



Institute for Development and Research in
Banking Technology
(Established by Reserve Bank of India)

Fast Forward

ISSN 0973 - 2527

Volume 21, No. 1
Newsletter, January 2018

From the Director's Desktop...

Happy New Year 2018

LET me wish all of you a Very Happy New Year 2018. As I welcome the new year, I also look back at the previous year - 2017 and I am happy to find some of the developments during the last year which are very important landmarks in the journey of 20+ years of IDRBT.

The first and foremost is the IDRBT Journal of Banking Technology. For an academic institution, it is certainly a proud moment to start a Journal for publishing high quality research papers in the area of Banking Technology from researchers across the globe. It is so heartening to receive acceptance from highly reputed researchers to our invitation to be on the Editorial Board of the journal. It is equally heartening to receive good articles from established researchers and practitioners for the first issue itself. With the support of all of them, we could publish the first issue of the Journal during 2017.

The second milestone is the receipt of first Patent to the Institute. Under the guidance of our faculty, research scholars of the Institute have produced original and useful work in the areas of Cyber Security, Analytics and Affordable Technologies and applied for patents during the past one-and-a-half years. We have received patent for the work in Cyber Security and the other two are under process. The year 2017 can be remembered as the year the Institute got its first patent.

The third milestone is the record number of Ph. D. submissions. The Institute has memorandums of understanding with University of Hyderabad; NIT, Warangal and NIT, Tiruchirapalli for offering Ph. D. programme at IDRBT. Out of 25+ research scholars presently on campus, six submitted their theses during the year 2017 on topics varying from Security to Biometrics to Analytics to Cloud Computing.

The fourth milestone is the recognition for the Center for Cyber Security by an external Research Advisory Committee. The committee recommended elevation of



the Center as Center of Excellence in Cyber Security. This is the second Center of Excellence in IDRBT after the Center of Excellence in Analytics.

The above and several other research activities helped the Institute to get the status of Scientific and Industrial Research Organization (SIRO) extended by three more years till March 31, 2020 by the Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India.

In addition to the developments on academic side, the Institute is also improving its physical infrastructure in a major way. Work relating to construction of an additional floor on the Academic Wing has just commenced. The additional space is to meet the increasing demand for various activities, including EDP and PGDBT. Plans for renovating the auditorium are also on board. Further, one of the existing floors in the Hostel Wing has been renovated to accommodate 12 more rooms to serve the increasing demand from participants of various programmes and conferences.

I am sure the activities during 2018 would be similar to, and possibly better than, those in 2017 and that the Institute will continue on the path of growth.

Wishing you all a very Happy New Year 2018 again.

Place: Hyderabad
Date: January 01, 2018



(Dr. A. S. Ramasastry)

Fifth International Conference on Mining Intelligence and Knowledge Exploration (MIKE - 2017)

CONTINUING the idea of organising a good conference every year, the Institute organised the Fifth International Conference on Mining Intelligence and Knowledge Exploration (MIKE 2017) from December 13-15, 2017. The conference, held at IDRBT, was inaugurated by Shri H. R. Khan, Former Deputy Governor, Reserve Bank of India.

The MIKE is a prestigious interdisciplinary conference that presents the latest research from the domains of Learning Algorithms, Data Mining, Machine Learning, Knowledge Exploration, Data Analytics, Big Data, Soft Computing, Information Systems, etc. Some of the previous editions of the MIKE were hosted by other reputed institutions such as National Polytechnic Institute, Mexico (2016) and National University of Ireland, Ireland (2014).

Dr. A. S. Ramasastri, Director, IDRBT, welcomed the dignitaries and delegates. Speaking on the occasion, he drew the attention of the research community to the Institute's cutting-edge research at the intersection of technology and banking and the renewed focus on the domains of Mobile Banking, Cloud Computing, Analytics, Affordable Technologies, Payment Systems, and Blockchain Technology.

Shri H. R. Khan, Former Deputy Governor, Reserve Bank of India, inaugurated the conference.



In his inaugural address, Shri Khan dwelt upon “Digital Financial Services and Payment Systems” through his I-framework covering:

- ★ **Inspiration:** The Government is focusing on building a less-cash society. The problems

related to cash such as cost, not formalising the economy has led to the ideation of building a digital economy, which increases productivity as well as efficiency

- ★ **Infrastructure:** The Reserve Bank of India is at the forefront of building critical infrastructure in both wholesale and retail payments. The development of RTGS and RTGS-II is amongst the best in the world. Focus on JAM (Jan Dhan-Aadhaar-Mobile) trinity is building digital infrastructure in a big way
- ★ **Innovation:** FinTech now plays an important role in innovation. They are very agile, their turnaround time is short and so they can bring a lot of changes. But being newcomers, they lack the scale, trust and the data, which banks have. Innovate to have a model where FinTechs can compete as well as co-operate with banks
- ★ **Incentives:** Technology offers the advantages of scale and cost reduction, but there needs to be adequate incentives to drive digitisation
- ★ **Insurance:** Cyber Security is a prime concern and awareness and sharing is crucial to contain cyber frauds. To ensure that the digital financial journey is not derailed, the customers need protection against fraud
- ★ **Information:** Customer education about use and misuse of digital financial services is needed for a coordinated and coherent national strategy.

MIKE 2017 brought together eminent researchers and practitioners from USA, Russia, Portugal, Norway, South Korea, Mexico, Columbia, Algeria, India, Bangladesh, etc., who presented 40 peer reviewed research papers addressing various application aspects and advances in the areas of Artificial Intelligence, Machine Learning, Data Mining and Information Retrieval, Image Analysis, Pattern Recognition and Computer Vision, Speech/Signal Processing, Text Mining and Natural Language Processing, Social Media and Big Data Analysis, Intelligent Security Systems, and Smart and Intelligent Systems.

A total of 139 submissions were received and the acceptance rate was 28.78%. An eminent Programme Committee led by Program Chairs, Prof. Ashish Ghosh, Indian Statistical Institute, Kolkata and Prof. Byung-Gyu Kim, Sookmyung Women's University, South Korea reviewed the manuscripts. Springer published the proceedings of the conference under the Lecture Notes of Artificial Intelligence Series.

