



INFORMATION TECHNOLOGIES: THEORETICAL AND APPLIED PROBLEMS (ITTAP-2024)

The 4th International Workshop

October 23-25, 2024

Ternopil, UKRAINE

Opole, POLAND

<https://ittap.tntu.edu.ua/>

CONFERENCE PROGRAMME



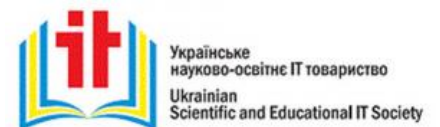
**Ternopil Ivan Puluj
National Technical
University**
Member Of European
University Association



TransLeader

<https://tl.ubb.edu.pl>

Erasmus+ project no: 2023-2-PL01-KA220-HED-000179445



23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

ITTAP 2024 General Timetable

October 23		
	9:50-10:00 (10)	Conference opening
1	10:00-10:10	Borys Lypa, Natalia Zagorodna, Ivan Horyn and Dmytro Tymoshchuk Comparison of feature extraction tools for network traffic data
2	10:10-10:20	Vasyl Yatsyshyn, Oleh Pastukh, Victoria Kukharska, Andriy Palamar and Serhii Kulikov Method and tool of detecting software architecture patterns in the process of computer systems development
3	10:20-10:30	Serhii Dolhopolov, Tetyana Honcharenko, Pavlo Kruk, Iryna Porokhovnichenko and Vladyslav Hots YOLOv8, YOLOv9, and YOLOv10: A Study in Automated Vehicle Damage Detection
4	10:30-10:40	Andrii Harasivka, Anatolii Lupenko, Mykhailo Fryz and Yuri Palaniza Improve data backup strategies with machine learning predictive analytics*
5	10:40-10:50	Serhii Dolhopolov, Tetyana Honcharenko, Denys Chernyshev and Olga Solovei YOLOv5-based Object Detection for Construction Site Efficiency: Equipment, Tool, and Vehicle Recognition
6	10:50-11:00	Iaroslav Lytvynenko, Volodymyr Dzyura and Pavlo Maruschak Automated algorithm for determining surface's oil capacity based on the analysis of the Abbot-Firestone diagram's parameters
7	11:00-11:10	Illia Fedorovych, Halyna Osukhivska and Nadiia Lutsyk Performance Benchmarking of Continuous Processing and Micro-Batch Modes in Spark Structured Streaming
8	11:10-11:20	Michał Wierzbicki and Jakub Osuchowski A Comparison of Frame-by-Frame and Aggregation Approaches for Gesture Classification Using Machine Learning
9	11:20-11:30	Mykhailo Fryz, Svitlana Kovtun, Yurii Kuts, Bogdana Mlynko and Oleksandra Kuchvara Stationarity, Ergodicity and Mixing Properties of Conditional Linear Time Series Models
10	11:30-11:40	Nina Bąkowska and Krzysztof Zatwarnicki Algorithm for conceptual problem-solving using General Environment Description Language
	11:40-12:00 (20)	Coffee brakes
11	12:00-12:10	Nataliia Dziubanovska Assessing Fake News Impact on Polish Political Attitudes Toward the Ukraine War
12	12:10-12:20	Oleg Lyashuk, Mykola Stashkiv, Yurii Palianytsia, Roman Khoroshun and Dmytro Mironov Fourier Model Fitting for Vibration Analysis of Car Wheel Suspension Enhanced Damping System
13	12:20-12:30	Oleh Yasniy, Dmytro Tymoshchuk, Iryna Didych, Nataliya Zagorodna and Olha Malyshevska Modelling of automotive steel fatigue lifetime by machine learning method
14	12:30-12:40	Oleksii Yehorov, Bohdan Volokh, Ihor Bosenko, Bohdan Yeremenko and Svitlana Terenchuk

