

Curriculum Vitae

Contact

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Employment

2018-Present	Assistant Professor Graceland University, Iowa, U.S.A. Computer Science & Information Technology
2013-2018	Full-time Lecturer Towson University, Maryland, U.S.A. Department of Computer & Information Sciences
2006-2012	Adjunct Faculty/Teaching Assistant Towson University, Maryland, U.S.A. Department of Computer & Information Sciences
1999-2006	Director/Senior Software Engineer Korea Telecom (KT) Data, Inc., Seoul, Korea
1992-1999	Software Engineer Korea Telecom (KT), Seoul, Korea Multimedia Lab. KT Research Center

Research Area

Two main research areas based on data analytics approaches, aiming at knowledge discovery and decision-making from a wide range of IoT devices:

- **Data Analytics Framework and its Application in Smart IoT Environment**
 1. Behavior analysis/anomaly detection on the context-aware collaborative massive events framework
 2. Real-time streaming analytics on the Big data cloud computing framework
 3. GIS- and machine learning-enabled data analytics framework and its application to cybersecurity, business, and smart grid environment
- **Human Assisting and Training Game System**
 1. Attention and behavior recognition through MindWave Brain-Computer Interface (BCI) and Kinect motion sensing device
 2. Fairytale-driven intervening mechanism of behavior training game system with attention and motion data analytics
 3. Exergames for older adults or students with minor physical or learning disabilities

Teaching Experience

Courses Taught at Graceland University as an Assistant Professor:

2018-present	CSIT4200	Machine Learning
	CSIT3400	Programming Languages
	CSIT3140	Information Security
	CSIT3800E	Artificial Intelligence in Practice
	CSIT3800D	Data Analytics Framework
	CSIT3800A	Game Design
	CSIT1200	Data Structure
	CSIT2200	Computer Hardware and Networks
	CSIT1300	Introduction to Operating Systems
	CSIT2100H	Intermediate Programming – Interactive Web Pgm
	CSIT2100F	Intermediate Programming – Python and R
	CSIT2100A	Intermediate Programming – JavaScript
	CSIT1100	Principles of Computing – Python
	CSIT1060	Introduction to Web Programming
	CSIT3800(0)	Independent Study (Impacts of Artificial Intelligence)
	DSCI5350	Basic Computer Algorithms – Databases
	DSCI5420	Artificial Intelligence in Practice

Courses Taught at Towson University include as a Full-time Lecturer:

2017-2018	COSC760	Big Data Analytics
2013-2018	COSC439	Operating System
	COSC237	Computer Science II
	COSC236	Computer Science I
2007-2016	COSC109	Computer and Creativity (Digital Multimedia)

As a Spatial DBMS (Database Management System) and GIS (Geographic Information System) consultant, involved in teaching Spatial DBMS, ZEUS, and GIS/LBS (Location Based Services) applications including electronic mapping solutions, Web GIS, and mobile LBS services to a variety of domestic (Local governments and Korean Information Security Agencies) and many government officers from Thailand, Malaysia, and Iraq.

Research Advising

Involved in advising research for undergraduate/master/doctorate graduates:

Undergraduate	Becky Menda, 2021 (Interdisciplinary Capstone Project on the Impact of COVID-19 on Businesses with Information Technology)
	Allen Retzler, 2019 (Data Analytics in R, Advising)
	Besnik Maloku, 2019 (Independent Study on AI, Data Analytics in R)
	Tribi Adhikari, 2019 (Data Analytics using ML)
	Nicolas Salazar, 2018 (Independent Study on Web programming)
M.Sc. Graduates (thesis/project)	ZhengZheng Li, 2018 (Master Project, Advising)
	Angad Maggo, 2018 (Master Project, Advising)
	Kevin Chu, 2018 (Master Project, Advising)

	Ayman Alotaibi, 2018 (Master Project, Advising)
	Chung Hao Juan, 2017 (Mentoring and Working with me 2016~2017)
	Yuehan Yin, 2014 (Master Project, Advisor)
	Daekyu Kim, 2010 (Master Project, Co-advising)
	Jekuk Yoon & Seyoon Kim, 2009 (Master Research, Co-advising)
Doctorate	Wonjin Kim, 2015 (Doctoral Research, Co-advising)
	Changhyun Byun, 2013 (Doctoral Research, Co-advising)
	Philip DePalo, 2013 (Doctoral Research, Co-advising)