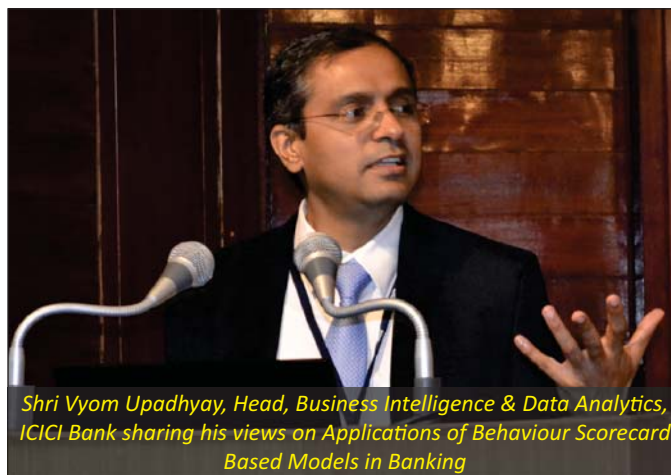
The papers were authored by leading researchers from across the globe including Moscow State University, Russia; University of Kentucky, USA; Norwegian University of Science and Technology, Norway; University of Cauca, Columbia; University of Minho, Portugal; Peking University, China; Bangladesh University of Engineering and Technology, Bangladesh, etc.

A galaxy of renowned international researchers participated and delivered the following keynote talks:

- ✦ **Prof. Sung-Bae Cho**, Yonsei University, Korea on Hybrid Deep Learning of Transfer-GAN with DAE for Anomaly Detection
- ✦ **Prof. Sankar Kumar Pal**, Distinguished Scientist and Former Director, Indian Statistical Institute, Kolkata on Granular Data Mining
- ✦ **Prof. Alexander Gelbukh**, Instituto Politécnico Nacional, Mexico on Opinion Mining, Sentiment Analysis, and Author Profiling.

The MIKE 2017 also included two half-a-day workshops focused on key emerging areas:

- ✦ **Workshop on Artificial Intelligence for Banking and Finance:** Chaired by Dr. Rajarshi Pal, Faculty, IDRBT, the workshop included the following talks by senior bankers:



- (a) **Intelligent Robotic Assistant for Customer Service in Branch** by Shri Rajnish Khare, Head of Product for Digital and Mobility, HDFC Bank
- (b) **Chatbot in Banking** by Shri Suresh Reddy, Wells Fargo
- (c) **Applications of Behaviour Scorecard Based Models in Banking** by Shri Vyom Upadhyay, Head of Business Intelligence and Data Analytics, ICICI Bank.
- ✦ **Workshop on Deep Learning and Industrial Applications:** Chaired by Dr. Krishnaiah Jallu, Scientist, BHEL, India, the workshop covered the following talks:
 - (a) **Learning: Biological Systems vs Machines** by Shri RVS Krishna Dutt, Scientist, BHEL, India
 - (b) **Deep Learning in Material Science Research** by Prof. N. Subba Reddy, Gyeongsang National University, South Korea
 - (c) **Open Source Tools available in R and Python in relation to Deep Learning** by Dr. Krishnaiah Jallu, Scientist, BHEL, India.

Prof. B. Yegnanarayana, INSA Senior Scientist, International Institute of Information Technology, Hyderabad, India and Prof. Chaman Lal Sabharwal, Missouri University of Science and Technology, USA were the General Chairs while Dr. Rajarshi Pal, IDRBT and Dr. Rajendra Prasath, Indian Institute of Information Technology, Sricity, were the organizing chairs of the three-day conference.

13th IDRBT Banking Technology Excellence Awards

THE Thirteenth Edition of the Annual IDRBT Banking Technology Excellence Awards was held on September 1, 2017. Shri Sudarshan Sen and Shri S. Ganesh Kumar, Executive Directors, Reserve Bank of India, were the Chief Guests on the occasion.

Dr. A.S. Ramasastry, Director, IDRBT, began the proceedings by extending a warm welcome to all the distinguished dignitaries. In his welcome address, the Director highlighted the increasing focus on research in the Institute, especially the renewal of SIRO recognition, growth in number of Ph.D. Scholars and thesis submitted; filing for patents in varied areas, setting up of a new research centre on Payment Systems, releasing a series of new publications including the White Paper on Blockchain Technology, etc. He also shared that the Institute has achieved 100% placement for the first batch of Post Graduate Diploma in Banking Technology.

Shri S. Ganesh Kumar, Executive Director, Reserve Bank of India, delivered the keynote address on “FinTech and Banks: Opportunities and Challenges” and the key points are as under:

- ★ FinTechs provide solutions to the complex needs of banks and their customers; they aim to provide products and services which are affordable and convenient to use
- ★ The IT-intensive banking sector is a prime target for cyberattacks. We need to ensure that there is no negative impact on the banks and that the customers have confidence in their operations so as

to ensure that their money is safe and secure. This is where FinTech can play a vital role

- ★ The tendency to exploit the weakness in a less secure but trusted device and then to use that device to attack critical and well protected resources will increase. FinTechs can play an important role here – they can develop products and services which can overlay on these systems for either enhanced security or for providing additional capabilities.
- ★ FinTechs are also playing a vital role in the emerging areas of Payment and Settlement Systems. We are all aware of the innovative systems that came up during demonetisation. Most of these were developed, implemented and managed by FinTechs. Use of QR for payments is perhaps an easy, convenient and cost-effective way – this is a product of a FinTech
- ★ Can FinTechs exist in isolation? The answer is 'No'. Collaboration by banks and FinTechs will yield smart outcomes and smart banks will find smarter ways for better use of FinTechs to serve smarter customers who are now demanding better, easy-to-use services.

WINNERS 2016-17

The IDRBT Banking Technology Excellence Awards is synonymous with excellence in technology adoption, upgradation and innovation. These Awards are the benchmark for recognising banks, which innovate and explore technology to improve cost, reach, customer service and efficiency. Pioneering and out-of-the-box approaches in the usage of technology for improving productivity and profitability are recognised through these awards.

As technology evolves and changes, the categories of awards also undergo changes. Over the years, reflecting the changing technology scenario and priorities of the sector, several categories have been dropped and new categories introduced. This year, the Institute has redefined quite a few categories so as to reflect the technological changes in the Indian Banking and Financial Sector.





Shri Sudarshan Sen, ED, RBI speaking at the awards function

The Jury for this edition of the IDRBT Banking Technology Excellence Awards consisted of:

- ★ **Shri V.G. Kannan**, Chief Executive, IBA
- ★ **Prof. G. Sivakumar**, IIT, Bombay
- ★ **Prof. B.H. Jajoo**, IIM, Ahmedabad
- ★ **Dr. J. N. Mishra**, CEO, IIBF
- ★ **Dr. Santanu Paul**, CEO & MD, TalentSprint.

This year, the IDRBT Banking Technology Excellence Awards, were presented in eight categories to the

Commercial Banks and one category each to Co-operative Banks and Regional Rural Banks. This year, we also recognized banks that have demonstrated commendable performance across multiple categories with the 'Best Emerging Bank' award.

In order to carry out effective evaluation, commercial banks were sub-divided into large, mid-sized and small banks. This provides a level playing field for the banks to be compared for evaluation on similar scale and size.