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

		Modeling of highly loaded distributed system supporting the process of assessing the technical condition of objects
15	12:40-12:50	Roman Yuzefovych, Ihor Javorskyj, Oleh Lychak, Roman Khmil and George Trokhym Analysis of the vibration signals based on PCR representation
16	12:50-13:00	Tetyana Honcharenko, Olga Solovei and Bohdan Solovei An approach to evaluate a classification model to predict a construction object's state
17	13:00-13:10	Vasyl Ustimenko and Oleksandr Pustovit Jordan-Gauss graphs and quadratic public keys of Multivariate Cryptography
18	13:10-13:20	Victoria Vysotska, Vasyl Lytvyn, Serhii Vladov, Viktor Vasylenko and Oleksii Kryshan The optimal controller parametric synthesis using variational calculus for a dynamic system general mathematical model
19	13:20-13:30	Viktoriia Mytsa and Mykola Riabchykov Improvement of intelligent systems for creating personalized products
20	13:30-13:40	Vitalii Mocharskyi, Bogdan Kovalyuk and Oksana Sitkar A mathematical modeling of surface periodic relief after nanosecond laser processing
21	13:40-13:50	Volodymyr Lytvynenko, Serge Olszewski, Volodymyr Osypenko, Violeta Demchenko and Dariia Dontsova Comparison of the efficiency of autoencoders for solving clustering problems
22	13:50-14:00	Volodymyr Semchyshyn and Dmytro Mykhalyk Analysis and strategy development for improving the performance of the Paillier cryptosystem algorithm in medical data processing
23	14:00-14:10	Dawid Pawuś, Szczepan Paszkiel and Tomasz Porązko Comparison of artificial intelligence algorithms and expert approach in risk classification in nephrology
24	14:10-14:20	Oleh Pihnastyi, Georgii Kozhevnikov and Bohdan Fedorchak The selection of a structure of a neural network model for predicting the flow parameters of transport systems
25	14:20-14:30	Andrii Sverstiuk, Taras Dubynyak, Mykola Stashkiv, Volodymyr Nevozhai and Mykola Poshyvak Analysis of the accuracy, stiffness and stability of shell structures of mirror antennas using computer modeling
26	14:30-14:40	Oleksandr Sorokivskyi, Volodymyr Hotovych, Oleg Nazarevych and Grygorii Shymchuk Comparative Analysis of Camera Calibration Algorithms for Soccer Applications

October 24		
1	10:00-10:10	Viktor Sineglazov and Kyrylo Lesohorskyi Semi-supervised learning for hyperspectral landmine detection
2	10:10-10:20	Vladyslav Khaidurov, Anastasia Bekesheva and Roman Yarovoy Using the variational principle of leveling illumination in images
3	10:20-10:30	Andrii Sverstiuk, Taras Dubynyak, Nadia Shostakivska, Myroslava Yavorska and Mykola Poshyvak Mathematical and computer modelling to assess accuracy and adequacy in torque measurement
4	10:30-10:40	Kirill Smetanin, Vasyl Trysnyuk, Ihor Humeniuk, Volodymyr Okhrimchuk and Oleksandr Lahodnyi Advanced data encryption method based on the monochrome pixel alphabet
5	10:40-10:50	Oleh Pihnastyi, Olha Kozhyna and Iuliia Karpushenko Comparative analysis of models for assessing asthma severity based on paraclinical studies
6	10:50-11:00	Petro Stukhliak, Oleg Totosko, Danulo Stukhlyak, Olena Vynokurova and Iaroslav Lytvynenko Use of neural networks for modelling the mechanical characteristics of epoxy composites treated with electric spark water hammer
7	11:00-11.10	Volodymyr Kuharsky and Dmytro Mykhalyk Integration of SQL Server Reporting Services into modern application infrastructure
8	11:10-11:20	Trong The Quan A Speech Enhancement Based on Minimum Variance Distortion Response Beamformer in Adverse Recording Scenario
9	11:20-11:30	Oleh Pastukh and Viktor Khomyshyn Using ensemble methods of machine learning to predict real estate prices
10	11:30-11:40	Volodymyr Halchenko, Ruslana Trembovetska and Volodymyr Tychkov Computer robust parameter design of surface eddy current probes. Developing software design of numerical experiments creating
	11:40-12:00 (20)	Coffee brakes
11	12:00-12:10	Yurii Hlado, Nadia Kryva and Nadia Gashchyn Information system for positioning and orienting antenna system
12	12:10-12:20	Barbara Jantos and Michal Tomaszewski Towards Digital Twins in Rehabilitation Processes - Examples of Publicly Available Datasets
13	12:20-12:30	Mykhaylo Petryk, Vitalii Chyzh, Halyna Tsupryk and Oksana Petryk Information System for Design of Thin Multilayer Film Processes Parameters Management based on Diffusion
14	12:30-12:40	Nataliia Dziubanovska Modeling of War-Induced Ukrainian Migration's Impact on Poland's Trade Using Machine Learning
15	12:40-12:50	Serhii Lupenko, Oleksandra Orobchuk, Igor Kateryniuk, Ruslan Kozak and Halyna Lypak