Program/Course Development

Big Data Analytics	<p>Developed and taught as the elective course of Data Science track for graduates at Towson University in 2017.</p> <p>Introduces data analytics methodology based on highly intensive cloud computing framework including Apache Spark, Apache Hadoop Distributed File System, and Apache Hadoop.</p> <p>Covers large stream data processing on Spark and Elastic as well as non-structured data set on NoSQL with machine learning approaches.</p>
Data Analytics Framework	<p>Developed based on the Big Data Analytics course by focusing on a wide range of Data Analytics Frameworks from Python and R to Hadoop to NoSQL Databases for undergraduates at Graceland University for Spring 2020.</p>
Machine Learning	<p>Developed Machine Learning for undergraduates at Graceland University for Fall 2020.</p> <p>Introduces principles behind machine learning, statistics in data science and machine learning algorithms such as regression, kernels, support vector machines, clustering, and Neural networks with practical examples using the latest open source libraries.</p> <p>Covers the overall machine learning pipelines including data preprocessing, model training, and model evaluation steps.</p>
AI in Python	<p>Developed Artificial Intelligence in Python for undergraduates and graduates at Graceland University for Fall 2021.</p> <p>Introduces basic ideas and techniques underlying the design of intelligent computer systems. Topics include intelligent agents, knowledge reasoning, learning, and AI problem solving in many real-world applications.</p> <p>Special emphasis is placed on how AI techniques apply to a wide variety of artificial intelligence problems and will serve as the foundation for further study in any application area.</p>

Basic Computer Algorithms–Databases

Developed for Data Science and Analytics Graduate program during the Summer 2021 semester to introduce computer systems, architecture, programming, data structures, and database systems.

Covers intermediate level object-oriented programming with various data structures in Python, relational databases using Access and MySQL. NoSQL database with MongoDB is discussed.

R and Python

Developed for R and Python programming language course as the data analytics tool for large-scale datasets.

The course was reshaped as the data analytics course using R Studio during the Fall 2019 semester.

Data Science Program

Co-developed Data Science program for undergraduate and graduate level and GIS professional program at Graceland University.

Cybersecurity Program

Currently working on developing Computer Science with Cyberoperation (or Cybersecurity) concentration program for undergraduates at Graceland University.

Core Courses in Computer Science and Information Technology

Developed most of courses taught at Graceland University including Information Security, Data Analytics Framework, Python, JavaScript, R, Web Programming, Game Design, Data Structures, Computer Hardware and Networks, and Operating Systems.

Education

D.Sc. Information Technology (Computer Science Research), Towson University, U.S.A.
 2012 *Collaboration Framework for a Context-Aware Environment with Multi-Device Enabled Applications*

Research on RFID/USN platform and its context-aware applications. Created collaboration framework with the XOntology based on the CAI (Context-Aware Inference) semantic behavior analysis model for smart environment and simulated the collaboration effect of the framework.

M.S. Computer Science, Seoul National University, Korea.
 1992 *Kernel Code Analysis Tool for Multiprocessor Operating System (MOS)*

B.S. Computer Science & Statistics, Seoul National University, Korea.
 1990 *Computer Science major (Statistics minor)*

Doctoral Dissertation

With the proliferation of smart computing equipment, the range of intelligent application services is widely expanding with continuous attempts to make the best use of the contextual information from individual data sources. This research attempts to present an intelligently coordinating framework maintaining RFID-enabled applications. According to technology development, the framework has been evolved to the collaboration framework for a context-aware environment with multi-device enabled applications. A variety of sensor data such as RFID tag events, sensing data from USN (Universal Sensor Network) sensor devices, and location information or instantaneous service requests from a wide range of mobile communication devices can be managed within the framework, the XCREAM (XLogic Collaborative RFID/USN-Enabled Adaptive Middleware). It enables us to develop various applications including an emergency rescue system, a smart facility management system, a frequent mobility supporting system, a multi-agent collaboration system, and a personalized mobile security/safety system. In order to support the context-awareness scheme, the XOnt agent has been integrated into the existing XCREAM framework. It examines all the collected events to see if they correspond to any conditions of certain rule(s) that could trigger associated actions of the rule(s). The XOnt agent seamlessly integrated with the XOntology in the Phase II part of XOnt agent. This research introduces the Context-Aware Inference (CAI) model based on general contextual behavior/situation analysis. The behavior/situation analysis is used as the context-aware mobile security option which is applicable to developing today's data analytics-based cybersecurity programs.

