



Vol. 3, No. 1: March 2022

# NEWSLETTER

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To contact us:

[newsletter.pprs@gmail.com](mailto:newsletter.pprs@gmail.com)

Disclaimer:

The views expressed in this newsletter represent the personal views of the authors and not necessarily those of their host institutions or of PPRS.

## EDITOR'S NOTE

Dear PPRS Family,

I am pleased to present the latest edition of PPRS Newsletter to you. As the time is passing, PPRS is gaining more recognition and its members are growing in numbers. PPRS events are now attracting more participants and many new members are joining us on regular basis. No doubt all this is due to the efforts and dedication of our core team that represents PPRS at both national and international platforms. In this edition, we have introduced some new features in addition to our regular ones. We felt that our members should have more information about IAPR and its objective. Therefore, we have started by introducing the IAPR technical committees. This will provide our readers, most of whom are researchers, guidance regarding how they can contribute to the various IAPR platforms. We have also introduced another feature 'Young Researchers', where we provide our young PPRS members an opportunity to introduce themselves and their ongoing research efforts. I hope you enjoy. Happy Reading...!!!

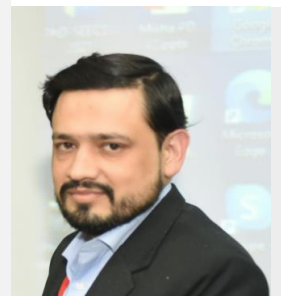
*Momina Moetesum*



A proud moment for PPRS, Dr. Faisal Shafait (President PPRS) has been appointed as Chair of IAPR Technical Committee of Reading Systems (TC11) for 2021-2022. IAPR TC11 is concerned with the theory and applications of Reading Systems. The committee seeks to study and develop

character content and structure in handwritten and typeset documents, images, and videos. For more information regarding IAPR TC11 visit their [webpage](#) or read our new feature on [IAPR Technical Committees](#) where we will be introducing one TC in each edition. Let's start with TC11 – Reading Systems.

Dr. Imran Siddiqi, a core member of PPRS has been selected as Head of the newly established AI Enabling Technologies Research Center at Bahria University, Islamabad. Dr. Imran Siddiqi is a senior researcher at BU and has also been contributing in most IAPR activities since



more than a decade. His research expertise includes automated handwriting analysis for the purposes of writer identification and verification, demographic prediction, neuropsychological health assessment and paleography. Currently, he and his team are working on historical Papyrus documents. Details of the research are provided in our regular feature on [Research @ PPRS](#).

## IAPR Technical Committees

### TC11 – Reading Systems



IAPR's Technical Committee No. 11 (TC11) is concerned with work in document image processing, Optical Character Recognition (OCR), handwriting recognition, and more generally the analysis and recognition of information in documents. For a list of research areas of interest to TC11, you can visit its [webpage](#). These topics cover both recognition of printed texts as well as recognition of handwritten material, both off-line (from images) and on-line (from pen-and touch-based computing devices). Analysis of electronic documents such as web pages and PDF files is also of interest to TC11.

These topics cover all levels of document processing, starting with image or planar coordinates obtained from sensors, through image and signal-processing stages, feature extraction and selection, and algorithms used to segment, classify, and parse document contents. Commonly, these algorithms involve some form of statistical and/or syntactic pattern recognition, as well as machine learning techniques.

**Reading System Applications** include digital libraries, pen-based computing, check and mail reading, signature verification, web mining and content repurposing, web security using human interactive proofs, textual content analysis in videos, and historical document preservation and archiving.

TC11 has spawned several lively activities in the domain of pattern recognition. These include:

- A journal,
  - International Journal on Document Analysis and Recognition (IJ DAR)
- Three conference series,
  - [International Conference on Document Analysis and Recognition \(ICDAR\)](#)
  - [International Conference on Frontiers in Handwriting Recognition \(ICFHR\)](#)
  - [Document Analysis Systems \(DAS\)](#)
- Maintaining collections of data sets and softwares,
- Numerous workshops
- A project for benchmarking on-line handwriting recognizers.
- TC11 Summer Schools

To know more about TC11 and its activities, join TC11 and subscribe to its newsletter. Visit the TC11 [Newsletter Archive - TC11 \(iapr-tc11.org\)](#) to know more.



