The 17th KIPS International Conference on Ubiquitous Information Technologies and Applications
(CUTE 2023)

December 18-20, 2023
Nha Trang, Vietnam

Organized by

KIPS & KIPS CSWRG & NTU

2024 International Conferences
(Sponsored / Technically Sponsored by KIPS / KIPS SWRG)

The 10th World Congress on Information Technology Applications and Services (World IT Congress 2024)
  - February 14-16, 2024 (Jeju, Korea)
  - http://www.worlditcongress.org/2024/

The 18th International Conference on Multimedia and Ubiquitous Engineering (MUE 2024)
  - April 23-215 2024 (Chongqing, China)
  - http://www.mue-conference.org/2024/

The 19th International Conference on Future Information Technology (FutureTech 2024)
  - April 23-215 2024 (Chongqing, China)
  - http://www.futuretech-conference.org/2024/

The International Conference on Big data, IoT, and Cloud computing (BIC 2024)
  - August 12-14, 2024 (unconfirmed)
  - http://www.bic-conference.org/2024/ (Unopened)

The 16h International Conference on Computer Science and its Applications (CSA 2023)
  - Dec 18-20, 2024 (unconfirmed)
  - http://www.csa-conference.org/2024/ (Unopened)

Message from the CUTE 2023 General Chairs

On behalf of the organizing committees, it is our pleasure to welcome you to the 17th International Conference on Ubiquitous Information Technologies and Applications (CUTE 2023), will be held in Nha Trang University, Vietnam on December 18-20, 2023.

This conference provides an international forum for the presentation and showcase of recent advances on various aspects of ubiquitous computing. It will reflect the state-of-the-art of the computational methods, involving theory, algorithm, numerical simulation, error and uncertainty analysis and/or novel application of new processing techniques in engineering, science, and other disciplines related to ubiquitous computing.

The papers included in the proceedings cover the following topics: Ubiquitous Communication and Networking, Ubiquitous Software Technology, Ubiquitous Systems and Applications, Ubiquitous Security, Privacy and Trust. Accepted papers highlight new trends and challenges in the field of ubiquitous computing technologies. We hope you will find these results useful and inspiring for your future research.

We would like to express our sincere thanks to Steering Committees: James J. Park (SeoulTech, Korea), Doo-Soon Park (SoonChunHyang University, Korea), Young-Sik Jeong (Dongguk University, Korea), Nammee Moon(Hoseo University, Korea), Hsiao-Hsi Wang (Providence University, Taiwan), Laurence T. Yang (St.Francis Xavier University, Canada), Hai Jin (Huangzhong University of Science and Technology, China), Chan-Hyun Youn (KAIST, Korea), Jianhua Ma (Hosei University, Japan), Mingyi Guo (Shanghai Jiao Tong University, China), Weijia Jia (City University of Hong Kong, Hong Kong). We would also like to express our cordial thanks to the Program Chairs & Program Committee members for their valuable efforts in the review process, which helped us to guarantee the highest quality of the selected papers for the conference.

Finally, we would thank all the authors for their valuable contributions and the other participants of this conference. The conference would not have been possible without their support. Thanks are also due to the many experts who contributed to making the event a success.

CUTE 2023 General Chairs

Jungho Kang, Baewha Woman University, Korea
Laurence T. Yang, St.Francis Xavier University, Canada
Pham Van Nam, Nha Trang University, Vietnam

KIPS
Korea Information Processing Society

KIPS CSWRG
Korea Information Processing Society
Computer Software Research Group

NTU
ĐẠI HỌC NHA TRANG
1959

Message from the CUTE 2023 Program Chairs

Welcome to the 17th International Conference on Ubiquitous Information Technologies and Applications (CUTE 2023), will be held in Nha Trang University, Vietnam on December 18-20, 2023.

