



ERCIM "ALAIN BENSOUSSAN"  
FELLOWSHIP PROGRAMME



## Scientific Report

First name / Family name	KANJAR DE
Nationality	INDIA
Name of the <i>Host Organisation</i>	NTNU GJØVIK
First Name / family name of the <i>Scientific Coordinator</i>	MARIUS PEDERSEN / SONY GEORGE
Period of the fellowship	01/03/2019 to 29/02/2020

### I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

Most of the modern computer vision systems have some sort of AI component integrated with it. One of the biggest challenges in AI based systems is robustness and system quality. Current state of the art systems uses deep neural networks for different computer vision tasks like image classification, segmentation etc. Image quality plays an important role in the system performance and robustness. The goal undertaken during the tenure of the fellowship was to investigate the impact of colours on deep neural networks. So, a dataset was augmented with well known colour distortions and the classification accuracy was analysed on state-of-the-art deep neural networks like Densenet, VGG Net and Resnet. A pilot study on effect of image gamut on deep neural networks was performed. To the best of our knowledge this is the first kind of study in this field.

During the fellowship, I could use the state-of-the-art laboratory facilities of the Colourlab of NTNU Gjøvik like the hyperspectral camera, multi spectral camera, spectrometer and OCE colour printer. I developed an understanding of colour profile. Also, I attended a seminar in Trondheim to attend a workshop on grant writing. Also, I continued my ongoing work in the field of biometrics and document images.

## II – PUBLICATION(S) DURING YOUR FELLOWSHIP

1. Debanjan Sadhya, **Kanjar De**, R. Balasubramanian and Partha Pratim Roy, Efficient Extraction of Consistent Bit Locations from Binarized Iris Features Accepted - Expert Systems with Applications 2019
2. Prateek Kesarwani, **Kanjar De**, Partha Pratim Roy and Umapada Pal, Zero Shot Learning based script identification in the wild. In International Conference on Document Analysis and Recognition (ICDAR) 2019 (Accepted- h-index 26).
3. Sanyam Rajpal, Debanjan Sadhya, **Kanjar De**, Partha Pratim Roy and R. Balasubramanian, EAI Net- Effective and Accurate Iris Segmentation Network, In International Conference on Pattern Recognition and Machine Intelligence (PReMI) 2019 (Accepted- Acceptance Rate 28%)
4. **Kanjar De** and Marius Pedersen, Impact of Colours on Deep neural networks, International Conference on Image Processing (Submitted)

## III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

1. Presented poster on paper on “Zero-Shot Script Identification in the wild” at the 15<sup>th</sup> International Conference on Document Analysis and Recognition between September 20-25, 2019 at Sydney Australia. (Funded by ERCIM)
2. Attended workshop writing proposals for Marie Curie Individual Fellowship held at NTNU Trondheim on May 22-23, 2019 at Trondheim Norway. (Funded by NTNU)

## IV – RESEARCH EXCHANGE PROGRAMME (REP)

As a part of ERCIM research programme visited the **Department of Video Coding and Analytics at Fraunhofer Heinrich-Hertz-Institute (HHI) Berlin** hosted by **Dr. Sebastian Bosse**. We discussed the possibility of using modern architectures of deep generative neural networks on image enhancement applications on compressed images. I worked on preliminary analysis of the image quality of the HEVC compressed images and built a roadmap for a model for developing a solution for the current image enhancement for artefacts generated during image compression. Also, analysis of baseline architecture on the generated dataset was performed to identify the issues with the current architectures and opens a door for further collaborative efforts in this direction.

Signature:

Kanjar De



Marius Pedersen