#### OVERVIEW OF IAPR



**The International Association for Pattern Recognition (IAPR) is an international association of non-profit, scientific or professional organizations concerned with pattern recognition, computer vision, and image processing in a broad sense.**

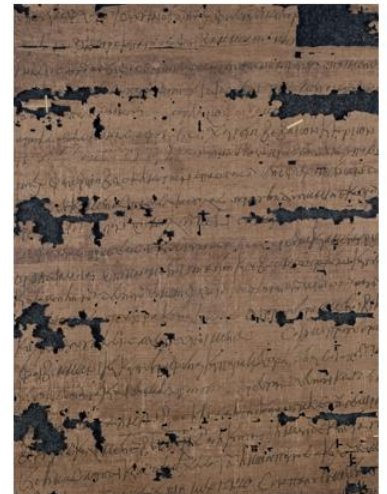
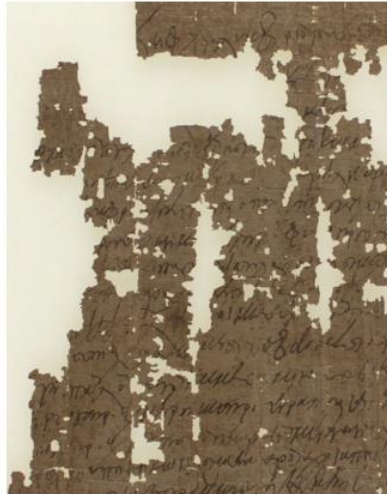
**The aims of IAPR are to promote pattern recognition and the allied branches of engineering together with the related arts and sciences, to advance international cooperation in the field of interest to stimulate research, development, and the application of pattern recognition in science and human activity, to further the dissemination and exchange of information on pattern recognition, and to encourage education in all aspects of the field of interest.**

**Areas of pattern recognition currently represented by technical committees are:**

- Statistical Pattern Recognition
- Structural & Syntactical Pattern Recognition
- Neural Networks & Computational Intelligence
- Benchmarking and Software
- Special Hardware & Software Environment
- Remote Sensing and Mapping
- Machine Vision Applications
- Biomedical Applications
- Graphics Recognition
- Reading Systems
- Multimedia & Visual Information Systems
- Pattern Recognition in Astronomy & Astrophysics
- Signal Analysis for Machine Intelligence
- Graph Based Representations
- Algebraic & Discrete Mathematical Techniques
- Machine Learning & Data Mining
- Discrete Geometry
- Cultural Heritage Applications
- Bioinformatics



## Research @ PPRS



## Handwriting on Papyrus

Identifying scribe from historical manuscripts offers useful applications for document examiners and paleographers. The scribe information can also be employed for manuscript dating and estimating the geographical and cultural circumstances in which a handwriting was produced. In this context, Dr. Imran Siddiqi and his team at Bahria University, Islamabad, are exploring the application of machine learning methods for problems in digital paleography in general and scribe identification in particular. A number of supervised pre-processing methods are investigated and small patches around key points in handwriting are extracted. Given the scarcity of samples per scribe, the problem is formulated in the few-shot learning framework where a number of Siamese neural networks first trained on contemporary handwriting images are employed to match patches from ancient manuscripts. The work is being done in the framework of the D-scribes project (<https://d-scribes.philhist.unibas.ch/en/>) in collaboration with [Isabelle Marthot-Santaniello](#) at the department of Ancient Civilizations, Basel University, Switzerland.



Isabelle Marthot-Santaniello

University of Basel, Switzerland



Imran Ahmed Siddiqi

Bahria University, Islamabad



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[International Conference on Document Analysis and Recognition](#)

ICDAR 2021: [Document Analysis and Recognition - ICDAR 2021 Workshops](#) pp 451-465 | [Cite as](#)

### Writer Characterization from Handwriting on Papyri Using Multi-step Feature Learning

## Events & Activities

### 4TH PPRS STUDENT SYMPOSIUM ON DOCUMENT ANALYSIS

4<sup>th</sup> PPRS student symposium was held on 9<sup>th</sup> December 2021 at RIMMS seminar hall NUST. Several students from different universities participated in the event and showcased their ongoing MS and PhD research work.