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

		Secure information system for Chinese Image medicine knowledge consolidation
16	12:50-13:00	Viktor Sineglazov, Dmytro Nikulin and Kyrylo Lesohorskyi Generation of camouflage based on the use of generative-competitive neural networks
17	13:00-13:10	Volodymyr Shanaida, Valeriy Lazaryuk and Ruslan Skliarov Software module for project analysis in mechanical processing and welding of frame structures
18	13:10-13:20	Tetiana Hovorushchenko, Vyacheslav Bachuk, Vladyslav Sevostyanov, Andrii Martsenyuk, Vladyslav Baranovskyi and Houda El Bouhissi Microcontroller system for air quality monitoring
19	13:20-13:30	Ihor Konovalenko and Pavlo Maruschak Computer assisted analysis of transgranular and intergranular micromechanisms of brittle fracture
20	13:30-13:40	Oleksii Matsiievskyi, Igor Achkasov, Yevhenii Borodavka and Roman Mazurenko Behavioral model of autonomous robotic systems using reinforcement learning methods
21	13:40-13:50	Iryna Didych, Andrii Mykytyshyn, Andrii Stanko and Mykola Mytnyk Application of machine learning methods to the prediction of NO2 concentration in the air environment
22	13:50-14:00	Dmytro Lukavenko and Tetyana Honcharenko Efficiency of Regression Testing Strategies in CI/CD Environments
23	14:00-14:10	Zineb Bougriche and Rafał Gasz Decoding Emotional Complexity: Challenges in Emotions Classification Using the CMU Dataset
24	14:10-14:20	Mykhailo Mykhailyshyn and Halyna Semenyshyn Mathematical and numerical modeling of nonlinear deformation processes..
25	14:20-14:30	Nadiia Marchenko, Hanna Martyniuk, Olena Monchenko, Larysa Chubko and Tetiana Scherbak Principles of construction of an adaptive multilevel system of monitoring and diagnostics of complex technical objects
26	14:30-14:40	Trong The Quan An Adaptive Post - Filtering - Based Generalized Sidelobe Canceller Beamformer's Speech Enhancement

October 25		
	10:00-10:30	Final session Conference summary. Discussion of the presented papers.

TIME FOR PRESENTATIONS

Paper presentation at the regular session – 5 min.

Discussion, questions – 5 min.

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND



Organized by:

**Ternopil Ivan Puluj National Technical University,
Faculty of Computer Information Systems and Software Engineering
Opole University of Technology**

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

October 23

Link Conference: <https://tube5.tntu.edu.ua/rooms/ec3-hzl-9qt-aqt>

YouTube: <https://www.youtube.com/channel/UCn3iBiVcrCCDooKSJTD2pww>

Conference opening

9:50-10:00 (10)

Time	Report	YouTube link
1 10:00-10:10	Borys Lypa, Natalia Zagorodna, Ivan Horyn and Dmytro Tymoshchuk Comparison of feature extraction tools for network traffic data	https://youtu.be/_qCmd4QU0hU
2 10:10-10:20	Vasyl Yatsyshyn, Oleh Pastukh, Victoria Kukharska, Andriy Palamar and Serhii Kulikov Method and tool of detecting software architecture patterns in the process of computer systems development	https://youtu.be/IOjaAxVQd8M
3 10:20-10:30	Serhii Dolhopolov, Tetyana Honcharenko, Pavlo Kruk, Iryna Porokhovnichenko and Vladyslav Hots YOLOv8, YOLOv9, and YOLOv10: A Study in Automated Vehicle Damage Detection	
4 10:30-10:40	Andrii Harasivka, Anatolii Lupenko, Mykhailo Fryz and Yuri Palaniza Improve data backup strategies with machine learning predictive analytics*	https://youtu.be/vnVTHAmudBM
5 10:40-10:50	Serhii Dolhopolov, Tetyana Honcharenko, Denys Chernyshev and Olga Solovei YOLOv5-based Object Detection for Construction Site Efficiency: Equipment, Tool, and Vehicle Recognition	
6 10:50-11:00	Iaroslav Lytvynenko, Volodymyr Dzyura and Pavlo Maruschak	https://youtu.be/u8eB6aP72QI