Shri S. Ganesh Kumar and Shri Sudarshan Sen, Executive Directors, Reserve Bank of India, presented the IDRBT Banking Technology Excellence Awards for the year 2016 – 17, at a very special function today to all the winners. And the winners of the 13th IDRBT Banking Technology Excellence Awards are:

Award Category	Winner
Best Bank Award for Use of Technology for Financial Inclusion Among Large Banks	State Bank of India
Best Bank Award for Use of Technology for Financial Inclusion Among Mid-Sized Banks	Vijaya Bank
Best Bank Award for Use of Technology for Financial Inclusion Among Small Banks	Karnataka Bank Ltd.
Best Bank Award for Digital Banking among Large Banks	Axis Bank Ltd.
Best Bank Award for Digital Banking among Mid-Sized Banks	Vijaya Bank
Best Bank Award for Digital Banking among Small Banks	South Indian Bank Ltd.
Best Bank Award for Electronic Payment Systems among Large Banks	State Bank of India
Best Bank Award for Electronic Payment Systems among Mid-Sized Banks	Andhra Bank
Best Bank Award for Electronic Payment Systems among Small Banks	The Federal Bank Ltd.
Best Bank Award for Analytics and Big Data among Large Banks	ICICI Bank Ltd.
Best Bank Award for Use of Technology for Fraud Prevention among Large Banks	HDFC Bank Ltd.
Best Bank Award for High Performance IT Ecosystem among Large Banks	Bank of India

Award Category	Winner
Best Bank Award for High Performance IT Ecosystem among Mid-Sized Banks	IndusInd Bank Ltd.
Best Bank Award for High Performance IT Ecosystem among Small Banks	South Indian Bank Ltd.
Best Bank Award for Cyber Security and Defense among Large Banks	HDFC Bank Ltd.
Best Bank Award for Cyber Security and Defense among Mid-Sized Banks	IndusInd Bank Ltd.
Best Bank Award for Cyber Security and Defense among Small Banks	City Union Bank
Best Bank Award for Innovative Use of Technology among Large Banks	HDFC Bank Ltd.
Best Bank Award for Innovative Use of Technology among Mid-Sized Banks	YES Bank Ltd.
Best Bank Award for Innovative Use of Technology among Small Banks	The Karur Vysya Bank Ltd.
Best Emerging Bank Award	Union Bank of India
Best IT-Enabled Co-operative Bank	The Cosmos Cooperative Bank Ltd.
Best IT-Enabled Regional Rural Bank	Andhra Pragathi Grameena Bank



Winners of 13th IDRBT Banking Technology Excellence Awards with the dignitaries

Launch of SFMS MI 6

During the Awards function, Shri S. Ganesh Kumar, Executive Director, Reserve Bank of India, also launched the SFMS MI 6. The SFMS MI 6 encapsulates key functional and security enhancements to the Structured Financial Messaging System, launched in 2001.

The functional enhancements include SFMS helpdesk reports module, facility to archive production and test messages, generate reports in Excel, HTML, CSV & PDF formats and user-friendly access to different filters and defined user profiles.

The new security improvements include address Critical Open Web Application Security Project vulnerabilities, logging in through Internet Explorer, Chrome and Mozilla Firefox to SFMS Hub, additional features for bank administration module including adding, modifying & deleting in both Bank queues & Certificate details, etc.

The top management of the Reserve Bank of India and Indian Banking and including Managing Director & CEOs, CIOs and IT Chiefs of Public, Private and Foreign Banks participated.

7th IDRBT Doctoral Colloquium

THE Annual IDRBT Doctoral Colloquium, in its 7th edition this year, has emerged as one of the most preferred forums for doctoral researchers in various areas of technology to present their research to an eminent jury as well as peers and get invaluable feedback. The numbers of proposals received as well as their quality has consistently improved and so has the acceptance benchmark set by the colloquium.

The 7th IDRBT Doctoral Colloquium, held on December 1, 2017, brought together 12 research scholars from reputed institutions like IISc., ISI, IITs, IIMs, to discuss their research. The specifics of the scholars and their research topics are as under:

S. No	The Topic	The Scholar	Institution
1.	Analysis of Firm Investments in Cyber Security using Stackelberg Games	Baidyanath Biswas	Indian Institute of Management, Lucknow
2.	Understanding the Relationship between Firm's Twitter Activity and Earnings Management	Adrija Majumdar	Indian Institute of Management, Calcutta
3.	Enforcing Service Level Agreements in an Untrusted Environment using Evidence Structures	Prasanna Karthik Vairam	Indian Institute of Technology, Madras
4.	Novel Approaches to Tolerate Interference and Node/Link Faults in WSN	Beneyaz Ara Begum	Indian Institute of Chemical Technology, Hyderabad
5.	3D Ear Recognition Using Local and Global Features	Iyyakutti Iyappan Ganapathi	Indian Institute of Technology, Indore
6.	A Robust Skull Stripping Method for 3-D MR Brain Images	Shaswati Roy	Indian Statistical Institute, Kolkata
7.	Score-level fusion for cancellable multi-biometric verification	Rudresh Dwivedi	Indian Institute of Technology, Indore
8.	Unsupervised Band Selection of Hyperspectral Images by Combining Clustering and Ranking Techniques	Aloke Datta	Jadavpur University
9.	A Multi-objective Genetic Programming Based Ensemble for Simultaneous Feature Selection and Classification	Kaustuv Nag	Jadavpur University
10.	Removing the Participation Bias in Competitive Crowdsourcing Markets	Sankar Kumar Mridha	Indian Institute of Engineering Science and Technology, Shibpur
11.	Drone based Targeted Cyber Attacks on Consumer Electronics: A Practical Study	Sibi Chakkaravarthy S	Madras Institute of Technology, Anna University
12.	Scalable Performance Tuning of Hadoop MapReduce: A Noisy Gradient Approach	Sindhu Padakandla	Indian Institute of Science (IISc.) Bangalore

Awards and Evaluation

The Jury for the Colloquium consisted of Prof. Yegnanarayana, Indian Institute of Information Technology, Hyderabad; Prof. Bapi Raju, University of Hyderabad; and Prof. Prasenjit Majumder, Dhirubhai Ambani Institute of Information and Communication Technology.

The Jury evaluated the presentations on the parameters of Originality, Depth of Work (Modelling, Design, Experimentation, Results), Technical Content (Models, Optimization, Technologies, Analysis), Presentation (PPTs, Graphs, Explanations, Language, Clarity), Relevance (Applicability, Modernism) and Correctness of Work (Correct, Complete, Gaps).

