國立政治大學

National Chengchi University

社群網路與人智計算國際研究生博士學位學程

Social Networks and Human-Centered Computing

(TIGP-SNHCC)

課程手冊

CURRICULUM GUIDE

105 學年度/2016

College of Science

The College of Science was founded in 1994 from the former College of Arts and Sciences. Currently it comprises the Department of Mathematical Sciences, Department of Psychology, and the Department of Computer Science, as well as the Graduate Institute of Neuroscience and the Graduate Institute of Applied Physics. Furthermore, it also includes the following university-level research centers and programs: the Research Center for Mind, Brain and Learning, Master Program in Digital Content and Technologies (in conjunction with the College of Communication), Patents Course Program (co-founded with the College of Law in 2010), MA Program of Counseling and Guidance (co-founded with the College of Education in 2011), Bachelor Program in Digital Content and Technologies (co-founded with the College of Communication in 2011), and the Financial Mathematics Program (co-founded with the College of Commerce in 2011). In 2012, together with the College of Foreign Languages and Literature, the international and pioneering cross-disciplinary Language, Cognition and Brain Program was established. In 2014, the Social Networks and Human-Centered Computing (SNHCC) Ph.D. Program was founded in joint collaboration with the Department of Computer Science, Academia Sinica, and National Tsing Hua University.

History of SNHCC

Academia Sinica has established the Taiwan International Graduate Program (TIGP) in collaboration with a consortium of key national research universities in Taiwan. The purpose of the program is to develop the research manpower pool in those modern multidisciplinary fields that are important in the future economic and social development of Taiwan and to enhance the innovative potential and academic standards of research in these and related fields.

TIGP will offer Ph.D. programs in only selected disciplines to be agreed upon between Academia Sinica and its national research universities partners. It is the intent of the Program to offer Ph.D. degree programs only in inter-disciplinary areas in the physical sciences, applied sciences, engineering, biological and agricultural sciences, health and medical sciences, and humanities and social sciences.

Academia Sinica will assume principal oversight of the academic options of the Program. It will provide the intellectual leadership, the research resources, and the research and physical facilities. Qualified and interested faculty members of the participating national research universities are invited to join the various programs as

affiliated faculty of the Program, and participate in the teaching of courses, supervision of research, and mentoring of the international graduate students.

The TIGP on Social Networks and Human-Centered Computing is a new program established jointly by National Tsing Hua University (NTHU), National Cheng Chi University (NCCU), and Academia Sinica. Social Networks and Human-Centered Computing are new important applications and technologies that have been rapidly developed in recent years. Therefore, this TIGP can cultivate Taiwanese and international talents in the field of the industry, strengthen innovative potential, and enhance academic research level. NTHU, NCCU and Academia Sinica will co-play leading and supervising roles, and provide research resources and equipment. Additionally, the participating scholars of these three units will be jointly responsible for teaching activities, supervising research, and guiding international graduate students.

This TIGP program hopes to attract domestic and foreign outstanding young students. In the scope of social networks and human-centered computing, this program gives priority to computer science and engineering, and takes social and behavioral sciences as subsidiary to provide students with the training across multiple fields. The curriculum contents will probe into various fields, including the natural language processing and information retrieval, data mining, multimedia, human-centered computing and human-computer interaction in computer science, and sociology, communication and psychology in society and behavioral sciences. This program hopes to attract doctoral students who are interested in related fields and provide research training for them.

In TIGP on Social Networks and Human-Centered Computing, the cooperative universities and institutes will support the required laboratory equipment and instrument for teaching and research. With equipment and various expertise of researchers from cooperative institutes, this program can provide young students with a good educational opportunity to cultivate their research interests in related areas. This TIGP will focus on theory and practice to provide students with a great theoretical basis and technical capacity of solving practical problems. The degree granted is Ph.D of Social Networks and Human-Centered Computing.