The purpose of the CUTE 2023 conference is to promote discussion and interaction among academics, researchers and professionals in the field of ubiquitous computing technologies. This year the value, breadth, and depth of the CUTE 2023 conference continues to strengthen and grow in importance for both the academic and industrial communities. This strength is evidenced this year by having the highest number of submissions made to the conference.

For CUTE 2023, we received a lot of paper submissions from various countries. Out of these, after a rigorous peer review process, we accepted only high-quality papers for CUTE 2023 proceeding, published by the Springer. All submitted papers have undergone blind reviews by at least two reviewers from the technical program committee, which consists of leading researchers around the globe. Without their hard work, achieving such a high-quality proceeding would not have been possible. We take this opportunity to thank them for their great support and cooperation.

Finally, we would like to thank all of you for your participation in our conference, and also thank all the authors, reviewers, and organizing committee members. Thank you and enjoy the conference!

CUTE 2023 Program Chairs

Ji Su Park, Jeonju University, Korea
Jin Wang, Yangzhou University, China
Joon-Min Gil, Jeju National University, Korea
Neil Y. Yen, The University of Aizu, Japan
Nguyen Dinh Hung, Nha Trang University, Vietnam

Organization

Honorary Chair
Nammee Moon, President of KIPS, Korea
Pham Thi Thu Thuy, Nha Trang University, Vietnam

Steering Committee
James J. Park, SeoulTech, Korea
Doo-Soon Park, Soonchunhyang University, Korea
Young-Sik Jeong, Dongguk University, Korea
Nammee Moon, Hoseo University, Korea
Hsiao-Hsi Wang, Providence University, Taiwan
Laurence T. Yang, St.Francis Xavier University, Canada
Hai Jin, Huangzhong University of Science and Technology, China
Chan-Hyun Youn, KAIST, Korea
Jianhua Ma, Hosei University, Japan
Mingyi Guo, Shanghai Jiao Tong University, China
Weijia Jia, City University of Hong Kong, Hong Kong

General Chairs
Jungho Kang, Baewha Woman University, Korea (Leading Chair)
Laurence T. Yang, St.Francis Xavier University, Canada
Pham Van Nam, Nha Trang University, Vietnam

Program Chairs
Ji Su Park, Jeonju University, Korea (Leading Chair)
Jin Wang, Yangzhou University, China
Joon-Min Gil, Jeju National University, Korea
Neil Y. Yen, The University of Aizu, Japan
Nguyen Dinh Hung, Nha Trang University, Vietnam

International Advisory Committee
Yi Pan, GSU, USA and SIAT, China
Byeong-Seok Shin, Inha, Korea
C.S. Raghavendra, University of Southern California, USA
HeonChang Yu, Korea University, Korea
Im-Yeong Lee, SoonChunHyang University, Korea
Han-Chieh Chao, National Ilan University, Taiwan
Shu-Ching Chen, Florida International University, USA
Keun Ho Ryu, Chungbuk National University, Korea
Victor Leung, University of British Columbia, Canada
Kwang-il Hwang, Incheon National University, Korea
Sherali Zeadally, University of Kentucky, USA
Jin Gon Shon, Korea Univeristy Open University, Korea
Sherali Zeadally, University of Kentucky, USA
Seok Cheon Park, Gachon University, Korea
Yang Xiao, University of Alabama, USA

Publicity Chairs
Yu-Wei Chan, Providence University, Taiwan
Sushil Kumar Singh, SeoulTech, Korea
Nguyen Manh Cuong, Nha Trang University, Vietnam

Industrial Cooperation Chairs
Yong Woo Lee, Ssangyong Information & Communications Corp, Korea
Sung Chul Yu, Ssangyong Information & Communications Corp, Korea
Sung Gil Kim, Wooju Telecomm, Korea
Bong Sang Seo, ALL4LAND co.,LTD, Korea
Se Jong Kim, SJ Info & Communications CO., LTD, Korea
Tae Yoon Kwon, Neighbor system co.,Ltd , Korea
Han Su Cheon, Selim TSG Co.,Ltd , Korea
Seokhong Min, MINDATA Corporation, Korea