The Winners

- ★ **First Prize of INR 1 lakh: Mr. Kaustuv Nag**, Jadavpur University, for his contribution entitled **A Multi-objective Genetic Programming Based Ensemble for Simultaneous Feature Selection and Classification**
- ★ **Second Prize of INR 50,000/-: Mr. Prasanna Karthik Vairam**, Indian Institute of Technology Madras, for his contribution entitled **Enforcing Service Level Agreements in an Untrusted Environment using Evidence Structures**

★ The third prize of INR 35,000/- was shared by the following two research scholars:

- **Mr. Baidyanath Biswas**, Indian Institute of Management, Lucknow, for his contribution entitled **Analysis of Firm Investments in Cybersecurity using Stackelberg Games**
- **Ms. Beneyaz Ara Begum**, Indian Institute of Chemical Technology, Hyderabad, for her contribution entitled **Novel Approaches to Tolerate Interference and Node/Link Faults in WSN**.

Presenting the awards to the winners, Dr. A. S. Ramasastry, Director, IDRBT, exhorted all the participating scholars to continue engaging with the Institute through its various initiatives so as to put their research ideas into practice.

The Annual IDRBT Doctoral Colloquium is a key initiative of the Institute, aimed at discovering and exploring emerging areas of research in various domains of technology, sharing knowledge and forming a network of technology researchers. It intends to create a platform to collaborate, and exchange research ideas, thereby exploring the opportunities for innovation in the Indian FinTech Sector.

The Colloquium was coordinated by Dr. N. V. Narendra Kumar and Dr. Nagesh Bhattu Sristy, Faculty, IDRBT.



Winners of the 7th IDRBT Doctoral Colloquium with Dr. A. S. Ramasastry, Director IDRBT; Prof. Bapi Raju, UoH and coordinators of the Colloquium

Seminar on Banking Technology for Directors on Bank Boards

IDRBT organised a two-day seminar on Banking Technology for Directors on Bank Boards from July 21-22, 2017, to help them appreciate the need for taking the digital banking journey forward and at the same time strengthen the preparedness of banks in cyber defence, in view of the growing threats.

The seminar opened with the inaugural interaction with Dr. A. S. Ramasastry, Director, IDRBT. He highlighted the need for bank boards to be proactive in visualising the fast-paced changes taking place in banking technology, to take the full advantage of digital banking. He also exhorted the Directors to play an active role in ensuring strategic alignment of IT and business in banks to pave the way for improving efficiency and effectiveness of banking operations.

This was followed by “Cyber Security Preparedness in Banks” which was the focus of intense interaction between the delegates and Shri R. Ravikumar, Chief General Manager, Department of Banking Supervision, RBI. The need for achieving a baseline cyber security framework and a cyber crisis management plan in banks, as early as possible, as envisaged by the RBI was of paramount importance, he reiterated and requested the boards to actively help and guide the banks in this regard.



Shri R. Ravikumar, CGM, Department of Banking Supervision, RBI sharing his perspectives on “Cyber Security Preparedness in Banks”

The last session for the day was on “Evolving IT Strategies for Banks”, by Shri Ajith Kumar Rath, Executive Director, Andhra Bank. He traced the development of technology in banks and what the banks have learnt through this long journey of evolution of banking technology. He outlined the options before bank boards on strategic planning for IT in the days ahead.



Shri Anil Sharma, UCO Bank participating in an interactive session for board members

In the session on “Role of IDRBT in Banking Technology Development”, the Director, IDRBT, interacted with the delegates and briefed them on what IDRBT is doing to promote banking technology in India. He also highlighted the useful and proactive role played by the Research Centres in IDRBT focusing on Analytics, Mobile Banking, Cyber Security, Cloud Computing and Affordable Technologies, in helping banks reduce their lead-time in deploying these technologies and solutions.

Later, Dr. N. V. Narendra Kumar, Faculty, IDRBT, made a brief presentation on Blockchain Technology (BCT) to update the audience on the current status and scope for applicability of BCT in banking.

Emerging Trends in Banking Technology was the next topic for interaction. Prof. V. Kamakoti, IIT, Madras, presented a case study on how technology projects are handled usually and took the audience through the nuances of technology absorption and upgradation.

This was followed by an update on the Recent Trends in Payment Systems, by Shri G. Raghuraj, GM, IDRBT and Shri P. Nandakumar, CEO, IFTAS.

In his valedictory address, Shri. S. Ganesh Kumar, Executive Director, RBI, drew the attention of the audience to the various approaches and priorities that manifest themselves in the Board Level Focus on Banking Technology. He also spent more time interacting with the directors on various queries and clarifications that they raised in this regard.

The seminar ended with a vote of thanks by Dr. M.V. Sivakumaran, coordinator of the event.

6th International Programme on Information Assurance & Management

THE 6th International Programme on Information Assurance and Management (IPIAM-6) was held during September 13-23, 2017. While the first part of the programme was held at IDRBT, Hyderabad during September 13-15, 2017, and the remaining part of the programme was held at Niagara Falls and Buffalo, USA during September 17-23, 2017.

The programme at IDRBT started with the welcome address by Dr. A. S. Ramasastri, Director, IDRBT. This was followed by a session on US Etiquettes, by Mr. Akash Suri, Assistant Public Affairs Officer, US Consulate, Hyderabad. Dr. B. M. Mehtre, Professor and Programme Coordinator, IDRBT provided an overview on Cyber Defence for Banks, covering Data Center Management and Metrics, Cyber Insurance for Banks, Blockchain Technology and Applications, and Digital Forensics.

This was followed by a talk on Recent Advances in Network Security by Prof. Atul Negi, School of Computer and Information Sciences, University of Hyderabad; an address on Securing and Managing Network Infrastructure to Mitigate Risk, by Shri Vinod Vanga, Chief Enterprise Architect, Yes Bank.

Prof. V. N. Sastry, IDRBT conducted sessions on Mobile Forensics for Android, Mobile Forensics for IoT and Mobile Payment Security. A Cyber Security Drill was also conducted by the cyber security team at IDRBT.

The sessions at Niagara Falls were delivered by a mix of faculty from academia, industry and practitioners. Prof. Venu Govindaraju, Vice President for Research and Economic Development, University at Buffalo, gave the welcome remarks. Prof. Shambhu Upadhyaya and Dr. Srirangaraj Setlur, University at Buffalo, gave the programme overview.

Mr. Holly Hubert, GlobalSecurityIQ, gave a lecture on Emerging Cyber Threats and Insider Threats. Dr. Utkarsh Porwal, eBay Research Labs and Dr. Anurag Bhardwaj, Quad Analytics spoke on “Delivering Better Banking Experience using AI Powered Chatbots”.

Dr. Catherine Ullman, Senior Security Analyst, University at Buffalo spoke on “Strategic Forensics in an Enterprise Environment.” This was followed by Dr. Manish Gupta on Cyber Warfare – Monitoring and Alerts, and Cyber Security – Risks and Mitigations. Mr. Scott R. Patronik, Chief Special Services Division, Erie County Sheriff's office spoke on Digital Forensics.