Publication

- P₁. S. Kim, K. Park, and T. Kihl, "Level Design of Platform Games Using Interest Curves," *International Journal of Engineering Research and Technology*, ISSN 0974-3154, Volume 13, Number 12 (2020), pp. 5176-5181
- P₂. K. Park, T. Kihl, S. Park, M. Kim, and J. Chang, "Fairy tale directed game-based training system for children with ADHD using BCI and motion sensing technologies," *Behavior & Information Technology*, DOI: 10.1080/0144929X.2018.1544276, November 2018
- P₃. K. Park, T. Kihl, S. Park, M. Kim, and J. Chang, "Improvement of Behavior and Reading Skills using Adaptive Intervention with Narrative Contents: Development of Adaptive Behavior Training Game Platform (ABTGP)," *Int'l Conference on Computer Games Multimedia & Allied Technologies (CGAT 2017)*, Singapore, April 2017.
- P₄. K. Park, T. Kihl, S. Park, M. Kim, and J. Chang, "Narratives and Sensor Driven Cognitive Behavior Training Game Platform," *Int'l Conference on Software Engineering Research, Management and Applications (IEEE/SERA 2016)*, Towson, MD, USA, June 2016.
- P₅. K. Park, T. Kihl, and J. Chang, "Development of Interactive Fairy Tale System Based on BCI and Motion Sensing Technology for Children with ADHD," *Journal of Korean Society For Computer Game (KSGC)*, vol. 28(1), pp. 21–27. March 2015.
- P₆. K. Park, Y. Kim, and J. Chang, "Semantic Reasoning with Contextual Ontologies on Sensor Cloud Environment," *Int'l Journal of Distributed Sensor Networks Vol. 2014*, Article ID 693957.
- P₇. Shin, S. H., Kim, S.K., Chang, J., and Park, K., "An Implementation of the HMD-Enabled Interface and System Usability Test," *Proc. of the 1st International Symposium on Simulation & Serious Games 2014 (ISSSG 2014)* in Seoul, Korea, May 2014. 183-193.
- P₈. K. Park, Y. Kim, and J. Chang, "Interoperable Context Sharing in an Ontology-Enabled Collaboration Framework," *Proc. of Int'l Conference on Ubiquitous Information Management and Communication (ACM IMCOM 2014)*, Siem Reap, Cambodia, January 2014.
- P₉. Y. Song, K. Park, and Y. Yoon, "Ontology based Learner-centered Smart E-Learning System," *Proc. of the VI International GUIDE Conference*, Athens, Greece, October 2013.
- P₁₀. K. Park, C. Byun, J. Yun, Y. Kim, and J. Chang, "Context-Aware Inference (CAI) Model on Smart Computing Environment," *Proc. of Int'l Conference on Information Science and Applications (ICISA 2012)*, Suwon, Korea, May 2012.

- P₁₁. J. Yun, K. Park, C. Byun, Y. Kim, and J. Chang, "Mobile Real-time Tracking System based on the XCREAM (XLogic Collaborative RFID/USN-Enabled Adaptive Middleware)," Proc. of the 9th ACIS Conference on Software Engineering Research, Management & Applications (SERA 2011), Towson, MD, USA, August 2011.
- P₁₂. K. Park, J. Yun, Y. Kim, and J. Chang, "Design and Implementation of Scenario-based Collaborative Framework: XCREAM," Proc. of Int'l Conference on Information Science and Applications (ICISA 2010), Seoul, Korea, April 2010.
- P₁₃. K. Park, Y. Kim, J. Chang, D. Rhee, and J. Lee, "The Prototype of the Massive Events Streams Service Architecture and its Application," Proc. of Int'l Conference on Software Engineering, Artificial Intelligence, Networking and Parallel/Distributed Computing (SNPD 2008), Thailand, August 2008.
- P₁₄. K. Park, J. Lee, K. Lee, K. Ahn, J. Lee, and J. Kim, "The development of GEUS(renamed to ZEUS): A spatial DBMS tightly integrated with an object-relational database engine," Proc. of the Annual Conference of Urban & Regional Information Systems Association (URISA'98), pp 256-267. Charlotte, NC, 1998.