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

		Automated algorithm for determining surface's oil capacity based on the analysis of the Abbot-Firestone diagram's parameters	
7	11:00-11:10	Ilia Fedorovich, Halyna Osukhivska and Nadiia Lutsyk Performance Benchmarking of Continuous Processing and Micro-Batch Modes in Spark Structured Streaming	https://www.youtube.com/watch?v=WsKYvArbA6E&t=6s
8	11:10-11:20	Michał Wierzbicki and Jakub Osuchowski A Comparison of Frame-by-Frame and Aggregation Approaches for Gesture Classification Using Machine Learning	https://youtu.be/MpE_cYOx96c
9	11:20-11:30	Mykhailo Fryz, Svitlana Kovtun, Yurii Kuts, Bogdana Mlynko and Oleksandra Kuchvara Stationarity, Ergodicity and Mixing Properties of Conditional Linear Time Series Models	https://www.youtube.com/watch?v=WMCBVTX1sj0
10	11:30-11:40	Nina Bąkowska and Krzysztof Zatwarnicki Algorithm for conceptual problem-solving using General Environment Description Language	https://youtu.be/6ORz-Qm2e3M
	11:30-12:00 (30)	Coffee brakes	
11	12:00-12:10	Nataliia Dziubanovska Assessing Fake News Impact on Polish Political Attitudes Toward the Ukraine War	https://youtu.be/mJuGpmmKguA
12	12:10-12:20	Oleg Lyashuk, Mykola Stashkiv, Yurii Palianytsia, Roman Khoroshun and Dmytro Mironov Fourier Model Fitting for Vibration Analysis of Car Wheel Suspension Enhanced Damping System	https://youtu.be/XKQMf2qY4TY

Time	Report	YouTube link	Time
13	12:20-12:30	Oleh Yasniy, Dmytro Tymoshchuk, Iryna Didych, Nataliya Zagorodna and Olha Malyshevska Modelling of automotive steel fatigue lifetime by machine learning method	https://www.youtube.com/watch?v=mHXa_RjtnAM&t=6s
14	12:30-12:40	Oleksii Yehorov, Bohdan Volokh, Ihor Bosenko, Bohdan Yeremenko and Svitlana Terenchuk Modeling of highly loaded distributed system supporting the process of assessing the technical condition of objects	
15	12:40-12:50	Roman Yuzefovych, Ihor Javorskyj, Oleh Lychak, Roman Khmil and George Trokhym Analysis of the vibration signals based on PCR representation	
16	12:50-13:00	Tetyana Honcharenko, Olga Solovei and Bohdan Solovei An approach to evaluate a classification model to predict a construction object's state	https://www.youtube.com/watch?v=LiqFysn085E
17	13:00-13:10	Vasyl Ustimenko and Oleksandr Pustovit Jordan-Gauss graphs and quadratic public keys of Multivariate Cryptography	https://youtu.be/6axV9UYNvCY
18	13:10-13:20	Victoria Vysotska, Vasyl Lytvyn, Serhii Vladov, Viktor Vasylenko and Oleksii Kryshan	

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

		The optimal controller parametric synthesis using variational calculus for a dynamic system general mathematical model	
19	13:20-13:30	Viktoriia Mytsa and Mykola Riabchykov Improvement of intelligent systems for creating personalized products	https://youtu.be/s_Vvx_4xrzE
20	13:30-13:40	Vitalii Mocharskyi, Bogdan Kovalyuk and Oksana Sitkar A mathematical modeling of surface periodic relief after nanosecond laser processing	
21	13:40-13:50	Volodymyr Lytvynenko, Serge Olszewski, Volodymyr Osypenko, Violeta Demchenko and Dariia Dontsova Comparison of the efficiency of autoencoders for solving clustering problems	
22	13:50-14:00	Volodymyr Semchyshyn and Dmytro Mykhalyk Analysis and strategy development for improving the performance of the Paillier cryptosystem algorithm in medical data processing	https://youtu.be/5oIBM9v59Vs
23	14:00-14:10	Dawid Pawuś, Szczepan Paszkiel and Tomasz Porażko Comparison of artificial intelligence algorithms and expert approach in risk classification in nephrology	https://youtu.be/9sJbKQJzBzw
24	14:10-14:20	Oleh Pihnastyi, Georgii Kozhevnikov and Bohdan Fedorchak The selection of a structure of a neural network model for	https://www.youtube.com/watch?v=BF9EN7foYmQ