Anomaly Detection by Dr. Varun Chandola, Faculty, University at Buffalo; Risk by Mr. John Walp, Digits LLC; Cloud Security by Dr. Marina Blanton, Faculty, University at Buffalo; and Fighting against Financial Crime, by Mr. Prakash Samaga, Senior Vice President, Compliance Solutions, First Niagara Financial Group were amongst the key sessions.

The participants also visited the Yahoo Data Center, one of the largest data centres in the world, where Dr. Amol Kulkarni, Senior VP (Engg.), Dr. Satyajit Nath, Senior Engineering Manager and Dr. Ramanand Kambli, Regional Director, India and SAARC provided an industry perspective on the Current Security Threat Landscape. This was followed by a session on Security Architecture, by Jeff Murphy, Information Security Program Manager, University at Buffalo.

The programme concluded with a campus tour visit to various labs and centers of the University at Buffalo, coordinated by Dr. Srirangaraj Setlur, Principal Research Scientist, CSE, UB and a round table discussion by programme coordinators and participants.



Bank Executives at the University at Buffalo, USA during the 6th International Programme on Information Assurance and Management

Ideation Meet on Blockchain

Blockchain technology is widely regarded as the latest revolution in technology, and banking and financial industry is at the forefront of experimenting with this technology. Varieties of blockchain platforms are being created by technology providers to suit various application scenarios. The fragmentation of solutions and lack of standardisation makes it difficult for organisations to evaluate and choose a suitable platform based on their requirements.

IDRBT recently published a White Paper on implementation of BCT in banking and finance, identifying the potential areas and flagging concerns. In continuation of its efforts in this important area, IDRBT organised an ideation meet involving banks, trusted intermediaries and technology providers for: (i) understanding the extent to which current blockchain platforms cater to the spectrum of applications in the banking and financial sector, (ii) identifying the gaps to be addressed, and (iii) characterising a model Blockchain platform that fulfills the gaps.

The meeting held on October 12, 2017 had 30 participants from Banks, Regulators, IT service providers and startups including some international organisations and consortia.

There were seven presentations and a brainstorming session. SBI and ICICI presented about their experiences in the blockchain consortia driven by them. IBM presented on the Hyperledger Fabric platform of which they were major contributors. R3 consortium, represented by Barclays Tech and TCS, presented on the Corda platform. Infosys/Edgeverve presented on their blockchain platform offerings. XinFin, a Singapore based

startup presented on the various interesting projects they are implementing including one on smart city management.

The presentations of the banks centered around the following: Desirable features of an ideal Financial Network/Platform, Limitations of existing systems, Features enabled by Blockchains/Distributed ledgers, Best use-cases for Blockchains/Distributed ledgers, Characteristic features of ideal Blockchains/Distributed ledgers platforms and Experiences and observations – gaps, if any, in present Blockchains/Distributed ledgers platforms.

The presentation from technology providers discussed the following: Targeted industry and application scenarios, Targeted characteristics – throughput, guarantees such as security and privacy, permissions, node types, roles etc., Design choices – pros and cons, Architecture, End-to-end transaction workflow, Consensus method, Similarities and distinguishing features.

In the concluding session, Dr. A. S. Ramasastri, Director IDRBT proposed creating a “Blockchain Forum” for discussing the common issues such as inter-operability, governance, regulation etc. as blockchain is a multi-stakeholder platform. All the participants concurred, and decided this meeting be considered as the first meeting of the Blockchain Forum. Given the rapid progress in technology, participants resolved that the Blockchain Forum meetings should take place more frequently – about once in two months.

NEW MILESTONE

IDRBT Receives its First Patent

The Institute has been granted its first patent entitled “System and Method for Zero-Day Privilege Escalation Malware Detection” on December 11, 2017.

This invention, by Hiran V Nath, who pursued his Ph.D from the Institute and Prof. B M Mehtre, Faculty, IDRBT, is useful in detecting and preventing cyberattacks.

Before any cyberattack is initiated on a potential victim machine (client, server), it begins with privilege escalation. Privilege escalation is the first step required to start an attack. If this step goes undetected, then the

system will be exposed to cyberattack, leading to various after-effects like shut down and non-availability of systems to users. Such privilege escalation is initiated and achieved by malicious programs (malware) and gets executed on infected machines and potential victim machines (like clients or server systems).

This patent describes a technique to detect the privilege escalation step and alert the system user/administrator about the impending cyberattack, thereby enabling the system owner/administrator to take appropriate steps to prevent the attack.

5th Meeting of the Indian Banks' CIO Forum

The Fifth Meeting of the Indian Banks' CIO forum started on August 31, 2017 with the inaugural interaction with Dr. A. S. Ramasastry, Director, IDRBT. He exhorted the CIOs to explore how the CIO Forum can become a regular source for best practices and commonly agreed standards for improving the overall management and effectiveness of IT infrastructure in banks and contribute to the growth of banks. He also highlighted the need for banks to prepare themselves to find adequate synergies with the FinTech companies to achieve the twin objectives of innovation and cost optimization.

The next session was on Blockchain Technology (BCT) by Dr. N.V. Narendra Kumar, Faculty, IDRBT, to update the CIOs on the latest developments in this area and the proposal of IDRBT to set-up a proof-of-concept test bed for banks to participate and familiarise themselves with BCT.

This was followed by a presentation by Dr. N. P. Dhavale, Faculty, IDRBT, on the latest developments on the INFINET and discussions on what needs to be done by the banks from their side to get the best out of the latest, upgraded implementation of INFINET.

The next session focussed on Cyber Insurance wherein Prof. B. M. Mehtre, IDRBT, presented the highlights of a reference guide being prepared by a Working Group, of bankers, experts from the insurance industry and IDRBT faculty, on Cyber Insurance.

The final session for the day was a Panel Discussion wherein the CIOs deliberated on issues of immediate concern, like KYC, Aadhaar enrolment centres, Aadhaar vaults, EMV compliance costs for ATMs, usage of apps for recovery and early warning solutions for NPA management.

The second day was fully devoted to the IDRBT Awards for Excellence in Banking Technology.

CISO Forum Meet

The Institute's CISO Forum is serving as an effective platform for the CISO's of Banks to discuss and resolve information security related issues. The CISO Forum meet, held once in every quarter, was held at IDRBT on August 29, 2017 and at Syndicate Bank, Bengaluru on November 24-25, 2017.

