Universitatea Transilvania din Brașov

Interdisciplinary Doctoral School

ADMISSION TO DOCTORAL STUDIES Session September 2022

Field of doctoral studies: Mechanical Engineering
Doctoral supervisor: Prof. dr. ing. NĂSTASE Gabriel

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: The study on fire protection in buildings, building services and facilities, using a fire protection system with mechanical action
Content / Main aspects to be considered *Fire protection system (fire detection, signalling and warning installation; thermal imaging camera; smoke hatch);* *System analysis methods;* *Experimental evaluation of the fire protection system;* *Electronic and physical system operation.*
Recommended bibliography: 1. Johnny Wong*, Heng Li - Development of a conceptual model for the selection of intelligent building systems, Building and Environment 41 (2006) 1106–1123, p 1-18, DOI: https://doi.org/10.1016/j.buildenv.2005.04.021; 2. Glenn Healey, David Slater, Ted Lin, Ben Drda, A. Donald Goedeke - A System for Real-Time Fire Detection , Donmar Limited 901 Dover Drive Newport Beach, CA 92660, ISSN: 1063-6919, DOI: https://doi.org/10.1109/CVPR.1993.341064; 3. Yigithan Dedeoglu, B. Ugur Toreyin, Ugur Gudukbay, A. Enis Cetin - REAL-TIME FIRE AND FLAME DETECTION IN VIDEO; Bilkent University, TR-06800 Bilkent, Ankara, Turkey; ISBN:0-7803-8874-7, DOI: https://doi.org/10.1109/ICASSP.2005.1415493; 4. MEI Zhibin1 , YU Chunyu1 , ZHANG Xi1 - Machine Vision Based Fire Flame Detection Using Multi-Features; Shenyang Fire Research Institute of MPS, Shenyang, Liaoning 110034, China; DOI: https://doi.org/10.1109/ccdc.2012.6244453; 5. Shidong Wang, Yaping He, Jujia Zou, Baobin Duan & Jian Wang - A Flame Detection Synthesis Algorithm; DOI: 10.1007/s10694-012-0321-6;
Prerequisites / Remarks: *It's not necessary*

TOPIC 2: *The study on fire protection in* buildings, building services *and facilities, using an innovative system with thermal imaging, detection and smoke exhaust hatches*

Content / Main aspects to be considered
Fire simulation software systems;
Fire protection system (signaling, alarm and fire warning installation; thermal imaging camera; mechanical/pneumatic smoke hatch);
Innovative system design;
Operation both in real conditions and through simulation.

Recommended bibliography:

1. Celik T, Demirel H, Ozkaramanli H, Uyguroglu M - Fire detection using statistical color model in video sequences; J Vis Commun Image Represent 18(2007):176–185; DOI:10.1109/ICASSP.2006.1660317;
2. Giuseppe Marbach*,Markus Loepfe,Thomas Brupbacher - An image processing technique for fire detection in video images; Fire Safety Journal41(2006);DOI: https://doi.org/10.1016/j.firesaf.2006.02.001;
3. Thou-Ho (Chao-Ho) Chen, Yen-Hui Yin, Shi-Feng Huang and Yan-Ting Ye - The Smoke Detection for Early Fire-Alarming System Base on Video Processing; ISBN:0-7695-2745-0; DOI: https://doi.org/10.1109/IIH-MSP.2006.265033;
4. Walter Phillips 111 Mubarak Shah Niels da Vitoria Lobo - Flame Recognition in Video; DOI: https://doi.org/10.1109/WACV.2000.895426; ISBN:0-7695-0813-8;
5. C. L. Lai, J. C. Yang, and Y. H. Chen - A Real Time Video Processing Based Surveillance System for Early Fire and Flood Detection*; Warsaw, Poland, May 1-3, 2007; ISSN: 1091-5281; DOI: 10.1109/IMTC.2007.379190.