Research Topics

*Natural Language Processing and Information Retrieval with Applications in Social Networks

*Data mining in social networks

*Social Multimedia
*Mobile Social Networks
*Human-Centered Computing

Academic System

	National Tsing Hua University	National Cheng Chi University
1st Year	Decide your area of concentration. Find a mentor within a month each semester. Find an advisor and a co-advisor within a year after enrollment.	
3rd Candidacy	1. Complete all required courses. 2. Pass TIGP Qualifying Exam 3. Pass Tsing Hua Qualifying Exam ***: --Algorithm --Data Structure --Probability Theory	1. Complete all required courses. 2. Pass TIGP Qualifying Exam 3. Pass Cheng Chi Qualifying Exam ***: --Algorithm --Data Structure --Probability Theory
4th Year	Pass Oral Examination on research plan / dissertation proposal.	
7th Year	Graduate	

Advisor :The student needs to find an advisor and a co-advisor, who are (assistant or associate) research fellow from Academia Sinica and (assistant or associate) professor from the partner university. If the advisor is changed, a second review shall be conducted.

Graduation Requirement

***Course Requirement**

Students have to choose one of the five topics in the Research Topics section as their area of concentration within the first year after enrollment.

The grade of every course should reach at least 70 points (or B- in letter grade).

Students are encouraged to take electives in our partner universities after the first year. However, the courses shall be at higher level for doctoral students or be approved by the Academics Affairs Committee.

Students have to participate in “Seminars” every semester in the first 6 semesters. According to students’ backgrounds, degree requirements may include participation of prescribed planned curriculum. Seminar is not included in the core course and it is mandatory to attend.

***Qualifying Examination**

Pass Core Course Qualifying Exam (QE)

A. Students should pass TIGP SNHCC’s qualifying exam within 5 semesters after enrollment.

B. Students are required to pass 3 out of 5 core courses. Students can choose which subjects to take on every examination. However, you can take one subject twice at most. The result of the examination of each subject taken is either pass or fail. Publication or paper submission is not allowed in lieu of the QE.

C. In the event of a failure of the qualifying exam, a letter will be sent, notifying the student of the failure and the opportunity for one more attempt to pass the exam.

D. In the event of a second failure, the student will be notified of formal dismissal from the doctoral program.

E.QE will be held at the beginning of every semester. Students can apply for QE by the end of the semester. Specific dates will be announced at the end of spring semester.

F. Students who are not able to pass three qualifying exam (3 out of 5) by the beginning of the third academic year are not qualified for the enrollment.

***Research Advisor**

A. The student is required to find an advisor and a co-advisor from our core faculty list.

B. The student can choose more than one co-advisor. But the primary co-advisor must be one of the core faculty members.

C. The student must decide their advisor and co-advisor within the first year. The student should find their advisor/co-advisor and get approved by the end of the third semester. Otherwise, the student shall be dismissed from the program.

D. The student cannot change their advisors in the year before the graduation.

***PhD Thesis Proposal Evaluation**

A. Students have to pass their PhD Thesis Proposal Evaluation within one year after finishing qualifying exam.

B. Students have to form an "Advisory Committee" after qualifying exam. The purpose is to steer toward a right track, objective, fair and appropriate standard, of Social Networks and Human-Centered Computing. The committee may last until doctoral oral defense exam.

C. The committee members must include

1. Advisor
2. Co-advisor
3. Committee Member : One teacher from SNHCC Academic Affairs Committee Member (If your advisor or co-advisor is NOT the member.)
4. Outside Committee Member: This teacher can be any SNHCC / Non-SNHCC Faculty.

***Publication and Final Oral Defense**

A.Publish at least one paper in a top journal or two papers in top conferences, which will be examined and verified by the TIGP Educational Administration Committee. The paper needs to be published, or a proof of its acceptance should be submitted.

B.Pass the oral defense. Noticed that a student must pass the examination of graduation by TIGP Educational Administration Committee before proposing the oral defense. The oral defense committee should include at least five members in related research fields. Among them, at least one third of the members should come from organizations other than NTHU, NCCU, and Academia Sinica.

C. Publish at least one paper in a top journal or two papars in top conferences, which will be examined and verified by the TIGP Educational Administration Committee. The paper needs to be published, or a proof of its acceptance should be submitted.

Course Planning

Students need to complete 3 of the 5 core courses and at least 3 elective courses. Since NTHU and NCCU honor the course credits granted by each other, students in this program can take related courses from both schools. Before completing 18 credits, students are required to take at least two courses "with" credits every semester.

