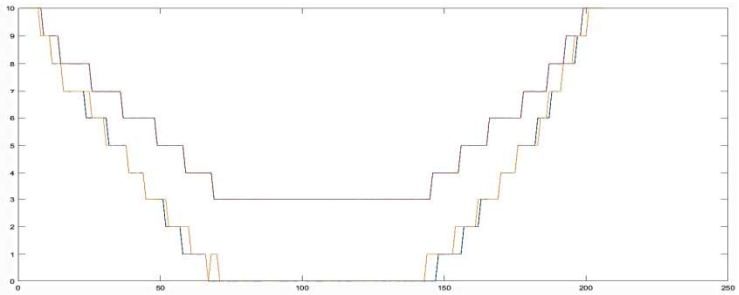


Figure 12: Dimm values of 3 different LED groups

Evaluation and Conclusion

Tunnel lighting requires a good design for safety purposes and because it creates a significant energy consumption. As can be seen from the study in this design, there are many elements to be considered. First of all, tunnels are divided into 5 different sections and 5 different illuminations are made. In these sections, sunlight was used with light pipes and artificial lighting and LED lighting control was provided for the threshold area. The aim here is that the LED luminaires do not consume energy if the environment is sufficiently bright thanks to the reflected and transported light rays. This

process is controlled by artificial intelligence, for each level of brightness is sent to the LEDs are sent to the appropriate dim data.

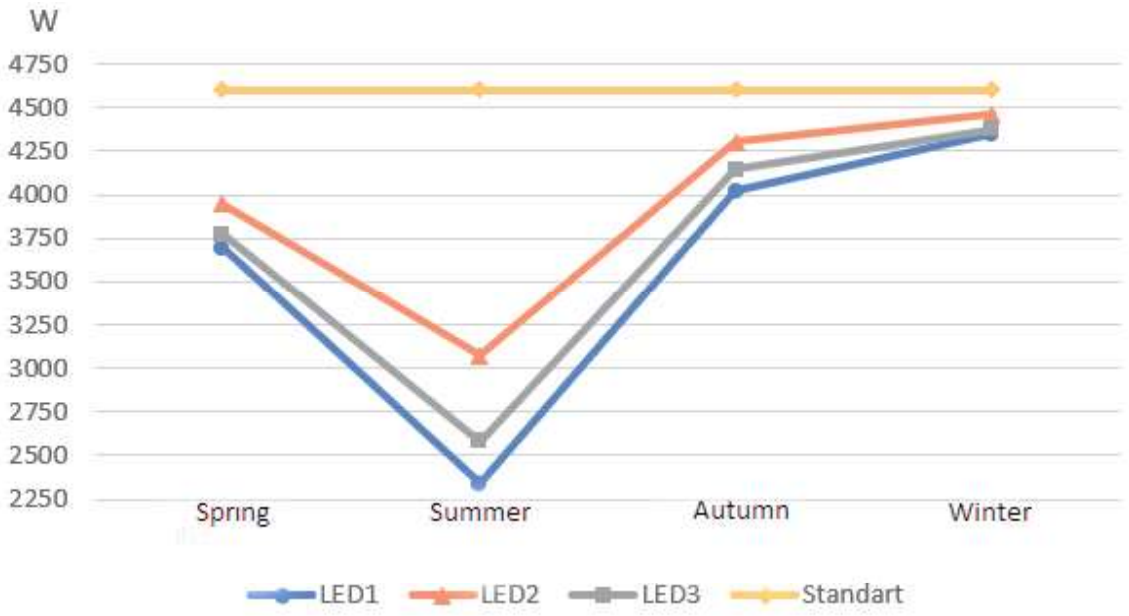


Figure 13: Average hourly consumption of luminaires according to seasons

Figure 13 shows the average hourly consumption data of the luminaires according to the seasons. LED1, LED2 and LED3 are LED-luminaires controlled by dimmable values obtained by ANN which are modeled on Matlab, while the other is standard controlled LED fixtures. According to the results obtained in this modeling on Matlab, approximately 7% in winter, approximately 18% in spring and approximately 40% in summer. As a result, approximately 21% less energy consumption per year occurs.

References

N. Wiener N. Cybernetics - Science, electronic version, 2008. p. 148

International Intellectual Systems Symposium Proceedings - Pskov: 2008. p. 256

Fedyukovich N. I. Anatomy and Physiology: Operating Manual - Polifact-Alpha LLC, 2009. p. 415

Sokolov E. N., Vaitkevicius G.G. Neuroscience: neuron to neurocomputer - M .: Nauka, 2009. s. 96.

Maluh V.N. Introduction to modern CAD systems: lesson lesson. DMK Press, 2010. - 192 p. - ISBN 978-5-94074-551-85.

