



Fellow	Dr. Md Roman Bhuiyan
Host Organisation	Fraunhofer Institute for Computer Graphics Research
Scientific coordinator	Dr. agr. Philipp Wree



I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

During my ERCIM postdoctoral fellowship, I had the chance to work in the smart farming technologies sector, concentrating on two key areas: computer vision-based analysis of chicken behaviour and deep transfer learning-based disease diagnosis. I develop computer vision-based methods in the area to improve the welfare and output of chicken farming. I developed a system to detect and examine chicken behaviour using cutting-edge computer vision techniques, giving me priceless knowledge on the health, and living circumstances of the animals. In addition, I develop a strong model for the chicken diseases classification using deep transfer learning and improving the general well-being and sustainability of poultry farming. This experience not only increased my understanding but also brought home how much technology has the ability to revolutionise the agriculture industry.

Throughout my fellowship at Fraunhofer IGD Rostock, I got the chance to learn the computer vision annotation tool (CVAT) for image and video data labelling, and this tool helped me a lot to make a good dataset for training and evaluating the model. To improve the quality of chicken dataset, I refined and pre-processed the images using morphological operations, a collection of image processing techniques. These processes, which included erosion, dilation, opening, and closure, assisted in removing noise, bridging gaps, and emphasising certain image elements.

Recently, I got the chance to attend a machine learning challenge where I classified three classes of datasets using convolutional neural networks (CNN) and achieved an outperform result. At Fraunhofer IGD Rostock in the smart farming sector, they are always arranging tech talks, round table talks, etc. I always presented and shared ideas with my teams.

Finally, I would like to thank my scientific coordinator, Dr. agr. Philipp Wree, and ERCIM for providing me with a lot of facilities and their constant support.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

Submitted Paper

1. Md Roman Bhuiyan, Philipp Wree, “Animal Behavior for Chicken Identification and Monitoring the Health Condition Using Computer Vision: A Systematic Review”, IEEE Access (Under Review).

Working Paper

1. Md Roman Bhuiyan, Philipp Wree, “Chicken Behaviour Analysis and Detection of Several Behaviours Using Computer Vision with Synthetic Data Generation”, IEEE Transactions on Artificial Intelligence (Planning to submit soon).



III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

Accepted Paper

1. Md Roman Bhuiyan, Philipp Wree, " Chicken Behaviour Analysis Using Computer Vision Techniques", 11th International Conference on Informatics, Electronics & Vision (ICIEV) and 6th International Conference on Imaging, Vision & Pattern Recognition (IVPR), University of East London, Dockland campus, London, UK, from 26~29 Oct. 2023. This paper will be presented in this conference and will be published as a book chapter (SCOPUS indexed) Taylor & Francis Group. I will go to the London for joining this conference and present my paper.

IV – RESEARCH EXCHANGE PROGRAMME (REP)

As part of the Research Exchange Programme, I got chance to visit the Centrum Wiskunde & Informatica (CWI) in the Netherlands to share ideas, present my research, and discuss prospective paths of collaboration between our respective research groups.

Meeting with Prof. Dr. Tristan van Leeuwen

During my participation in the ERCIM Research Exchange Programme, I had the opportunity to meet Prof. Dr. Tristan van Leeuwen, which was an eye-opening experience. We exchanged ideas that had the potential to significantly improve my research analysing the behaviour of chickens as we spoke about possible enhancement strategies. Prof. van Leeuwen graciously imparted his knowledge of computer vision technology, offering insightful advice that helped further my research. He also introduced me to his team colleagues, which promoted a spirit of cooperation and friendship among researchers. This experience was a turning point in my stay at CWI in the Netherlands since it not only improved my project but also laid the groundwork for future cooperative projects.

Meeting with UTOPIA Group

At Utrecht University in the Netherlands, I had a fruitful and cooperative discussion with the UTOPIA Group. I was given the chance to present my work to this prestigious group, which sparked interesting discussions and the creation of cutting-edge concepts to improve the calibre and significance of my research findings. The importance of this meeting was further reinforced by having good discussions regarding prospective ventures and future opportunities. The knowledge and passion of the UTOPIA Group had a lasting effect, improving my present research and sowing the seeds of potential future cooperation and inquiry in the exciting world of academia. This discussion served as proof of the value of academic networking and the spirit of group invention.