Local Arrangement Chairs
Jun-Ho Huh, Korea Maritime and Ocean University, Korea
Jinho Park, Dongguk University, Korea
Dinh Dong Luong, Nha Trang University, Vietnam

Program Committee
Andrew Kusiak, The University of Iowa, USA
Chang Wu Yu, Chung Hua University, Taiwan
Chin-Fu Kuo, The National Kaohsiung University, Taiwan
Debajyoti Mukhopadhyay, Balaji Institute of Telecom & Management, India
Dion Hoe-Lian Goh, Nanyang Technological University, Singapore
Jehn-Ruey Jiang, National Central University, Taiwan
Paprzycki Marcin, Polish Academy of Sciences, Poland
Qian Yu, University of Regina, Canada
Tzung-Pei Hong, National University of Kaohsiung, Taiwan
Marco Listanti, DIET, Roma, Italy
Sun-Yuan Hsieh, National Cheng Kung University, Taiwan
Yue-Shan Chang, National Taipei University, Taipei
Ahmed EL Oualkadi, Abdelmalek Essaadi University, Morocco
Jung Hanmin, KISTI, Korea
Liu Chuan-Ming, National Taipei University of Technology, Taipei
Ali Shahrabi, Glasgow Caledonian University, UK
Bo-Chao Cheng, National Chung-Cheng University, Taiwan
Chang Yao-Chung, National Taitung University, Taiwan
Deok Gyu Lee, Seowon University, Korea
Min Choi, Chungbuk National University, Korea
Hang-Bae Chang, Chung-Ang University, Korea
Hong-Jun Jang, Jeonju University, Korea
Imad Saleh, University of Paris 8, France
Jinhyun Ahn, Jeju National University, Korea
Lai Kuan-Chu, National Taichung University, Taiwan
Lam-for Kwok, City University of Hong Kong, Hong Kong
Seung-Ho Lim, Hankook University of Foreign Studies, Korea
Ki Yong Lee, Sookmyung Womens University, Korea
Koojoo Kwon, Baewha Woman University, Korea
Yeong-Seok Seo, Yeungnam University, Korea
Yeong Wook Yang, Hanshin University, Korea
Yoo-Jae Won, Chungnam National University, Korea

Shi Junren, Chongqing University of Post and Telecom, China
Liu Ping, Chongqing University of Post and Telecom, China
Chen Junsheng, Chongqing University of Post and Telecom, China
Chia-Hung Yeh, National Sun Yat-sen University, Taiwan
Jin Gon Shon, Korea National Open University, Korea
Ka Lok Man, Xi'an Jiaotong-Liverpool University, China
Peng Ran, Chongqing University of Post and Telecom, China
Xu Zhang, Chongqing University of Post and Telecom, China

Invited Speaker

The contribution of Artificial Intelligence to the significant achievements of Computer Vision today and the future trends of Computer Vision development.

Dr. Nguyen Khac CUONG

Head of the Department of Information Systems,
Faculty of Information Technology, Nha Trang University.

Abstract:

The contribution of Artificial Intelligence (AI) has played a pivotal role in the significant achievements of Computer Vision (CV) today. Through Machine Learning capabilities and complex data processing, AI has propelled the advancement of CV systems. Applications such as Facial Recognition, Object Classification, Medical Image Processing, and Autonomous Driving have all benefited from the integration of AI, leading to enhanced performance and capabilities.

  Looking ahead, the future of CV holds promising developments. Continued progress in understanding and modeling image context, coupled with the evolution of powerful Deep Learning, is expected to further enhance the capabilities of CV systems in recognizing and interacting with the environment. Applications across fields such as healthcare, security, manufacturing, and more will continue to be optimized to deliver tangible benefits to individuals and society. AI is playing a pivotal role in driving the development of CV, yielding significant advancements and paving the way for a promising future in applying this technology to crucial aspects of our lives.