Introductory remarks were made by Dr. Momina Moetesum who briefly explained the history and purpose of the student symposium to the new participants. The participants and their presented research titles are enlisted as follows:

Participants	Research Title
Mr. Awais Nawaz	Query Based Document Summarization
Ms. Marium Shareef	Urdu Handwriting Generation using Generative Adversarial Networks (GANs)
Ms. Saman Yasmin	Visual Question Answering for Document Images
Mr. Muhammad Atif Butt	Multi-lingual Traffic Signboard Detection and Recognition in Natural Scene Images
Ms. Arooba Maqsood	Legal Judgement Prediction (LIP) for Pakistan Supreme Court
Ms. Ayesha Sarwar	Text Summarization from Judicial Records using Deep Neural Machines
Ms. Marium Daud	Automated Anonymization of Court Room Records
Ms. Nida Ahmed	Information Extraction from Court Room Records
Mr. Nouman Riaz	Table Detection and Structure Recognition
Mr. Ammad ul Islam	iVision HHID: Handwritten Hyperspectral Images Dataset for Benchmarking Hyperspectral Imaging-based Document Forensic Analysis

Constructive feedback was given by a panel of experts in the domain of document analysis and pattern recognition. Their valuable suggestions not only helped the presenters but also guided aspiring researchers in the audience.



Dr. Faisal Shafait concluded the ceremony by lauding the efforts of the young researchers. Shields were presented to the experts and certificate were distributed amongst the presenters.







Artificial Intelligence has turned out to be an emerging field in the industry for both men and women and continues to revolutionize our already modern lifestyle. We at PPRS (in collaboration with [AI Lounge](#)), organized an event to provide a platform to Pakistani women in the AI domain to showcase their work. The event was organized at SEECS Seminar Hall, NUST on 27<sup>th</sup> September 2021. Insightful talks and lectures were delivered by Pakistani women experts working around the globe. Main topics covered during the event included AI in Finance, Algorithmic Decision-making in Pakistan and the Right to Equality, AI in Healthcare and Medical Imaging, and AI for self-driving networks.

Dr. Momina Moetesum hosted the event. Dr. Mariam Kiran from California, USA joined us online and talked about her ongoing research on self-driving networks. Dr. Majida Kazmi from Karachi delivered a talk on AI in Healthcare. Ms. Uzma Nazir joined us from Lahore to discuss the legal regulations necessary for AI decision-making systems. Ms. Nosheen Abid, a research fellow at Lulea University of Technology, Sweden joined the event as a panelist and discussed the "Change the role of Women in AI".



Other prominent names who delivered insightful lectures were Dr. Seemab Latif, Dr. Rabia Irfan, Dr. Zunaira Saqib, Dr. Sana Mohsin, Dr. Shahrukh Malik, Ms. Maria Nazir, and Ms. Uridah Sami Ahmed.

The event was arranged in a hybrid mode keeping in view the COVID SOPs and to maximize participation. This allowed participants from around the world to attend the seminar. A special thanks to the AI Lounge team lead by Dr. Adnan Ul-Hasan and Ms. Aymen Tasneem for providing the technical support to make the hybrid mode a success.

All the participants and the guests complimented the efforts and requested for arrangement of similar events in future as well.

## Participant Review


It's a great initiative for empowering women and motivating them toward AI. It was a great event. Enjoyed every second with novel ideas presented by speaker. The scope of events should be extended to other provinces as well.




## HANDS-ON ADVANCED DEEP MACHINE LEARNING USING PYTHON

Learn to make Algorithms and their implementation in Python from Deep Learning & AI experts and get the hands-on experience that will prepare and equip you with the in-demand skills required to become a successful AI practitioner.