Muromtsev, Yu.L., Muromtsev, D.Yu., Tyurin, I.V et al., Information Technologies in Electronic Equipment Design: A Study Guide for University Students. - Publication Center "Academy", 2010. - 384 p. - ISBN 978-5-7695-6256-3

Norenkov I. P. Fundamentals of computer aided design: a textbook for universities. - 4th edition, revised and extended - Publisher MSTU. N. Bauman, 2009. - 430 p. - ISBN 978-5-7038-3275-2

I. Norenkov.Automatic design. Textbook. - M .: Moscow State Technical University Press. N. E. Bauman, 2000. - 188, p.

Andrew A. Artificial Intelligence - World, 1985. p. 256 (https://works.doklad.ru/view/x_wUISJiCqU/all.html)

A. Brushlinsky Is Artificial intelligence possible? Accessed by: 05.02.2019.

Hong Zeng, Jian Qiu, Xingfa Shen, Guojun Dai, Peng Liu, Shuping Le, “Fuzzy Control of LED Tunnel Lighting and Energy Conservation”, Elsevier, Tsinghua Science & Technology, Volume 16, Issue 6, December 2011, Pages 576-582

Katja Kircher, Christer Ahlstrom, “The Impact of Tunnel Design and Lighting on The Performance of Attentive and Visually Distracted Drivers”, Elsevier, Accident Analysis & Prevention, Volume 47, July 2012, Pages 153-161

Salata, F.; Golasi, I.; Bovenzi, S.; Vollaro, E.D.L.; Pagliaro, F.; Cellucci, L.; Coppi, M.; Gugliermetti, F.; Vollaro, A.D.L. Energy Optimization of Road Tunnel Lighting Systems. Sustainability 2015, 7, 9664-9680.

Kıyak I., Oral B., Topuz V., “Smart indoor LED lighting design powered by hybrid renewableenergy systems”, Elsevier, Energy and Buildings, 2017, sayfa 342-347.

Boyekin T., Kıyak I., “Analiz Applied Analysis of Estimation of Life and Life in COB LEDs” Ö, Kırklareli University Journal of Engineering and Science 4-2 (2018) 153-162.

Glazer. A. C., Durak M., Kılıç Y., Altun B.,, “Led Technology in Tunnel Lighting Systems”, 3E Electrotech, 2013.

K.Kurtuluş İzbek, “Brake Distance in Tunnel Lighting Design and Some Misapplication in Turkey, EMO”.

Akbulut A. Yüksek “Tunnel Lighting”, Yildiz Technical University, Institute of Science and Technology, Master Thesis, 2006.

Eren N., “Yol Aydınlatma Armatürleri İçin Bakım Faktörünün Belirlenmesi”, VIII. Ulusal Aydınlatma Sempozyumu Bildirileri.

E.J.Gago, T.Muneer, M.Knez, H.Köster, “Natural Light Controls and Guides İn Buildings. Energy Saving For Electrical Lighting, Reduction of Cooling Load” Elsevier, Renewable and Sustainable Energy Reviews Volume 41, January 2015, Pages 1-13

Apollo® Solar Light Pipe, Orion Energy Systems Inc. Accessed by: 20.02.2019

Solatube International, Inc. Accessed by: 15.02.2019

Lavancha Renewable Energy Pvt. Ltd. Accessed by: 12.02.2019

Das U. K., Tey K. S., Seyedmahmoudian M., Mekhilef S., Idris M. Y. I., Van Devender. W., Horan B., Stojcevski A., “Forecasting of photovoltaic power generation and model optimization: A review”, Elsevier, Renewable and Sustainable Energy Reviews, Volume 81, Part 1, January 2018, Pages 912-928.

Baysal N., “Inference System based on Adaptive Network Structure (Anfis) with Numerical Signal Processor Implementation and Application” Inonu University, Institute of Science and Technology, Master Thesis, 2009.

https://cs.stanford.edu, Accessed by: 25.01.2019

Matlab Neural Network Toolbox User's Guide, The MathWorks Inc.

Kıyak İ, Topuz V, Oral B. Modeling of Dimmable High Power LED Illumination Distribution Using ANFIS on the Isolated Area. Expert System with Application. Cilt 38. sf 11843-11848, 2011

http://www.asimovinstitute.org/neural-network-zoo/, Erişim tarihi:25.01.2019

Yumurtacı M., Yabanova İ., “Dynamic Weight Estimation Application with Artificial Neural Networks”, Politeknik Magazine, 2017; 20 (1), pp: 37-41.

Onur F., “Logic Approach to Estimating Dam Lake”, Gebze Technical University, Institute of Science and Technology, Master Thesis, 2015.

Notkin L.I. Artificial intelligence and learning problems. p.211

Levin R. et al., A practical introduction to artificial intelligence and expert systems technology with pictures in BASIC. 1991. (https://works.doklad.ru/view/6Bu4Twb21L8/all.html)