		predicting the flow parameters of transport systems	
25	14:20-14:30	Andrii Sverstiuk, Taras Dubynyak, Mykola Stashkiv, Volodymyr Nevozhai and Mykola Poshyvak Analysis of the accuracy, stiffness and stability of shell structures of mirror antennas using computer modeling	https://youtu.be/C8bpol4XAJU
26	14:30-14:40	Oleksandr Sorokivskyi, Volodymyr Hotovych, Oleg Nazarevych and Grygorii Shymchuk Comparative Analysis of Camera Calibration Algorithms for Soccer Applications	



Organized by:

**Ternopil Ivan Puluj National Technical University,
Faculty of Computer Information Systems and Software Engineering
Opole University of Technology**

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

October 24

Link Conference: <https://tube5.tntu.edu.ua/rooms/ec3-hzl-9qt-aqt>

YouTube: <https://www.youtube.com/channel/UCn3iBiVcrCCDooKSJTD2pww>

Time		Report	YouTube link
1	10:00-10:10	Viktor Sineglazov and Kyrylo Lesohorskyi Semi-supervised learning for hyperspectral landmine detection	
2	10:10-10:20	Vladyslav Khaidurov, Anastasia Bekesheva and Roman Yarovoy Using the variational principle of leveling illumination in images	https://youtu.be/SA3YU9lzH5Y
3	10:20-10:30	Andrii Sverstiuk, Taras Dubynyak, Nadia Shostakivska, Myroslava Yavorska and Mykola Poshyvak Mathematical and computer modelling to assess accuracy and adequacy in torque measurement	https://youtu.be/Q7B5OTZ9LcA
4	10:30-10:40	Kirill Smetanin, Vasyl Trysnyuk, Ihor Humeniuk, Volodymyr Okhrimchuk and Oleksandr Lahodnyi Advanced data encryption method based on the monochrome pixel alphabet	https://www.youtube.com/watch?v=raKb9ZBMFf4
5	10:40-10:50	Oleh Pihnastyi, Olha Kozhyna and Iuliia Karpushenko Comparative analysis of models for assessing asthma severity based on paraclinical studies	https://youtu.be/QEJp7LUFN30
6	10:50-11:00	Petro Stukhliak, Oleg Totosko, Danulo Stukhlyak, Olena Vynokurova and Iaroslav Lytvynenko	

		Use of neural networks for modelling the mechanical characteristics of epoxy composites treated with electric spark water hammer	
7	11:00-11:10	Volodymyr Kuharsky and Dmytro Mykhalyk Integration of SQL Server Reporting Services into modern application infrastructure	
8	11:10-11:20	Trong The Quan A Speech Enhancement Based on Minimum Variance Distortion Response Beamformer in Adverse Recording Scenario	https://www.youtube.com/watch?v=rBc9idq40ho&t=2s
9	11:20-11:30	Oleh Pastukh and Viktor Khomyshyn Using ensemble methods of machine learning to predict real estate prices	https://www.youtube.com/watch?v=0wARhMns1Qg&t=1s
10	11:30-11:40	Volodymyr Halchenko, Ruslana Trembovetska and Volodymyr Tychkov Computer robust parameter design of surface eddy current probes. Developing software design of numerical experiments creating	https://www.youtube.com/watch?v=dbaLYQJDMIU
	11:40-12:00 (20)	Coffee brakes	
11	12:00-12:10	Yurii Hlado, Nadia Kryva and Nadia Gashchyn Information system for positioning and orienting antenna system	https://youtu.be/JOOpOXL0cuI
12	12:10-12:20	Barbara Jantos and Michał Tomaszewski Towards Digital Twins in Rehabilitation Processes - Examples of	https://youtu.be/iccbn2i4MgE