Fall			
Course#	Course Title	credits	Weekly Study hours
761002001	Data Mining in Social Networks	3 credits	6
761007001	Human-Centered Computing	3 credits	6
761013001	Seminars	0 credit	1

Spring			
Course#	Course Title	credits	Weekly Study hours
761002001	Natural Language Processing and Information Retrieval with Applications in Social Networks	3 credits	6
761005001	Multimedia in Social Networks	3 credits	6
761006001	Mobile Social Networks	3 credits	6
761013001	Seminars	0 credit	1

Note : All international students are required to take Chinese Class for one year.

Course Description

Course#	Course Title	No. of Credits	Academic Semester
761001001	Natural Language Processing and Information Retrieval with Applications in Social Networks	3	Spring

[**Course objectives**]
As social media and social network sites have become one of the major means of communication and content producing, researchers can access rich and heterogeneous information from the social media and social network sites that include not only text content but also social relationships among persons. The content on social media and social network websites is different from the others in terms of style, tone, purpose. Therefore, it is not suitable for applying existing natural language processing (NLP) or information retrieval (IR) techniques on such content. Therefore, new challenges for NLP and IR arises in social media and social networks, including summarization of posts/replies, relationship extraction, social structure and position analysis, opinion retrieval, sentiment analysis, entity resolution, trend analysis, etc. It is thus important to develop new algorithms for addressing the above needs.

[Course Overview]
This course covers a broad range of topics in NLP and IR. Practical applications, fundamental algorithms and mathematical models are introduced. To raise students' study motivation, besides midterm and final exam, students are requested to be involved in one hands-on IR projects near the midterm and another NLP project in the end of semester.

Course#	Course Title	No. of Credits	Academic Semester
761002001	Data Mining in Social Networks	3	Fall

[**Course objectives**]
Some websites own considerable amount of data, e.g., the user topology of Facebook contains billions of nodes. For a large variety of social networking applications, community detection is the one of the most basic issues for mining their data. Moreover, new topics emerge for modeling the user behaviors with the abundant social information, e.g., credibility mining, user interest modeling, user demographics and social strategy inference, advertisement targeting, fraud/anomaly detection, influence probability learning. On the other hand, analyzing social links provides fundamental knowledge for different applications, e.g., link prediction for friend/item recommendation, social influence for viral marketing, and anchor link inference for identity authentication. Also, graph pattern mining is one of the most important topics for graph data mining as well as the pairwise shortest path query and triangle counting. Furthermore, to avoid malice adversary obtaining users' real

identities of each corresponding node, privacy-preserving graph mining plays a very important role when social network data is used in practical commercial sales. The clustering and classification of documents in social media are also important for social networks.

[Course Overview]
In this course, the following topics will be presented and discussed: social media analysis, blogs and friendship network analysis, email and messaging analytics, influence spreading and viral marketing, social reputation and trust, user profiling and recommendation systems, social media searches, expertise and authority discovery, community identification, link prediction, collaborative data analysis, and data mining with social factors.

Course#	Course Title	No. of Credits	Academic Semester
761007001	Human-Centered Computing	3	Fall

[Course Objective]
Users of various forms, including individual human actors, teams and communities, are increasingly integral parts of computing systems. In professional and everyday use of software and hardware as well as online communication and social computing systems, users demand system utility, usability and enjoyable experience of use. It is a present and pressing challenge to endow computing systems with these qualities, and to better service users of all kinds (professional, non-professional, and special populations) with careful, considerate designs. Decades of research in Human-Centered Computing (HCC) related fields, including Human-Computer Interaction, Software Engineering, Ergonomics, Cognitive Science, Industrial and Interaction Design, and Digital Society and Technologies have demonstrated much rationale and benefit to lay the basis of technology building on the understanding of the goals, characteristics, constraints and needs of users and their contexts. User research that applies behavioral and social science methods and theories is thus an important foundation to HCC. Prototyping and evaluation methods distinguish HCC from non-HCC system building in that user-based testing and iteration are central to HCC research and development. Innovations in HCC further leverage human and collective intelligence, and integrate human and machine processing for complex problem solving and value creation.

