

Shubhajit Basak

Machine Learning Engineer
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A machine learning research engineer with more than 2 years of work experience developing and deploying computer vision models on-the-edge devices. Research interests include face analytics, object detection, network quantization, 3D face reconstruction, learning from synthetic data, adversarial domain adaptation, thermal imaging, alternative sensing and deep learning on the edge. Previously worked as an IT and data engineer for more than 6 years.

EDUCATION

2019 – 2023	Ph.D., Computer Science , University of Galway, Galway, Ireland Advisor: Michael Schukat (UoG), Rachel McDonnell (TCD), Peter Corcoran (UoG) Thesis: "Contributions towards 3D synthetic facial data generation and 3D face analysis with weak supervision"
2018-2019	MSc, Computer Science (Data Analytics) , University of Galway, Galway, Ireland Advisor: Matthias Nickles (UoG)
2007-2011	BTech, Electronics and Communication Engineering West Bengal University of Technology, India Advisor: Biswa Nath Chatterji

WORK EXPERIENCE

Non-Academic

5/2023 – Till Date	Research Engineer (Machine Learning with Computer Vision), Fotonation <ul style="list-style-type: none">Face Recognition and Face Analytics, which includes facial expression recognition and face activity recognition for Driver Monitoring System (DMS)Network quantization and optimization, porting imaging solutions into on-the-edge devicesThermal Super Resolution, Object Detection and Moving Object DetectionTech Stack – Python, Pytorch, ML Ops (ML Flow), Git, Docker, Jenkins, Onnx, Caffe, Blender, PyCharm, VS Code, Linux, Deployment in Embedded Boards (e.g., Hailo, Nvidia Jetson Nano)
9/2014 – 6/2018	IT and Data Engineer, Cognizant <ul style="list-style-type: none">Full Stack Web Application Development, Technology Stack – C#, ASP.Net MVC, Web API, SQL, Angular JSData Warehouse development and maintenance, Technology – MS Azure, NETEZZA
7/2011 – 8/2014	Programmer Analyst, Cognizant <ul style="list-style-type: none">Application maintenance and Support through proper Incident and Problem Management procedure (ITIL), Technology Stack – C#, ASP.Net, WCFDatabase Development, maintenance & migration, Technology Stack – MS SQL Server, SSIS, SSRS

Academic

10/2019 - 5/2023	Teaching Assistant, NUIG <ul style="list-style-type: none">CT437: Computer Security and Forensic ComputingCT5102: Programming for Data Analytics (R Programming)CT5105: Tools and Techniques for Large Scale Data Analytics (Java with Apache Spark)CT861: Computer Architecture and Operating Systems
7/2019 – 9/2019	Research Assistant, NUIG <ul style="list-style-type: none">Building a pipeline to generate synthetic 2D data from 3D Virtual Human Models with the help of CGI tools like Blender

RESEARCH PROJECTS

11/2019 – 10/2021	Accurate Human Facial Depth and 3D Head Pose Estimation from 3D Synthetic Data <ul style="list-style-type: none">Generating accurate facial depth and head pose data from 3D Models through the CGI Tool Blender and estimating the real facial depth and head pose with a deep learning model trained on that synthetic data.
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11/2021 – 09/2022	Semi-Supervised 3D Face Reconstruction from a single face image <ul style="list-style-type: none"> - Generated the 3D face model from a single face image using weak supervision and the parametric face models as priors.
10/2022 – 01/2023	Dense 3D Facial Landmark Estimation <ul style="list-style-type: none"> - Generate 3D dense facial landmark data with the help of fitting a 3DMM parametric model and train a lightweight network for dense facial landmark estimation.
1/2019 – 8/2019	Combining External Domain Knowledge with Deep Neural Network in Text Classification <ul style="list-style-type: none"> - Enriching the training data with an external knowledge graph database like WordNet, DBPedia, for text classification, where there is a limited amount of labelled data.
9/2010 – 7/2011	Hand Recognition as a Biometric with Stereo Images <ul style="list-style-type: none"> - Capture stereo images of the hands of human subjects and calculate the depth cue from the stereo pair to generate identity information and use it as biometric recognition.

SELECTED PUBLICATION

2024	Bigioi D, Basak S , Stypułkowski M, Zieba M, Jordan H, McDonnell R, Corcoran P. Speech driven video editing via an audio-conditioned diffusion model. Image and Vision Computing
2023	Basak S , Mangapuram S, Costache G, McDonnell R, Schukat M. A lightweight 3D dense facial landmark estimation model from position map data. IMVIP .
2023	Basak S , Khan F, Javidnia H, Corcoran P, McDonnell R, Schukat M. C3I-SynFace: A synthetic head pose and facial depth dataset using seed virtual human models. Data in Brief .
2022	Basak S , Corcoran P, McDonnell R, Schukat M. 3D face-model reconstruction from a single image: A feature aggregation approach using hierarchical transformer with weak supervision. Neural Networks .
2021	Basak S , Corcoran P, Khan F, McDonnell R, Schukat M. Learning 3D head pose from synthetic data: A semi-supervised approach. IEEE Access .
2021	Khan F, Hussain S, Basak S , Lemley J, Corcoran P. An efficient encoder-decoder model for portrait depth estimation from single images trained on pixel-accurate synthetic data. Neural Networks .
2020	Basak S , Javidnia H, Khan F, McDonnell R, Schukat M. Methodology for building synthetic datasets with virtual humans. ISSC .

AWARDS & SCHOLARSHIPS

2019	Postgraduate Research Scholarship NUIG 2019-20.
2019	Research Scholarship in SFI Center for Research Training in Digitally Enhanced Reality (D-REAL) under Grant No. 18/CRT/6224.

SKILL PROFILE

Languages	Python, R, C# with ASP.Net MVC, Java 8, LATEX
ML Frameworks	PyTorch, ML Flow, Onnx, TensorFlow, Keras, Apache Spark
Cloud Platform	Azure Cortana Intelligence Suite
Database	Microsoft SQL Server, Oracle 11g, Netezza, Azure SQL Data Warehouse
Dev Tools	PyCharm, Microsoft Visual Studio, Jupyter Notebook, R Studio, Git, Blender, Docker
Reporting	Power BI, Tableau, Crystal Reports
JS	JavaScript, AngularJS
Agile	Scrum, Jira, Bitbucket, Confluence, Jenkins