		Publicly Available Datasets	
13	12:20-12:30	Mykhaylo Petryk, Vitalii Chyzh, Halyna Tsupryk and Oksana Petryk Information System for Design of Thin Multilayer Film Processes Parameters Management based on Diffusion	https://www.youtube.com/watch?v=jAopfxg6PfY&t=6s
14	12:30-12:40	Nataliia Dziubanovska Modeling of War-Induced Ukrainian Migration's Impact on Poland's Trade Using Machine Learning	https://youtu.be/JZZakf1Lixc

	Time	Report	YouTube link
15	12:40-12:50	Serhii Lupenko, Oleksandra Orobchuk, Igor Kateryniuk, Ruslan Kozak and Halyna Lypak Secure information system for Chinese Image medicine knowledge consolidation	
16	12:50-13:00	Viktor Sineglazov, Dmytro Nikulin and Kyrylo Lesohorskyi Generation of camouflage based on the use of generative-competitive neural networks	
17	13:00-13:10	Volodymyr Shanaida, Valeriy Lazaryuk and Ruslan Skliarov Software module for project analysis in mechanical processing and welding of frame structures	https://www.youtube.com/watch?v=CFNam_2FviM
18	13:10-13:20	Tetiana Hovorushchenko, Vyacheslav Bachuk, Vladyslav Sevostyanov, Andrii Martsenyuk,	https://www.youtube.com/watch?v=f2-gqmVrAzW

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND

		Vladyslav Baranovskyi and Houda El Bouhissi Microcontroller system for air quality monitoring	
19	13:20-13:30	Ihor Konovalenko and Pavlo Maruschak Computer assisted analysis of transgranular and intergranular micromechanisms of brittle fracture	https://youtu.be/fJ8Us-xAcNY
20	13:30-13:40	Oleksii Matsiievskyi, Igor Achkasov, Yevhenii Borodavka and Roman Mazurenko Behavioral model of autonomous robotic systems using reinforcement learning methods	
21	13:40-13:50	Iryna Didych, Andrii Mykytyshyn, Andrii Stanko and Mykola Mytnyk Application of machine learning methods to the prediction of NO ₂ concentration in the air environment	
22	13:50-14:00	Dmytro Lukavenko and Tetyana Honcharenko Efficiency of Regression Testing Strategies in CI/CD Environments	
23	14:00-14:10	Zineb Bougriche and Rafal Gasz Decoding Emotional Complexity: Challenges in Emotions Classification Using the CMU Dataset	
24	14:10-14:20	Mykhailo Mykhailyshyn and Halyna Semenyshyn Mathematical and numerical modeling of nonlinear deformation processes..	https://youtu.be/6ORz-Qm2e3M
25	14:20-14:30	Nadiia Marchenko, Hanna Martyniuk, Olena Monchenko, Larysa Chubko and Tetiana Scherbak Principles of construction of an adaptive multilevel system of monitoring and diagnostics of complex technical objects	https://www.youtube.com/watch?v=VdHezZjXJ8I

26	14:30-14:40	Trong The Quan An Adaptive Post - Filtering - Based Generalized Sidelobe Canceller Beamformer's Speech Enhancement	https://www.youtube.com/watch?v=EBUpbsUSZpA&t=1s
----	-------------	---	---



Organized by:
**Ternopil Ivan Puluj National Technical University,
Faculty of Computer Information Systems and Software Engineering
Opole University of Technology**

October 25

Link Conference: <https://tube5.tntu.edu.ua/rooms/ec3-hzl-9qt-aqt>

YouTube: <https://www.youtube.com/channel/UCn3iBiVcrCCDooKSJTD2pww>

October 25		
Time		Final session
1	10:00-10:30	1. Conference summary. Discussion of the presented papers. 2. Meeting of the participants, Program and Organizing Committees. Feedbacks on the conference. Discussion on the possible ways of improvement for future.



Organized by:

**Ternopil Ivan Puluj National Technical University,
Faculty of Computer Information Systems and Software Engineering
Opole University of Technology**

23-25, October, 2024, Ternopil, UKRAINE, Opole, POLAND