Biography:

Dr. Nguyen Khac CUONG is currently engaged in research and teaching in the field of Information Technology (IT). He has accumulated over 20 years of experience in the IT industry. Prior to his current position, he has held numerous significant roles in researching and developing HCI systems, integrating intelligent systems into smart cars, autonomous vehicles, signal processing systems derived from CCD, RADAR, LiDAR, and Laser Scanner sensors. Additionally, he has also participated in managing and developing various IT projects for major companies in South Korea. Dr. Nguyen Khac CUONG holds a Doctorate and Master's degree in Computer Science and Engineering from Yeungnam University (South Korea) and a Bachelor's degree in IT from Hanoi University of Science and Technology (Vietnam).

PROGRAM SCHEDULE FOR CUTE 2023

Day 1, December 18, 2023		
Time	**Min**	**HALL C**
09:40-10:00	20	**Registration**
10:00-11:30	90	**On/Off Session C-1** **Chair: Su-Hyun Kim**
11:30-11:40	10	**Coffee Break**
11:40-13:00	80	**On/Off Session C-2** **Chair: Yan Li**
13:00-14:00	60	**Lunch**
14:00-14:10	10	**Welcome speech: Prof. Pham Quoc Hung – Vice Rector of Nha Trang University** **"Welcome speech from the hosting university"** **Chair: Kwang-il Hwang**
14:10-14:40	30	**Keynote Speech: Dr. Nguyen Khac CUONG** **"The contribution of Artificial Intelligence to the significant achievements of Computer Vision today and the future trends of Computer Vision development"** **Chair: Kwang-il Hwang**
14:40-14:50	10	**Coffee Break**
14:50-16:20	90	**Session C-3** **Chair: YongSoo CHOI**
16:30-16:40	10	**Coffee Break**
16:40-18:00	80	**Session C-4** **Chair: Hyoungsuk Yoo**
18:00-19:00	60	**Break**
18:30-21:00	150	**Banquet** **(Location: Sheraton Nha Trang)**

Day 2, December 19, 2023		
Time	**Min**	**HALL C**
09:40-10:00	20	**Registration**
10:00-11:30	90	**Session C-1** **Chair: Jin Gon Shon**
11:30-13:00	90	**Lunch**
13:00-15:30	150	**Local Arrangement Committee Meeting I**
15:30-18:00	150	**Organizing Committee Meeting I**

Day 3, December 20, 2023		
Time	**Min**	**HALL C**
09:00-10:30	90	**Local Arrangement Committee Meeting II**
10:30-12:00	90	**Organizing Committee Meeting II**

1. **A paper presentation should be made by one of authors of the paper for 15 minutes (10 minutes for the presentation itself and 5 minutes for Q/A).**
2. **All speakers of each session should meet the session chair at their room 10 minutes before the session begins.**
3. **Windows 7/10 laptops running the Adobe Reader and Microsoft Office for paper presentations will be prepared. Please prepare for your presentation.**
4. **For Q&A in the online section, please email the author.**

DETAILED SCHEDULE FOR

THE 16TH KIPS INTERNATIONAL CONFERENCE ON UBIQUITOUS INFORMATION TECHNOLOGIES AND APPLICATIONS (CUTE 2023)

Day 1, December 18, 2023 (Monday)

09: 40-10: 00   Registration

10: 00-11: 30   On/Off Session C-1
(HALL C)
(Chair: Su-Hyun Kim)

1. **Implement a Storage Engine to Improve Query Performance Based on a Computational Storage Device**
   Ria Choi, Jaehoon An, Younghwan Kim
2. **Embedded core-based Machine Learning design for baseboard management controller**
   Hangyeol Kim, Jaehoon An, Younghwan Kim
3. **An Edge Server Management System Based on Extended High Availability**
   Junho Jeong, Jaehoon An, Younghwan Kim
4. **Similarity Analysis of Waste Images Through Feature Extraction**
   JunHyeok Go, Nammee Moon
5. **Optimizing Behavior Classification Model Performance through Sensor Data Augmentation using K-Equidistant Partitioning**
   Jeong Hyeon Park, Nammee Moon
6. **Vision Transformer Based Classification of Bulky Waste**
   Siung Kim, nammee Moon