 **January 10 - 12, 2022**  
0900 - 1600 Hrs (PKT)

 <https://forms.gle/9oYXonrbMyMMbQLDA>  
Registration Fee: Rs. 15,000/-

 muhammadasad429@gmail.com  
(92) 3065676268



### Trainers



DR. SAJID BALOCH



DR. KHURRAM KHURSHID



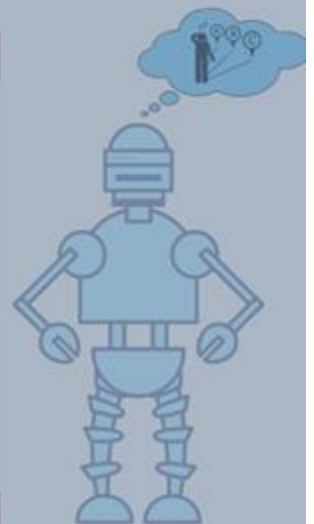
DR. USMAN QAYYUM



ENGR. MUHAMMAD ASAD



DANYAL MATEEN



PPRS organized an advanced level Hands-on Deep Machine Learning workshop using Python on 10-12 January 2022. The workshop was jointly conducted by a team of experts from the Institute of Space Technology (IST) and National Electronics Complex of Pakistan (NECOP), and was held at iVision Lab, IST. A total of 47 participants from various Research and Development organizations and academia attended the workshop.



The workshop was designed into 8 sessions across three days. On the first day of the workshop, an opening talk was given by Dr. Khurram Khurshid (Professor IST) followed by a very interesting keynote talk by Dr. Sajid Baloch (DG NECOP).

During the next two days trainers like Dr. Usman Qayyum, Eng. Muhammad Asad, and Mr. Danyal Mateen conducted comprehensive hands-on exercises & applications.

Relevant tools and techniques were explained, and participants were familiarized with the state-of-the-art.



The three days workshop ended with concluding remarks from Dr. Khurram Khurshid. Certificates were distributed amongst the participants who appreciated the experience. The participants of the workshop were awarded one CPD point from PEC as well.



*Reported by: Hira Masood*





## PPRS @ ICDAR2021



### TabAug: Data Driven Augmentation for Enhanced Table Structure Recognition

Umar Khan, Sohaib Zahid, Muhammad Asad Ali, Adnan Ul-Hasan, and Faisal Shafait

**Abstract:** Table Structure Recognition is an essential part of end-to-end tabular data extraction in document images. The recent success of deep learning model architectures in computer vision remains to be non-reflective in table structure recognition, largely because extensive datasets for this domain are still unavailable while annotating new data is expensive and time-consuming. Traditionally, in computer vision, these challenges are addressed by standard augmentation techniques that are based on image transformations like color jittering and random cropping. As demonstrated by our experiments, these techniques are not effective for the task of table structure recognition. In this paper, we propose TabAug, a re-imagined Data Augmentation technique that produces structural changes in table images through replication and deletion of rows and columns. It also consists of a data-driven probabilistic model that allows control over the augmentation process. To demonstrate the efficacy of our approach, we perform experimentation on ICDAR 2013 dataset where our approach shows consistent improvements in all aspects of the evaluation metrics, with cell-level correct detections improving from 92.16% to 96.11% over the baseline.

### Two-Step Fine-Tuned Convolutional Neural Networks for Multi-label Classification of Children's Drawings

Muhammad Osama Zeeshan, Imran Siddiqi, and Momina Moetesum

**Abstract:** Developmental psychologists employ several drawing-based tasks to measure the cognitive maturity of a child. Manual scoring of such tests is time-consuming and prone to scorer bias. A computerized analysis of digitized samples can provide efficiency and standardization. However, the inherent variability of hand-drawn traces and lack of sufficient training samples make it challenging for both feature engineering and feature learning. In this paper, we present a two-step fine-tuning based method to train a multi-label Convolutional Neural Network (CNN) architecture, for the scoring of a popular drawing-based test 'Draw-A-Person' (DAP). Our proposed two-step fine-tuned CNN architecture outperforms conventional pre-trained CNNs by achieving an accuracy of 81.1% in scoring of Gross Details, 99.2% in scoring of Attachments, and 79.3% in scoring of Head Details categories of DAP samples.

### High Performance Urdu and Arabic Video Text Recognition Using Convolutional Recurrent Neural Networks

Abdul Rehman, Adnan Ul-Hasan, and Faisal Shafait

**Abstract:** Text extraction from videos is an emerging research field in the document analysis community. We propose a simple Convolutional Recurrent Neural Network to perform text recognition on both Arabic and Urdu scripts. We use a large variety of data augmentation techniques to generalize the model and prevent over-fitting. We also use a slightly improved loss function that helps the model converge faster. Using the proposed method we achieved 99.73% CRR, 88.37% WRR and 89.92% LRR on the Urdu Ticker Text dataset and 96.82% CRR, 90.41% WRR and 76.78% LRR on the AcTiVComp20 dataset. The proposed method has significantly outperformed Google Vision API on both of the datasets.