The mission of the HCC aspect in the TIGP-SNHCC program is to ensure that students specializing in HCC have a firm grasp of the methods, concepts and principles of HCC research and development. Through our education and cultivation, HCC students will develop knowledge, skills and confidence in empirical user research, system design, prototyping, evaluation and innovation.
[Course Overview] The course aims to provide graduate students of the TIGP program of Social Network and Human-Centered Computing (SNHCC) an overview of human-centered computing (HCC), particularly from the view of user-oriented computing system design and research. As an emerging, multidisciplinary field, HCC is commonly referred to and characterized by the idea of devising designs of computing systems based on properties, needs and constraints of the users and their tasks, rather than the inverse. Thus HCC embodies more than technology building, such as how to the software and hardware systems for supporting people. It also includes systematic understanding of people and the interactions between people and technologies. In this course, we'll explain and illustrate the state of the art of human-centered computing, focusing on fundamental concepts and practices of interface/interaction design and engineering, methods for studying users/tasks, methods for design-prototyping, and key topics that are closely related to the TIGP program, such as human computation, social computing, mobile computing, and tangible interaction etc.

Course#	Course Title	No. of Credits	Academic Semester
761005001	Multimedia in Social Networks	3	Spring

[**Course objectives**]

In *Social Multimedia*, not only multimedia contents are included, but also social comments, social links, and social interactions are considered, so that the result of analysis will be more accurate and meet the requirements more precisely. Research issues include user reasoning, user interest profiling, community activity analysis, privacy preservation, spreading speed analysis/prediction, CTR (Click Through Rate) prediction, social setting based content pooling, user grouping for multimedia broadcasting, interaction system design and implementation, emotional impact analysis/prediction, image/video ranking and application development with emotion model, aesthetic quality assessment, efficiency improvement on data/metadata collection, music classification, recommendation, and watermark, and multimedia ground truth construction with crowdsourcing. Since multimedia data is linked widely in multiple dimensions, the topic of privacy has been concerned over the recent years.

[Course Overview]

1. Introduction to Multimedia
   1.1. What is Multimedia?
   1.2. Overview of Multimedia Applications
   1.3. Multimedia Research Resources
2. Multimedia Basics
   2.1. Graphics and Image Data Representations
   2.2. Color in Image and Video
   2.3. Fundamental Concepts in Video
   2.4. Basics of Digital Audio
3. Multimedia Processing & Coding
   3.1. Video coding fundamentals
   3.2. Lossless Compression & Lossy Compression
   3.3. Transform Coding
   3.4. Motion Compensated Predictive Coding
4. Multimedia Coding Standards
   4.1. JPEG, JPEG-2000
   4.2. H.261, H.263, MPEG-1, MPEG-2, MPEG-4, and H.264
5. Social Network Basics
   5.1. An Introduction to Social Networks
   5.2. Properties and Models of Social Networks
   5.3. Centrality Analysis and Community Detection
   5.4. Information Diffusion in Social Networks
6. Social Multimedia Analytics

6.1. Sentiment, Opinion, Locations, and Multimedia
6.2. Search and Recommendation in Social Media
6.3. User Understanding
6.4 Using Social Multimedia for Prediction and Forecast
7. Advanced Multimedia Processing
7.1. Image Manipulation Techniques
7.2. Interactive Multimedia Editing

Course#	Course Title	No. of Credits	Academic Semester
761006001	Mobile Social Networks	3	Spring

[**Course objectives**]
Researchers are increasingly interested in addressing a wide spectrum of challenges in mobile social networks to extract useful knowledge. Different from online social networks, mobile social networks exploits mobile devices as an integrated part of users' social networks and life style. Mobile social networks span over various research topics, such as identifying common static topological structures and dynamic evolutions of social networks, and exploiting location-based and contextual information embedded with mobile social networks to create useful insights. The insights foster important implications on community discovery, anomaly detection, trend prediction with the applications in many domains, such as recommendation systems, information retrieval, future prediction, and so on. In light of the above crucial need, sophisticated data mining and query processing techniques on both social and spatial dimensions are demanding for extracting representative information from mobile social network.

[Course Overview]
A. Introduction on Mobile Social Networks
B. Mobile Social Network Services
C. Context-Aware Mobile Computing in Mobile Social Networks
D. Data Analysis in Mobile Social Networks
E. Security and Privacy in Mobile Social Networks

Course#	Course Title	No. of Credits	Academic Semester
761013001	Seminar	0	Fall/Spring
[**Course objectives**] To enhance the learning experiences as a student, students are expected to attend and participate in the school's Weekly Seminar Series. These seminars feature the latest cutting edge research and can expend their research interests.			
[Course Overview] Research-related topics.			