11: 30-11: 40   Coffee Break

11: 40-13: 00   On/Off Session C-2
(HALL C)
(Chair: Yan Li)

1. **One-stage Object Detection and Feature Embedding Network for Multiple Object Tracking**
   Young Chul Lim, Minsung Kang

2. **Development of school indoor fine dust prediction model for each school**
   Sungsuk Kim, Jaehyun Kim, Sun Ok Yang
3. **Identifying Duplicate Hidden Services on the Dark Web**
   Daeil Jang, SangTae Woo, Boram Kim, HyunJi Kim, SeungGu Ji
4. **Time-Series Clustering of eGFR Data to Enhance Kidney Function Prediction Efficiency**
   Jeung Min Lee, Ji-Eun Kim, Gang-Jee Ko, Jieun Yoo, HwaMin Lee
5. **A Comparative Analysis of Mortality: Deaths from Poisoning versus Other Causes (2019-2021)**
   Seok Jin Kong, Sung Woo Lee, Hwa Min Lee
6. **Development of an e-Learning Motivation Index**
   JungHyun Park, Ji Su Park, Jin Gon Shon

13: 00-14: 00   Lunch

14: 00-14: 10   Welcome Speech
(KEYNOTE HALL)
(Chair: Kwang-il Hwang)

Prof. Pham Quoc Hung – Vice Rector of Nha Trang University
"**Welcome speech from the hosting university**"

14: 10-14: 40   Keynote Speech
(KEYNOTE HALL)
(Chair: Kwang-il Hwang)

Keynote Speech: Dr. Nguyen Khac CUONG
"The contribution of Artificial Intelligence to the significant achievements of Computer Vision today and the future trends of Computer Vision development"

14: 40-14: 50   Coffee Break

14: 50-16: 30   <u>Session C-3</u>
(HALL C)
(Chair: YongSoo CHOI)
1. **Federated learning for moderating server-side bias**
   Jihyun Seo, Sunwook Kim
2. **IoT-enabled Home Automation for Energy Optimization**
   Seri Park, Euiri Jo, Dong Hyeon Kim, Sunghyun Kim, Malik Muhammad Saad, Dongkyun Kim, Soon Ki Jung
3. **Automatic Extraction of Base Noun Phrases from Law Corpus by Stanza**
   Seungshik Kang, Minhaeng Lee

4. **Computational Thinking Education model through Play-type Software Teaching and Learning Model**
   Kil Hong Joo, Ji-Hoon Seo, Nam Hun Park
5. **A Hybrid Approach to Detect Encrypted Malicious TLS Flows**
   Preab Vuthy, Jonghee M. Youn
6. **Discriminative Region Attention with Vision Transformer-based Detection of Digital Face Synthesis**
   Van-Nhan Tran, Jae-Hyun Kim, Philjoo Choi, Suk-Hwan Lee, Hoanh-Su Le and Ki-Ryong Kwon

16: 30-16: 40   Coffee Break

16: 40-18: 00   Session C-4
(HALL C)
(Chair: Hyoungsuk Yoo)

1. **A DRL Approach to Android Ransomware Detection for Supervised Problems**
   Sekione Reward Jeremiah, Jong Hyuk Park
2. **Survey on Network System for Privacy in Smart City Environment**
   Heeji Park, Jungho Kang, Jong Hyuk Park
3. **Efficient Metasurface-Coupled Wireless Power Transfer System for Health Care Biotelemetric Implantable Devices**
   Izaz Ali Shah, Hyoungsuk Yoo
4. **Reinforcing Log Anomaly Detection using Embedding-based Similarity Learning Automatic Extraction of Base Noun Phrases from Law Corpus by Stanza**
   Lelisa Adeba Jilcha, Deuk-Hun Kim, Jin Kwak
5. **Cyber Threat Response in DeFi: Volatility-based Approach for RugPull Detection**
   Sanghyeon Park, In-Su Jung, Yu-Rae Song, Jin Kwak