To read the full papers, visit: <https://icdar2021.org/proceedings/>



## YOUNG RESEARCHERS

PPRS is well aware of the strength of the youth, and this is why our senior members are always focused on grooming and nurturing the young members to reach their full potential. In this feature, we highlight the stories of those who have been active members of PPRS and with the guidance of their seniors and the exposure they received from PPRS platform are now fulfilling their dreams. In today's edition, we will share the journey of **Muhammad Jaleed Khan**.

[Muhammad Jaleed Khan](#) is currently pursuing his PhD in Artificial Intelligence at the Data Science Institute, NUI Galway. Jaleed is investigating neuro-symbolic visual reasoning approaches and commonsense knowledge graphs for expressive event processing for the Internet of Multimedia Things. He published his initial research findings at the International Conference on Information and Knowledge Management (CIKM) 2020 Workshops and the Extended Semantic Web Conference (ESWC) 2022. He has a Master's degree in Signal and Image Processing and a Bachelor's degree in Computer Engineering. His Master's research was focused on forensic analysis of questioned documents using hyperspectral image analysis and deep learning and was published at the International Workshop on Document Analysis Systems (DAS) 2018 and the International Conference on Document Analysis and Recognition (ICDAR) 2019. Jaleed is also an adjunct researcher at the Artificial Intelligence and Computer Vision (iVision) Lab, Institute of Space Technology, Islamabad. He is associated with PPRS since beginning.

Jaleed is pursuing his research under the supervision of [Prof. Edward Curry](#) who is the Director of the Data Science Institute and Insight SFI Research Centre for Data Analytics at NUI Galway. Prof. Curry has substantial contributions to semantic technologies, incremental data management, event processing middleware, software engineering, distributed systems and information systems. He has authored over 200 peer-reviewed scientific publications, which attracted more than 5,000 citations. The excellence and impact of his research are acknowledged by numerous awards, including best paper awards, the NUIG President's Award for Societal Impact in 2017, and invitations to speak at several leading research organizations and venues, including UC Berkeley, Harvard, MIT, Stanford and Dagstuhl.



*"I have a very special association with PPRS, as I have been with it since the beginning. PPRS gave me the opportunity to meet with experts from around the world and broadened my vision."*

The Data Science Institute (DSI), formerly known as INSIGHT and Digital Enterprise Research Institute (DERI), is a dedicated research institute of NUI Galway, Ireland. The research at DSI is focused on technologies at the convergence of Computer Science, Web Science and AI to build a fundamental understanding of how information and knowledge are increasingly driving society through digital processes, and of the tools, techniques and principles supporting a data-enhanced world.





## Upcoming IAPR Events

### INTERNATIONAL JOINT CONFERENCE ON BIOMETRICS (IJCB 2022)

Oct. 10-13, 2022

Abu Dhabi, United Arab Emirates

#### ABOUT

The 2022 International Joint Conference on Biometrics (IJCB 2022), supported by the [IEEE Biometrics Council](#) and the [IAPR TC-4](#), will be held in Abu Dhabi, United Arab Emirates (UAE) on October 10-13, 2022. This will be the first biometrics conference to be held in the Middle East. Abu Dhabi is a picturesque capital of UAE, an hour's drive away from Dubai.



#### Important Dates

##### Papers

- Paper submission due: **April 15, 2022**
- Decision to authors: **June 30, 2022**
- Camera-ready papers due: **July 31, 2022**
- Main conference: **October 10-13, 2022**

## IJCB 2022

### ICFHR 2022

## INTERNATIONAL CONFERENCE ON FRONTIERS IN HANDWRITING RECOGNITION

📅 December 07 - 10, 2022

📍 Hyderabad, India

*May 22, 2022*

*Paper abstract submission*

*May 29, 2022*

*Full paper submission*

To know more about IAPR activities and to subscribe its monthly newsletters, visit: <https://iapr.org/>



Thoughts on articles you've read in this issue of the PPRS Newsletter?

Ideas for features you'd like to see in the PPRS Newsletter?

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