Meeting on August 29, 2017

- ★ Dr. A. S. Ramasastry, Director, IDRBT, in his inaugural address, stressed on the growing importance of Cyber Security Drills and IB-CART for the Banking Sector. He also urged the CISOs to provide suggestions for further strengthening the IB-CART portal
- ★ Dr. B. M. Mehtre, Professor, IDRBT, presented a report on the 10th Cyber Drill, which preceded the CISO Forum Meeting
- ★ Dr. Rajarshi Pal, Assistant Professor, IDRBT, presented the enhancements in the new IB-CART system, which was already rolled-out and urged the banks to undertake testing of the web services integration of IB-CART
- ★ Shri Lalit Mohan, Senior Domain Expert, IDRBT dwelt on “Quality Control in Crowdsourcing”
- ★ Shri Surendra Tulsyan, Cybernet Security, talked on Security Issues in Mobile Payment Applications, Challenges and Solutions
- ★ Dr. Sanjay Behl, Director General, CERT-In, advised banks to re-architect processes to suite technology based systems and start rethinking on business process implementation. He stressed on proper risk management, creating trust with other banks, and proper communication to abate weaknesses in business process automation
- ★ Shri Krishna Sastry Pendyala, Executive Director, PwC, gave a talk on various types of Cyber Security Breaches that are taking place in day-to-day life and cautioned about the threats residing in hard drives of an ATM and IoT systems
- ★ Shri Ray Irving, FS-ISAC, shared about the successful completion of Critical Infrastructure Notification System that allows the FS-ISAC to speed security alerts to multiple recipients. He also shared that FS-ISAC was involved in readiness exercises for incidence response and Cyber-Attack Against Payment Systems, where the banks participated from their own premises in a virtual, confidential two-day in table-top exercises that simulates an attack on payment systems and processes
- ★ 40 CISOs participated.

Meeting on November 24-25, 2017

- ★ Shri U. S. Majumdar, General Manager – Risk Management, Syndicate Bank, in his welcome address stressed on the necessity of CISO's role in a bank in the ever changing landscape of cyberattacks
- ★ In his inaugural address, Dr. A. S. Ramasastry, Director, IDRBT, highlighted the importance of forums in knowledge sharing and discussing the best technology practices, policies, and to create awareness about recent trends. Drawing attention to four pillars of security: (i) governance, (ii) technology, (iii) policy, and (iv) awareness, he invited CISOs to come forward with technology-enabled solutions to tackle such frauds using analytics
- ★ Prof. B. M. Mehtre, IDRBT, presented the report of XI cyber security drill and suggested remedial measures
- ★ Dr. Venkat Rayapati, CEO and Founder, Cyber Forza Inc. presented on their cognitive computing based initiatives to detect cyberattacks
- ★ Dr. Rajarshi Pal, IDRBT dwelt on “Cognitive Computing for Cyber Defence” and pointed to several cases where traditional signature based and sand-box based detection techniques have failed. So, cognitive computing can be thought of as advance on preliminary artificial intelligence based techniques. He also initiated a discussion on PoS ransomware and how malwares have infected PoS devices, in past, to steal card details and urged banks to work on various proactive strategies to reduce the chance of infections of these devices
- ★ Shri Vivek Gupta, CISO, Allahabad Bank, stressed on the risks involved as surface area of PoS is much bigger than that of ATMs
- ★ Shri Sarvesh Gupta, CISO, Bank of Baroda, pointed to the lack of hardening document and proper governance mechanism for PoS devices
- ★ Shri Khursheed, CISO, J&K Bank, mentioned the challenges of auditing PoS devices
- ★ Ms. Ekta Prahasar, Amazon Web Services, expressed her views on the common security concerns over public cloud, including on issues like encryption, data residency, and VAPT
- ★ Shri Shantanu Mahajan, FireEye Technologies Pvt.



Shri U. S. Majumdar, GM, Syndicate Bank welcoming the CISOs

Ltd., detailed about various categories of malwares and types of detection techniques for advanced malwares

- ★ In a useful discussion moderated by Prof. B. M. Mehtre on how CISOs need to approach their role in a bank, the following were proposed by various CISOs:
 - Shri Khursheed, CISO, J&K Bank, shared how a vulnerability tracker is used by all stakeholders in their bank to track any identified vulnerability
 - Shri Ramanamurthy, CISO, SBI stressed that the CISO should not prescribe the step to mitigate a risk. IT Risk mitigation has to be done by the IT team. But the solution being adopted by the IT team, needs to be approved by the CISO
 - Shri Sarvesh Gupta, CISO, Bank of Baroda emphasized that a CISO's role is to notify an identified risk to the business vertical owner and IT/Risk Management committee of the Board. It is the business vertical owner (in consultation with IT) who must commit about the timeline of the risk to be closed. If a risk is not being closed (as per the recommendation of the business vertical owner), the Board should be informed about it and proper documentation of the case has to be maintained
 - Shri Patrick, BNP Paribas has shared how security has to be built into the design, development, and deployment of a system. Hence, a CISO should be involved in every stage of the lifecycle of an IT system
 - 45 CISOs participated.

Second CAO Forum Meet

- ★ The Chief Analytics Officers' Forum met for the second time at IDRBT on September 20, 2017
- ★ Prof. V. Ravi suggested that a survey about the state of analytics in banking industry be done periodically which can be published and circulated among the banks. Some of the segments which can be queried about are: Data availability quality, Analytics Tools, Areas in which analytics is applied, State of Data Warehousing, Skillset present in the analytics department in bank
- ★ Prof. V. Ravi, CoEA, introduced RUIBA v2.0 developed by the analytics team of IDRBT
- ★ Primary objective of RUIBA was to develop a banker-friendly, coding-less interface for performing common data mining tasks. It has an intuitive process flow and is easy to learn
- ★ Methods to tackle data imbalance, which is a serious issue in banking data, have been included in v2.0
- ★ Prof. Yegnanarayana, IIIT Hyderabad, gave a talk on deep learning and the hype surrounding it
- ★ Shri Bharath Shasthri, Vertical Head, Machine Learning & Big Data, HDFC Bank explained the importance of Analytics in Banks. He pointed to the new trend of Image Analytics for getting the essence of data from PDF files and other text documents. He interpreted that internal scores are better than bureau scores (like CIBIL)
- ★ Shri Dhirendra Sharma, Kotak Mahindra, said that the bank focusses on Channel Analytics and explained the six pillars of Analytics in Banking – Data, BI Tools and Visualization, Model Building (Beyond Visualization), Analytical CRM, Operational CRM, and Lead Management System. The bank built the first Data Lake in India, which mainly focuses on real-time, unstructured data and are now utilizing the power of Spark and ML library.

NURTURING GENNEXT

Increasing No. of Ph.D.s

Since July 2017, three Ph. D. Scholars have submitted their thesis and the details are as under:

S. No	Name of the Scholar	Guide	Title of the Work	Date of Submission
1.	Deepnarayan Tiwari	Dr. G. R. Gangadharan	Authenticated Secure Data Storage and Sharing in Cloud Computing	October 25, 2017
2.	Jatoth Chandrashekar	Dr. G. R. Gangadharan	QoS-aware Service Composition using Computational Intelligence Techniques	December 04, 2017
3.	Bangari Shruvan Kumar	Dr. V. Ravi	Novel Text Mining Methods and Applications	December 04, 2017

Further, the number of Ph. D. scholars in the Institute has also significantly increased with 28 research scholars now carrying out research work in the relevant areas to the Institute. While 14 scholars are from the University of Hyderabad, eight students are from NIT Warangal and six students are from NIT Trichy.