18: 00-19: 00   Break

19: 00-21: 00   Banquet
(Sheraton Nha Trang)

Day 2, December 19, 2023(Tuesday)

09: 40-10: 00   Registration

10: 00-11: 30   Session C-1
(HALL C)
(Chair: Jin Gon Shon)

1. **Dynamic Conjunctive Search Encryption with Hash-Based Subset Membership Check**
    Ziren Xiong, Haipeng Qu
2. **Power Consumption Characteristics and Prediction of Airport Terminal Based on Data Mining**
    Sun Yongxiang, Chen Chao, Guan Dongya, Kang ChunhuaM Li Zhiyong, Qiao Peng
3. **Understanding Dynamics of Loneliness through Comparative Social Intelligence Analysis**
    Hurmat Shah, Mowafa Househ
4. **Self-Viewing and Attitudes towards Distance Learning**
    Xiaoyun Jia, Ting Yu, Ruili Wang
5. **Study on the method of determining the area of local heating demand for rural residential buildings in China**
    Wang Tianhui, Dengjia Wang, Yanfeng Liu, Weijun Gao
6. **Reducing the WSN's communication overhead by SD-SPDZ encryption protocol**
    Alexander Alexandrov
7. **Improving the Accuracy of the Electricity Consumption Prediction in SmartFarm**
    SaravanaKumar Venkatesan, Wajahat Ali Khan
8. **Blockchain-Based Framework for Protection in IoT Networks**
    Inyoung Bang, Usman Afzaal

11: 30-13: 00   Lunch

13: 00-15: 30   Local Arrangement Committee Meeting I

15: 30-18: 00   Organizing Committee Meeting I

Day 3, December 20, 2023 (Wednesday)

09: 00-10: 30   Local Arrangement Committee Meeting II

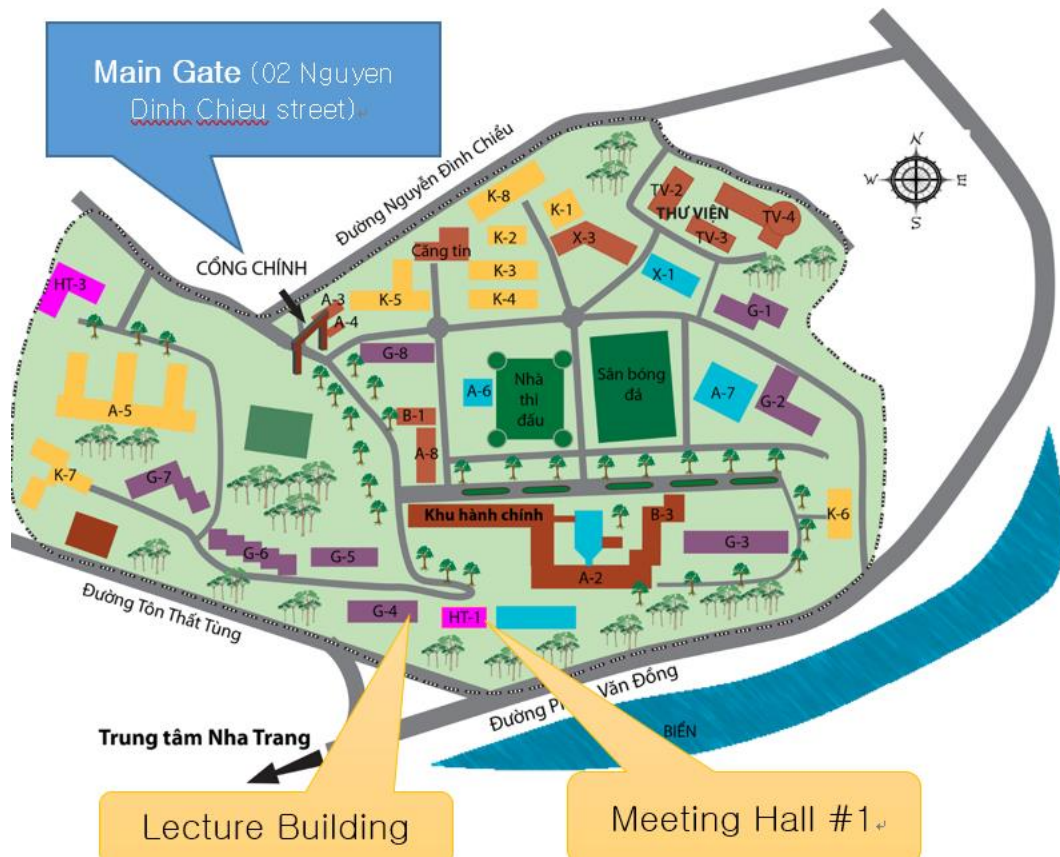**10: 30-12: 00   Organizing Committee Meeting II**