Research Experience

Research in finding semantic relationships between many real-world entities and developing ontologies on them based on the collaboration framework

- Identification and prediction of unauthorized behavior and anomaly detection using dynamic reasoning of complex contextual events from RFID tags, mobile locations, social activities, and remotely captured IoT sensor data from Smart Grid environment: Java, RDF, Jena, and Hadoop
- Semantic analysis and decision-making framework with ontology-driven contextual events processing for e-Healthcare and e-Learning systems: RDF, OWL, Jena, Protégé
- Massive events handling and data analytics on Big Data cloud framework: Big data processing on Hadoop and Spark framework with MapReduce programming and real-time analysis on unstructured streaming data on Elasticsearch and NoSQL databases

Research in developing the Adaptive Behavior Training Game Platform for children with mental and learning disabilities using sensor-driven intervention mechanism according to the narrative contents of fairy tale stories

- Attention and behavior monitoring through MindWave Brain-Computer Interface (BCI) and Kinect motion sensing device, respectively
- Interactive video game as the Adaptive Behavior Training Game Platform using Unity3D, MySQL
- Big Data processing framework for analysis and visualization of brainwaves and motion sensing data with interactive game intervention records using Elasticsearch
- Narrative based adaptive approach to improve reading skills, attention, and social skills, and treat hyperactive behaviors of children with mental and learning disabilities

Research in developing the Dance Exergame for Older Adults with Wearable Motion Capture Sensing Technology

- Gesture detection by machine learning approach for the accelerometer data from smartwatches and cellphone devices
- Streaming Big Data analytics framework for exergame performance management

- Development of dance motions by adapting a well-balanced moderate physical exercise for body, mind, internal organs, and muscular system as well as meditation, disciplined and healthy lifestyle and well-known/popular physical therapy motions
- Integrated solution for older adults with the dance exergame Narrative based adaptive approach to improve reading skills, attention, and social skills, and treat hyperactive behaviors of children with mental and learning disabilities

Industrial Experience

Gained a broad background and industrial experience over a ten year period in a variety of fields of Computer Science and Information Technology. The practical knowledge gained with reputed companies include: KT Data, Inc. and KT Research Center in Korea. Some of the highlights of the experience gained include:

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| 1999-2006
KT Data, Inc. | Directing business/marketing strategies of Spatial DBMS and GIS
Planning/Designing/Developing/Delivering multiple projects including:

GIS/LBS Platform and LBS Services for U-City C&C Center, Telecommunication Carriers including KT, KTF, LGT, KIT, etc.

GIS Solutions based on Spatial DBMS (ZEUS) such as Military Movement Tracking System for Korean Army, Location-sensitive Huge Directory Server System for KTI, Neo-address system for Korean Local Governments. |
| 1992-1999
KT | Developing Telephone Outside Plant System as a Facility Management Solution for KT using GIS S/W

Designing/Developing Spatial DBMS (ZEUS) |

Professional Service

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| 2002 – 2006 | LBS (Location-Based Services) Standardization Forum
TTA (Telecommunication Technology Association), KOREA

Main & Co-Editor of LBS Service and Platform WG:
<i>“LBS Platform Stage 1 and 2”</i>

Chairperson of Emergency Rescue Service SIG:
<i>“Mobile Emergency Services”</i> |
| 2019 | Served as a member of the program committee of IEEE/ACIS International Conference on Software Engineering Research, Management and Applications (SERA 2019) |
| 2016 –2019 | Reviewed papers for the conference proceedings of SERA 2016 and 2019 |
| 2019 | Served as a member of the Essential (General) Education Committee at Graceland University |

Skill Set

GIS: ZEUS, INFOMAP, ArcGIS, etc.

DBMS: Oracle, UniSQL, SQLServer, Access, MySQL, MongoDB

Cloud Platform: Hadoop and Spark Stack, Elasticsearch, OpenStack

Game Engine: Unity3D

Programming Language: C, C++, C#, Java, JavaScript, Python, R

Semantic Web with Ontology: RDF, OWL, SPARQL, Protégé, Jena

Programming Framework: Hadoop (HDFS, MapReduce, etc.)

Operating System: Unix, Linux, Mac OS X, Windows

Patent

2011-03-04	System and method for learning history using network (1010216340000)
2006-11-10	Apparatus and Method for generating Image map and controlling Communication of Image map (1006474120000)
2002-01-10	Method for Searching Cross Point of Poly-line using Division of Poly-line (1003217740000)
2001-10-15	Method for Expanding Transaction Isolation Phase in Database Management System (1003129100000)
1999-11-23	Method for placing names for point-features on a map based on a plane sweeping technique (US 5988853 A)
1999-05-10	Simulated Annealing Method (1002123050000)
1999-02-10	Name Layout Method (1001947620000)

Scholarship and Award

2006-2012	Graduate Teaching and Research Assistantship (Towson University)
2002	Jang Young-Shil Award (IR52) for ZEUS Software Development KOITA (Korea Industrial Technology Association), Korea.

References

Dr. Kevin Brunner (brunner@graceland.edu)

Dr. Yanggon Kim (ykim@towson.edu)

Dr. Sungchul Hong (shong@towson.edu)

Dr. Chao Lu (clu@towson.edu)