First PGDBT Convocation

The inaugural batch of the students of the Institute's Post Graduate Diploma in Banking Technology (PGDBT), successfully passed out in June 2017. The Institute also achieved 100% placements with all the students being placed by February 2017 in reputed banks and financial institutions.

The convocation for the first batch was held on September 05, 2017 and Dr. A. S. Ramasastry, Director, IDRBT, handed over the diplomas. Speaking on the occasion, the Director, congratulated the students on their completion of the PGDBT and exhorted them to leverage the latest in technology for their respective organisations, set high benchmarks and be brand ambassadors for PGDBT as well as IDRBT.



The second batch of the PGDBT programme commenced from July 03, 2017.

IDRBT Journal of Banking Technology

In a pioneering initiative aimed at promoting new thinking, conceptual frameworks and research/practice-oriented innovative ideas on topics of current interest and broad relevance to application of Technology in Banking and Financial Services, the Institute has launched the IDRBT Journal of Banking Technology.

The scope of the journal covers all aspects of technology, which directly or indirectly contributes to the technological growth of the banking and financial sector, both from researchers' as well as practitioners' perspectives. The journal publishes original research/practice articles on all aspects of computing and communication technologies, which can be used in banking and finance, including case studies, practitioners' perspectives, experimental and survey articles.

The bi-annual journal carries articles of two types – Research Articles and Practitioners' Perspectives. This helps the journal achieve a fine balance between research and practice so as to reach out to all stakeholders.

Editorial Board

With a view to publish a high quality Journal, the Institute has constituted an Editorial Board consisting of reputed researchers/practitioners across the globe. The Editorial Board of the Journal, drawing from eminent experts across the world, consists of:

- ★ **Prof. Chin-Teng Lin**, National Chiao-Tung University, Taiwan
- ★ **Prof. Constantin Zopounidis**, Technical University of Crete, Greece
- ★ **Prof. D. B. Phatak**, IIT Bombay
- ★ **Prof. Dirk Van den Poel**, Ghent University, Belgium
- ★ **Prof. Kalyanmoy Deb**, Michigan State University, USA
- ★ **Mr. Marc Hollanders**, Bank of International Settlements
- ★ **Mr. Massimo Cirasino**, The World Bank
- ★ **Prof. Paolo Bellavista**, University of Bologna
- ★ **Prof. Rajkumar Buyya**, University of Melbourne
- ★ **Prof. R.K. Shyamasundar**, IIT Bombay
- ★ **Prof. Sushil Jajodia**, George Mason University
- ★ **Mr. Thomas Lammer**, European Central Bank
- ★ **Prof. Venu Govindaraju**, State University of New York

Inaugural Issue

The inaugural issue of the journal consists of the following articles –

Research Articles	
Article Name	Author(s) & Affiliation
Indoor Self-localization via Bluetooth Low Energy Beacons	<ul style="list-style-type: none"> • Azkario Rizky Pratama, University of Groningen, The Netherlands • Widyawan, Universitas Gadjah Mada, Indonesia • Alexander Lazovik, University of Groningen, The Netherlands • Marco Aiello, University of Groningen, The Netherlands
Anomaly Detection in Banking Operations	<ul style="list-style-type: none"> • Chilukuri K. Mohan & Kishan G. Mehrotra, Syracuse University, NY, USA
Artificial Neural Networks for Artificial Intelligence	<ul style="list-style-type: none"> • Nikola Kasabov, Auckland University of Technology, New Zealand
Upcoming Research Challenges in the Financial Services Industry: A Technology Perspective	<ul style="list-style-type: none"> • Raghu Krishnapuram & Anirban Mondal, Xerox Research Center, India
Practitioner's Perspective	
Disruptive Innovation in the Financial Sector	<ul style="list-style-type: none"> • Dr. Duvvuri Subbarao, Former Governor, Reserve Bank of India



Shri Sudarshan Sen, Executive Director, Reserve Bank of India, launched the inaugural issue of the IDRBT Journal of Banking Technology on September 01, 2017.

Handbook on Information Security Operations Center

We are in the age of anytime, anywhere banking. Technology innovation has moved banking to desktops, laptops, tablets and mobiles. The customer has grabbed banking into her palm. Yet, she has issues with the new era digital banking because of the increasing trend in failed or fraudulent transactions.

It is the responsibility of the banks to put in place all necessary infrastructure and systems to ensure that digital banking is safe and secure. They have to ensure confidentiality, integrity and availability, the three key requirements of secured banking.

Banks have been working on security solutions at various levels. In order to put all such solutions together and to build a system that not only integrates the best features of the solutions but also a super structure that identifies abnormalities early and alerts stakeholders immediately, banks have started working on Information Security Operation Centers (ISOCs).

Though there has been considerable work done by academicians, security solution providers and banks in the realm of ISOC, there are still several issues and concerns at the stage of implementation of ISOC. During IDRBT's interaction with the employees of banks, a need was felt to bring out a Handbook on ISOC to help banks.

Accordingly, IDRBT with the active participation of banks and solution providers, prepared the Handbook on ISOC. It presents in detail the steps to be taken during conceiving, designing, building, maintaining and managing various phases of ISOC. It is expected that all security practitioners in banks would benefit from the Handbook in every stage of ISOC implementation.



Shri S. Ganesh Kumar, Executive Director, RBI, released the Handbook on Information Security Operations Center during the 13th IDRBT Banking Technology Excellence Awards on September 01, 2017.

FAQs on Cloud Adoption for Indian Banks



There has been considerable debate among banks and other financial organisations in India regarding the suitability of cloud-based solutions. On one hand, big-sized banks have made considerable investments into their IT infrastructure and put in place appropriate HR systems to manage huge and complex solutions for various operations. On the other hand, smaller banks, cooperative banks, new players such as payment banks and small finance banks are considering cloud model as the most suitable alternative for their solutions.

The Reserve Bank of India has encouraged the urban cooperative banks to move towards cloud based core banking solution in order to ensure that they are able to offer products and services similar to what other banks have been offering.

It is in this context of banks looking for cloud solutions that it was felt it would be useful to bring out a document detailing the relevant facts about cloud technology, including the concerns to be addressed. It was also felt that a question-answer format would be most suitable for the presentation for easy readability.