Conference Venue

Nha Trang University

Address: Meeting Hall number 1 and Lecture Building number 4

Nha Trang University, No 02 Nguyen Dinh Chieu street, Nha Trang city, Vietnam.

Phone: +856-20-5441-1199

How do I get to Nha Trang University?

The main campus of Nha Trang University (NTU) is located on the long beach of Nha Trang city. This is the capital city of Khanh Hoa province, a land rich in history and culture. The city is located in the south of Central Vietnam, about 440 km north of Ho Chi Minh City, 1280 km south of Vietnam's capital Hanoi.

1. Go to Nha Trang University by plane

Most international airlines have flights to Hanoi, Ho Chi Minh or Da Nang. From one of these cities, local airlines (Vietnam Airlines, Vietjet Air, Jetstar Pacific, Bamboo Airways) can connect you to Nha Trang (Cam Ranh airport). These airlines offer daily flights. Recently, due to increased demand from international tourists, many international direct flights have been connected to Cam Ranh airport such as from China, Russia, Korea, etc. You can refer to flight times as well as Airfare prices via https://www.traveloka.com / en-vn / From Cam Ranh airport, you can go to Nha Trang University by taxi or airport bus. It takes you about 45 minutes to travel.

2. By Grab

Get a safe and reliable ride in minutes with Grab (formerly GrabTaxi). With the largest team of drivers in Nha Trang, Grab provides the fastest taxi, personal car or motorbike booking service.

There are many options for you to choose from when you want to go anywhere in Nha Trang City.

 * GrabTaxi: Book a budget or premium taxi from the largest driver network in Southeast Asia.

* GrabCar: Ride comfortably and pay a pre-agreed fixed fee.

3. By taxi

Taxis in Nha Trang often have meters and prices are generally quite reasonable.

There are several companies that stand out:

Mai Linh (Green taxi): (0258) 38 38 38 38

International (Green Taxi): (0258) 3 52 52 52

Asia (Yellow Taxi): (0258) 35 35 35 35

Vinasun (Blue and white taxi): (0258) 38 27 27 27

Banquet

Sheraton Nha Trang

Address: 26-28 Tran Phu Street, Nha Trang City, Vietnam
Phone: +84 258-3880000
Email: crowneplaza.vientiane@ihg.com
Website: https://www.marriott.com/en-us/hotels/nhasi-sheraton-nha-trang-hotel-and-spa/overview/

The 17th KIPS International Conference on Ubiquitous Information Technologies and Applications
(CUTE 2023)

December 18-20, 2023
Nha Trang, Vietnam

Organized by

KIPS & KIPS CSWRG & NTU