



Information and Communication Technologies (ICTs)

Thematic Research Group

Progress: 2017~18

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Head International Office



COMSATS International Thematic Research Groups

- **Information and Communication Technologies (ICTs)**
Lead Institution: CIIT, Pakistan
- Natural Products Sciences (ICCBS Pakistan)
- Climate Change and Environmental Protection (ICCES China)
- Mathematical Modeling (NMC Nigeria)
- Renewable Energy (IROST Iran)
- Agriculture, Food Security and Biotechnology (IRCC, Sudan)



Flow of Presentation

1. Research Themes
2. Projects and Progress
3. Way Forward

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Research Themes



A. National Center for Artificial Intelligence



Big Data
and IoT

Theme 1

- Approved by Government of Pakistan
- Worth PKR **1023.3 Million (USD 10 Million)**
- **9** labs to be established across the country
 - **Computer Vision lab** to be established at CIIT, Islamabad (funding approved for lab **PKR 100 Million/ US 1 Million**)

Focal Person : Dr. Ahmad Raza Shahid
Assistant Professor, Computer Science

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B. *Innopedia*: Innovation Network for connecting Pakistani researchers with industry



Cloud
Computing

Theme 2

- State of the art knowledge management system is being developed to facilitate collaboration between academia, industry and funding agencies.
- Funded by Government of Pakistan
- Status: in progress

Focal Person : Dr. Khalid Latif
Associate Professor, Computer Science

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C. ICT4CoP: Levering ICTs for community policing



e-Solutions
Theme 3

- Horizon 2020 project with Norwegian Uni of life sciences as lead institute
- Partners from **8** different European and Non-European countries
- Another proposal under submission to Higher Education Commission
- A prototype for field testing is being developed

Focal Person : Dr. Sajjad A. Madani
Director Virtual Campus CIIT

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D. Cyber Security



Cyber Security
Theme 4

- Data Analytics in Network Security
- T-Eye (threat intelligence platform) in collaboration with Trillium Information Security Systems
- SHEPERD (Container Security Platform) in collaboration with WANClouds Inc. US
- Project worth **PKR 120 Million (USD 1.2 Million)**

Focal Person : Dr. Masoom Alam
Associate Professor, Computer Science

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E. IoT-Cloud for Big Data Analytics in Agriculture



Big Data
and IoT
Theme 1

- Application-oriented R&D Lab to design and develop implementable solutions to solve Agricultural Issues in Pakistan
- Aimed for technology development and commercialization leading to sustainable economic growth.
- Status: Proposal to be submitted to funding agency

Focal Person : Prof. Dr. Sohail Asghar
Computer Sciences Department

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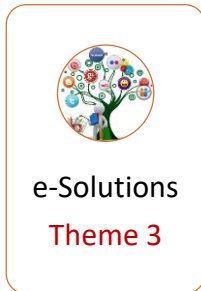
GENERAL INFORMATION Conferences/Workshops



- Frontiers of Information Technology was held **December 18~20, 2017** in Islamabad with the theme “connecting with industry”.
- International Symposium on Conflict, Peace and Development at CIIT Abbottabad on **October 16th-17th, 2017** [relevant theme ICT for community policing]
- Hands on Workshop on Data Science, **March 17~21 2018** with trainers from Pakistan, Germany, and Netherlands
- Frontiers of Information Technology technically co-sponsored by IEEE Industrial electronics society and IEEE computer society is planned for **December 17~19, 2018** in Islamabad.

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Hybrid Learning Initiative for e-Education: **Digitize or Die**



e-Solutions
Theme 3

- Flexibility in time, space, and pace
- A tailor-made MOOCs, is being developed
- A customized **learning management system** developed that supports online randomized quizzes, discussion boards, automatic assignment submissions, live sessions, and video lectures
- Report writing skills course was offered at all campuses where **2300** students registered the course
- **Two** courses offered in the current semesters with enrollment of around **6000** students

Focal person: Dr. Sajjad A Madani

Director Virtual Campus CIIT

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Publications around the themes [1]



1. J. Shujah, A. Gani, K. Ko, K. So, S. Mustafa, Sajjad A. Madani, M. K. Khan "SIMDOM: A Framework for SIMD Instruction Translation and Offloading in Heterogeneous Mobile Architectures", **Transactions on Emerging Telecommunications Technologies**, 2017.
2. S. K. Zaman, A. R. Khan, S. R. Malik, AN Khan, T. Maqsood, Sajjad. A. Madani "*Performance analysis and formal verification of task scheduling heuristics for makespan optimization and workflow distribution in Large-scale Computing Systems*", **Computer Systems Science & Engineering**, Volume 32, Issue 3, 2017.
3. J. Shujah, R. Wasim, S. Mustafa, Sajjad A. Madani "*Analysis of Vector Code Offloading Framework in Heterogeneous Cloud and Edge Architectures*", **IEEE Access**, Volume 5, Page 24542-24554, 2017.
4. Ahmad, Raja Wasim, Abdullah Gani, Siti Hafizah Ab Hamid, Mohammad Shojafar, Abdelmuttlib Ibrahim Abdalla Ahmed, Sajjad A. Madani, Kashif Saleem, and Joel JPC Rodrigues. "*A survey on energy estimation and power modeling schemes for smartphone applications.*" **International Journal of Communication Systems** 30, no. 11 (2017).

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Publications around the themes [2]



5. Khalid, Osman, Rao Naveed Bin Rais, and Sajjad A. Madani. "Benchmarking and Modeling of Routing Protocols for Delay Tolerant Networks." **Wireless Personal Communications** 94, no. 3 (2017): 859-888.
6. Shuja, Junaid, Abdullah Gani, Muhammad Habib ur Rehman, Ejaz Ahmed, Sajjad A. Madani, Muhammad Khurram Khan, and Kwangman Ko. "Towards native code offloading based MCC frameworks for multimedia applications: A survey." **Journal of Network and Computer Applications** 75: 335-354.
7. Tahir Maqsood, Kashif Bilal, and Sajjad A. Madani, "Energy and Communication Aware Task Mapping for MPSoCs". **Journal of Parallel and Distributed Computing**, 2017.
8. Tahir Maqsood, Nikos Tziritas, Thanasis Loukopoulos, Sajjad A. Madani, Samee U. Khan, and Cheng-Zhong Xu, "Leveraging on Deep Memory Hierarchies to Minimize Energy Consumption and Data Access Latency on Single-Chip Cloud Computers". **IEEE Transactions on Sustainable Computing**, 2017.

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Publications around the themes [3]



9. Ismail, Saadia, Majed Alshari, Khalid Latif, and Hafiz Farooq Ahmad. "A Granular Ontology Model for Maternal and Child Health Information System." **Journal of Healthcare Engineering** 2017 (2017).

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Way Forward



- Solicitation of focal persons from each member country to effectively organize the thematic area
- Meeting cum workshop on the sidelines of FIT 2018 of the thematic area members in December subject to availability of funds
- Establishment of center of excellence in cyber security (Lab proposal already submitted but a large scale center needs to be established for COMSATS member countries. Relying on cyber security solutions from external sources is not advisable)
- Establishment of CoE in IoT and Cloud and Data Science needs consideration

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Thank you for your attention!



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