Checklist for Course Requirement

Core Courses				
Course Title	Credits	Grades		*Students need to complete 3 of the 5 core courses and at least 3 elective courses *All international students are required to take Chinese Class for one year. *Students have to participate in "Seminars" every semester in the first 6 semesters.
Natural Language Processing and Information Retrieval with Applications in Social Networks	3		☐	
Data Mining in Social Networks	3		☐	
Human-Centered Computing	3		☐	
Multimedia in Social Networks	0		☐	
Mobile Social Networks	3		☐	
Seminars	0		☐	
Elective Courses				
Course Title	Credits	Grades		
_____			☐	
_____			☐	
_____			☐	
_____			☐	
_____			☐	
_____			☐	
_____			☐	
Course Requirement (at least completing 18 credits) Core Courses：_____ Elective Courses：_____				

Course Planning for TIGP SNHCC

Name：_____

Student ID No: _____

Grade:_____

Fall Semester			
Course Title	Time	Core/Elective	Credits
Spring Semester			
Course Title	Time	Core/Elective	Credits

Faculty Members

The Faculty members are composed of Academia Sinica, National Chengchi University and National Tsing Hua University.

Institute of Information Science, Academia Sinica

Dr. Wen-Lian Hsu(hsu@iis.sinica.edu.tw)
Research : Analysis of algorithms,graph theory, search methods in artificial intelligence, bioinformatics, computational biology, computational linguistics, natural language understanding, intelligent agent systems.

Dr. Hsin-Min Wang(whm@iis.sinica.edu.tw)
Research : Spoken language processing, natural language processing, multimedia information retrieval, pattern recognition.

Dr. Wen-Tsuen Chen(chenwt@iis.sinica.edu.tw)
Research : Intelligent sensing and applications, mobile computing, high-speed communications networks, parallel algorithms and systems, software engineering.

Dr. Wen-Liang Hwang(whwang@iis.sinica.edu.tw)
Research : Wavelet analysis signal, image and video processing.

Dr. Yuan-Hao Chang(johnson@iis.sinica.edu.tw)
Research : Next-Generation storage systems and their applications, Real-Time embedded systems and their OS designs, multi-Core architecture and virtualization technology.

Dr. Jan-Ming Ho(hoho@iis.sinica.edu.tw)
Research : Combinatorial optimization and algorithm design, multimedia network protocol and applications, design of algorithms and applications of big data technologies in bioinformatics and financial computing, design of algorithms and efficient software in financial risk management.

Dr. Tyng-Luh Liu(liutyng@iis.sinica.edu.tw)
Research : Computer vision, pattern recognition, machine learning.

Dr. Da-Wei Wang(wdw@iis.sinica.edu.tw)
Research : Privacy enhancing technology, graph theory and algorithm, medical informatics.

Dr. Tsan-Sheng Hsu(tshsu@iis.sinica.edu.tw)
Research : Design, analysis, implementation and performance evaluation of computer

Dr. Chu-Song Chen(song@iis.sinica.edu.tw)
Research : Pattern recognition, computer vision, image processing.

algorithms, graph theory and its applications, data-intensive computing, data privacy ,theory of computer games.

Dr. Chi-Jen Lu(cjlu@iis.sinica.edu.tw)
Research : Machine learning, computational complexity, algorithms, game theory.

Dr. Chun-Shien Lu(lcs@iis.sinica.edu.tw)
Research : Compressed sensing, sparse signal processing, security and privacy in multimedia and sensor network.

Dr. Sheng-Wei Chen(swc@iis.sinica.edu.tw)
Research : Quality of experience, multimedia systems, social computing, crowdsourcing / human computation.

Dr. De-Nian Yang(dnyang@iis.sinica.edu.tw)
Research : Social networks and mobile data management, mobile multimedia networks and applications.

Dr. Hong-Yuan Mark Liao(liao@iis.sinica.edu.tw)
Research : Content-based multimedia retrieval, video-based human behavior analysis, multimedia protection, 3D mesh decomposition and recognition, multimedia signal processing.

Dr. Wei-Yun Ma(ma@iis.sinica.edu.tw)
Research : Natural Language Processing, Semantic Analysis of Social Media, Machine Reading, Machine Translation, Knowledge Representation, Question Answering.