Accordingly, frequently asked questions were compiled, with answers to each one of them, and were grouped into four different sections – (i) cloud computing overview, (ii) architecture and technology, (iii) applications and usage scenarios and (iv) risks and challenges. It is expected that these FAQs on Cloud Computing would be helpful to various stakeholders like banks, solution providers, academic institutions and regulators.

Shri Sudarshan Sen, Executive Director, RBI, released the FAQs on Cloud Adoption for Indian Banks during the 13th IDRBT Banking Technology Excellence Awards on September 01, 2017.

Banking Technology in India: Present Status & Future Trends

This Report on Banking Technology is an attempt to share the salient observations on the current status and emerging trends in Banking Technology. Published every year coinciding with the IDRBT Banking Technology Excellence Awards, the Report is evolving into a useful source of reference for bankers, academics and researchers for the collective wisdom and data points it provides for a broader understanding of and further research in Banking Technology and related areas.

This year, the contributions from experts focus on an interesting array of topics related to like Innovation, Robotic Process Automation, Digitisation of India, Dealing with Demonetisation, Cyber Security, Inclusive Payment Systems and Analytics. The section from our Knowledge Partner for the Awards presents insights with data points from the bank submissions. The report contains the following contributions:

- ★ **Digitisation of India – Role of Banks** – by Shri V. G. Kannan, Chief Executive, Indian Banks' Association
- ★ **Emerging Trends and Challenges in Cyber Security** – by Shri Nandakumar Saravade, Chief Executive Officer, Reserve Bank Information Technology Pvt. Ltd. (ReBIT)
- ★ **Is Innovation Governance Possible?** – by Shri Mrutyunjay Mahapatra, Deputy Managing Director & Chief Information Officer, State Bank of India
- ★ **The Demonetization Drive – How Technology Helped Us** – by Shri Munish Mittal, Chief Information Officer, HDFC Bank Ltd.
- ★ **Taking Data Analytics to the Next Level in Banking** – by Shri Rakesh Kumar, Chief Information Officer, Punjab National Bank
- ★ **Evolution of Intelligent Automation** – by Shri Abhijit Singh, Head, Business Technology Group, ICICI Bank Ltd.
- ★ **Robotic Automation Process for Banking Sector in India** – by Shri Rakesh Kumar, Chief Information Officer, Punjab National Bank
- ★ **Banking Technology – The Global Trends in Innovation** – by Shri N. K. Subbu, Head (Technology), South Asia, Citi Bank Ltd.

- ★ **Payment Systems & Inclusive Banking** – by Shri S. Kumar, General Manager (IT), Corporation Bank
- ★ **Insights from the 13th IDRBT Banking Technology Excellence Awards**

Shri Sudarshan Sen and Shri S. Ganesh Kumar, Executive Directors, RBI, and Dr. A. S. Ramasastri, Director, IDRBT released the report during the 13th IDRBT Banking Technology Excellence Awards on September 01, 2017.

Cyber Insurance for Banks: A Reference Guide

Cyber frauds is a fast emerging threat to most of the business entities and more so to financial institutions, including banks. Banks have been building suitable cyber defence systems to detect and thwart cyberattacks and minimize, if not avoid, financial losses. As no defence solution can give total protection and hence full assurance, it may become necessary to transfer the risk through cyber insurance.

Cyber insurance is an evolving ecosystem. Banks and other entities wishing to cover their risk through insurance have to understand the need for insurance, quantum to be insured, premium that can be paid, clauses that need to be introduced and the overall scope of such cyber insurance. Simultaneously, the insuring companies need to understand the requirements of banks and offer appropriate insurance products.



It is in this context that this guide on cyber insurance, prepared with inputs from academicians, banks and insurance companies, would serve as a reference book to both banks and insurance companies. The document will help all the stakeholders in understanding cyber

insurance and help banks in managing their cyber risk through appropriate products and agreements.

Dr. A. S. Ramasastry, Director, IDRBT released the Reference Guide on Cyber Insurance during inauguration of the CISO Forum meeting held on November 24-25, 2017 at Syndicate Bank, Bengaluru.

IDRBT Staff Paper Series on Biometrics

The world in general, and banking sector in particular, has been working on usage of biometric-based identification and authentication techniques. In the process of adoption of such techniques, they have been encountering certain difficulties.

The IDRBT Staff Paper Series on Biometrics, released in October 2017, is an attempt to present the issues and the approaches to address them. The first paper is a Survey on Biometrics. The second paper presents various methods used in Voice Based Authentication and the third dwells on Biometric Template Protection, a crucial aspect for Banking. The fourth paper discusses the impact of Biometrics on Banking in India.

The Staff Papers on Biometrics provides necessary inputs and impetus to regulators, academic institutions, banks and industry in defining, designing, developing and deploying suitable biometrics based systems in India.

IDRBT Staff Paper Series on Analytics

With the unprecedented growth in both banking and payment transactions in digital form, banks have been becoming repositories of large volumes of varied data piling up at a great velocity. The more the data available, more informed the decisions would be, provided the data is analysed quickly and meaningfully.

Banks have recognized the strength of analytics in their Customer Relationship Management (CRM). A few banks have put in place reasonably matured analytics-based solutions to improve their CRM. As the discipline of analytics is getting enriched with more sophisticated techniques, banks need to continuously upgrade and update their solutions.

There is a consensus that analytics is very useful to banks and that banks have to evolve strategies to build analytics-based solutions for many of their activities. It is in this background that IDRBT chose to publish Staff Paper Series

Analytics, which will help in increasing the usage of Analytics in Banking.



Shri H. R. Khan, Former Deputy Governor, Reserve Bank of India, released the IDRBT Staff Paper Series on Analytics, during the inaugural session of the Fifth International Conference on Mining Intelligence and Knowledge Exploration on December 13, 2017.

COMING UP

IDRBT Banking Technology Innovation Contest (IBTIC)

The Institute has been organising the IDRBT Banking Apps Contest (IBAC). The scope of the IBAC was limited to Apps. Based on the experiences and feedback received from the contest as well as the Banking Sector, the Institute felt that the scope of the contest needs to be broadened to cover not just the Apps, but all the innovations in the area of Banking Technology.

Accordingly, in order to bring out the innovations happening in the area of banking technology, the Institute is organising the first IDRBT Banking Technology Innovation Contest (IBTIC) on 6th April, 2018. The objective of IBTIC is to identify and promote innovative ideas from the best technology talent.

Participation has been invited from individuals, banks, industries and academia to submit innovative ideas and solutions for the contest. The scope of the submission covers the entire gamut of technology, which can directly influence in banking and financial services.

Participating teams are required to submit a write-up on their proposed innovation highlighting the underlying technology, novelty, and its likely impact in the banking sector by **January 15, 2017** to ibtic@idrbt.ac.in.

Published by:



Institute for Development and Research in Banking Technology

(Established by Reserve Bank of India)

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