Prerequisites / Remarks: *It's not necessary*

TOPIC 3: *The study regarding the verification of the compliance with the regulations regarding fire protection in buildings, building services and facilities, using a fire protection system with mechanical action*

Content / Main aspects to be considered
Designing the entire physical system;
Electronic and physical system operation;
The elements of the fire protection system (signaling, alarm and fire warning installation; thermal imaging camera; mechanical/pneumatic smoke extraction hatch);
Mode of operation and use of the fire protection system;
Fire simulation software systems.

Recommended bibliography:

1. Sahar Bayoumi, Elham AlSobky, Moneerah Almohsin, Manahel Altwaim, Monira Alkaldi and Munera Alkahtani - A Real time Fire Detection and Notification System Based on Computer Vision; ISBN:978-1-4799-2845-3; DOI: 10.1109/ICITCS.2013.6717783;
2. Nicholas True - Computer Vision Based Fire Detection; University of California, San Diego 9500 Gilman Drive, La Jolla, CA 92093 ; DOI:10.7763/IJCEE.2013.V5.703;
3. Mingyi Zhu; Jiamin Zhang - Design of Fire Detection and Alarm System Based on Intelligent Neural Network;DOI: https://doi.org/10.1109/ICCRD.2011.5764264; ISBN:978-1-61284-840-2;
4. T. Celik, H. Demirel, H. Ozkaramanli, M. Uyguroglu - FIRE DETECTION IN VIDEO SEQUENCES USING STATISTICAL COLOR MODEL; DOI: http://dx.doi.org/10.1109/ICASSP.2006.1660317;
5. Ren C. Luo, Kuo L. Su, and Kuo H. Tsai - Fire detection and Isolation for Intelligent Building Using Adaptive Sensory Fusion MethodSystem,ISBN:0-7803-7272-7; DOI: https://doi.org/10.1109/ROBOT.2002.1014799;

Prerequisites / Remarks: *It's not necessary*

TOPIC 4: *Research on complying with fire protection regulations in buildings using fire installations*

Content / Main aspects to be considered

Design of the entire fire installation;
The installation is an innovative fire installation, consisting of a signaling, alarm and fire warning installation; thermal imaging camera; mechanical/pneumatic exhaust hatch);
Mode of operation and use of the fire installation;
Software systems for simulating a fire, having the innovative facility designed.

Recommended bibliography:

1. M. Hashemzadeh and A. Zademehdi, "Fire detection for video surveillance applications using ICA K-medoids-based color model and efficient spatio-temporal visual features", Expert Systems with Applications, vol. 130, pp. 60-78, 2019, DOI: https://doiorg.ezproxy.csu.edu.au/10.1016/j.eswa.2019.04.019
2. Liting Cao, Jingwen Tian and Wei Jiang - Information Fusion

Technology and Its Application to Fire Automatic Control System of Intelligent Building; Proceedings of the 2007 International Conference on Information Acquisition July 9-11, 2007, Jeju City, Korea ; DOI:https://doi.org/10.1109/ICIA.2007.4295775; ISBN:1-4244-1219-6
3. Zaighum Ateeq; Mohammad Momani - Wireless Sensor Networks using image processing for fire detection; ISBN:978-1-7281-9438-7; DOI:https://doi.org/10.1109/CITISIA50690.2020.9371798
4. Seong G. Kong, Donglin Jin, Shengzhe Li, Hakil Kim - Fast fire flame detection in surveillance video using logistic regression and temporal smoothing; Fire Safety Journal 79 (2016) 37–43; DOI: https://doi.org/10.1016/j.firesaf.2015.11.015
5. T. Chen, P. Wu, Y. Chiou - An early fire detection method based on image processing, 2004 International Conference on Image Processing(ICIP);ISSN: 1522-4880;DOI: http://dx.doi.org/10.1109/ICIP.2004.1421401

Prerequisites / Remarks: *It's not necessary*

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