Dr. Keh-Yih Su(kysu@iis.sinica.edu.tw)
Research : Statistical semantic machine translation, machine reading, statistical language modeling, natural language processing, natural language understanding, machine learning.

Dr. Ling-Jyh Chen(cclljj@iis.sinica.edu.tw)
Research : Mobile and wireless networks, network measurements, networked sensing, human computation.

Dr. Meng-Chang Chen(mcc@iis.sinica.edu.tw)
Research : QoS networking, wireless networks, operating systems, data, text and knowledge management, information retrieval.

Dr. Mi-Yen Yeh(miyen@iis.sinica.edu.tw)
Research : Data mining, databases.

Dr. Chien-Min Wang(cmwang@iis.sinica.edu.tw)
Research : Cloud computing, parallel and distributed computing, distributed file systems, virtualization technology, dynamic binary translation.

Dr. Lun-Wei Ku(lwku@iis.sinica.edu.tw)
Research : Natural Language Processing ; Computational Linguistics ; Sentiment (Opinion and Emotion) Analysis ; Information Extraction and Retrieval ; Chinese Language Processing ; Topic Detection and Tracking ; Artificial

Intelligence ; Computer Assisted Language Learning (CALL).

- **Research Center for Information Technology Innovation, Academia Sinica**

Dr. Tei-Wei Kuo(ktw@citi.sinica.edu.tw)
Research : Real-time systems, embedded systems, flash memory storage systems, PCM, Real-time operating systems, Real-time database systems.

Dr. Wen-Huang Cheng(whcheng@citi.sinica.edu.tw)
Research : Multimedia content , analysis Computer vision, mobile multimedia applications, human computer interaction.

Dr. Wei-Ho Chung(whc@citi.sinica.edu.tw)
Research : communications, signal processing, networks, and multimedia.

Dr. Yi-Hsuan Yang(yang@citi.sinica.edu.tw)
Research : Music information retrieval, analysis and visualization, machine learning, multimedia system, smart phone and cloud-based applications, lyrics analysis.

Dr. Chia-Han Lee(chiahan@citi.sinica.edu.tw)
Research : Wireless communications, wireless networks, image processing, stochastic geometry, complex systems.

Dr. Pi-Cheng Hsiu(pchsiu@citi.sinica.edu.tw)
Research : Embedded systems, Real-Time systems, mobile network.

Dr. Ching-Ju Lin(Katelin@citi.sinica.edu.tw)
Research : Wireless system design, Multimedia networking, mobile social networks, Multiuser MIMO Systems.

Dr. Yu Tsao(Yu.tsao@citia.sinica.edu.tw)
Research : Speech and audio processing, pattern recognition and machine learning, human language processing, multimedia signal and information processing.

Dr. Ronald Y. Chang(rchang@citi.sinica.edu.tw)
Research : Wireless communications and networking, signal processing applications.

Dr. Yu-Chiang Frank Wang(ycwang@citi.sinica.edu.tw)
Research : Pattern recognition, machine learning, computer vision, multimedia signal processing, information retrieval.

Dr. Chih-Yu Wang(cywang@citi.sinica.edu.tw)
Research : Game theory, wireless communication, social network.

Dr. Yen-Yu Lin(yylin@citi.sinica.edu.tw)
Research : Computer vision, pattern recognition, machine learning, multimedia systems.

Dr. Cheng-Te Li(ctli@citi.sinica.edu.tw)
Research : Social networks, data mining, social media analytics, urban computing.

- **Department of Computer Science, National Chengchi University**

Dr. Tsai-Yen Li(li@nccu.edu.tw)
Research : Robotics, computer animation, artificial intelligence.

Dr. Cheng-Chia Chen(chencc@cs.nccu.edu.tw)
Research : Software language engineering, Logic in computer science, theory of computation.

Dr. Man-Kwan Shan(mkshan@nccu.edu.tw)
Research : Data mining, multimedia information systems, social networks,

Dr. Yuh-Jong Hu(jong@cs.nccu.edu.tw)
Research : Semantic web, privacy-preserving big data analysis, privacy-aware social web, data protection in the cloud, Information and law.

Dr. Hung-Chin Jang(jang@cs.nccu.edu.tw)
Research : Wireless communications, mobile network management, mobile communication systems, Green network communication, Machine to Machine (M2M), iOS / Android APP development.

Dr. Jyi-Shane Liu(jsliu@cs.nccu.edu.tw)
Research : Social network analysis and mining, social informatics, digital humanities, digital library.

computer music, cloud databases, digital archive.

Dr. Chao-Lin Liu(chaolin@cs.nccu.edu.tw)
Research : Automatic reasoning, Machine learning, Natural language processing and information retrieval, Intelligent tutoring systems, Intelligent transportation systems.

Dr. Ray-lin Tso(raylin@cs.nccu.edu.tw)
Research : Cryptography, network security, Information security.

Dr. Peggy Kuo(peggykuo@cs.nccu.edu.tw)
Research : Multimedia retrieval and analysis, digital content technology, digital archive.

Dr. Ming-Feng Tsai(mftsai@cs.nccu.edu.tw)
Research : Information retrieval, machine learning, Web search and mining, social network analysis, natural language processing.

Dr. Chun-Feng Liao(cfliao@cs.nccu.edu.tw)
Research : Smart Environment (Pervasive Computing), service-oriented systems, cloud computing , Linked Open Data , healthcare systems.

Dr. Tzu Chieh Tsai(ttsai@cs.nccu.edu.tw)

Dr. Kung Chen(chenk@cs.nccu.edu.tw)
Research : Programming languages, software design for cloud computing (SaaS development), aspect-oriented technologies, technologies for web-based information systems.

Dr. Wen-Hung Liao(whliao@cs.nccu.edu.tw)
Research : Computer vision, pattern recognition, human-computer interaction.

Dr. Ming-Te Chi(mtchi@cs.nccu.edu.tw)
Research : Non-Photorealistic rendering, stylistic rendering, applied perception in graphics and visualization, point rendering.

Dr. Kuo-Wei Hsu(hsu@cs.nccu.edu.tw)
Research : Data management and analysis, database systems, Software engineering.

Dr. Neng-Hao Yu(jonesyu@cs.nccu.edu.tw)
Research : Interactive tabletop, tangible and multi-touch interactions, mobile and cloud computing.

Dr. Jia-Ming Chang
(chang.jiaming@gmail.com)
Research Bioinformatics

Research : Computer Network, Mobile Computing.

- **Institute of Information Systems and Applications, National Tsing Hua University**

Dr. Chung-Ta King(king@cs.nthu.edu.tw)
Research : Pervasive computing, cluster computing, parallel and distributed systems.

Dr. Jason S. Chang(jschang@cs.nthu.edu.tw)
Research : Natural language processing, knowledge management, IR, MT, AI.

Dr. Yi-Shin Chen(yishin@cs.nthu.edu.tw)
Research : Web intelligence, multimedia retrieval meta-search, Real-time queries for continues data streams.

Dr. Cheng-Hsin Hsu(chsu@cs.nthu.edu.tw)
Research : Multimedia systems and computer networks, mobile multimedia, video dissemination over hybrid networks, cloud multiplayer games, and efficient content sharing in mobile social networks.

Dr. Fu-Ren Lin(frlin@mx.nthu.edu.tw)
Research : Data/text mining and knowledge discovery, professional community and knowledge management, business process innovation and e-business management, electronic commerce: developing dynamic e-

Dr. Von-Wun Soo(soo@cs.nthu.edu.tw)
Research : Artificial intelligence, machine learning, expert systems.

Dr. Hwann-Tzong Chen(htchen@cs.nthu.edu.tw)
Research : Computer vision, image processing, machine learning.

Dr. Hao-Chuan Wang(haochuan@cs.nthu.edu.tw)
Research : Human-computer interaction, social computing, language technologies, educational technology.

Dr. Chia-Wen Lin(cwlin@ee.nthu.edu.tw)
Research : Multimedia networks, visual communication, image/signal processing.

Dr. Jyun-Cheng Wang(jcwang@mx.nthu.edu.tw)
Research : Social network, community & EC, patent analysis.

business, service science, management, and engineering.

Dr. Shelly Shwu-Ching Young(scy@mx.nthu.edu.tw)
Research : E-learning model and design of internet information spread, Handheld learning devices and Mobile Learning, Game-based learning, Learning application of tangible device.