MES COLLEGE OF ENGINEERING

DEPARTMENT OF ADS BATCH 2021

ADQ 413 SEMINAR- TOPIC PROPOSAL

Name : Aleem Ahamed N

Register No : MES21AD004

Guide Name: Ms. Surya C

Seminar Topic 1 : Accelerating Innovation With Generative AI: AI-Augmented Digital Prototyping and Innovation Methods

Abstract:

Easy-to-use generative artificial intelligence (AI) is democratizing the use of AI in innovation management and may significantly change the way how we work and innovate. In this article, we show how large language models (LLMs), such as generative pretrained transformer (GPT), can augment the early phases of innovation, in particular, exploration, ideation, and digital prototyping. Drawing on six months of experimenting with LLMs in internal and client innovation projects, we share first-hand experiences and concrete examples of AI-assisted approaches. The article highlights a large variety of use cases for generative AI ranging from user journey mapping to idea generation and prototyping and foreshadows the promising role LLMs may play in future knowledge management systems. Moreover, we argue that generative AI may become a game changer in early prototyping as the delegation of tasks to an artificial agent can result in faster iterations and reduced costs. Our experiences also provide insights into how human innovation teams purposively and effectively interact with AIs and integrate them into their workflows.

Seminar Topic 2: H2HSR: Hologram-to-Hologram Super-Resolution With Deep Neural Network

Abstract:

In holography, the resolution of the hologram significantly impacts both display size and angle-of-view, yet achieving high-resolution holograms presents formidable challenges, whether in capturing real-world holograms or in the computational demands of Computer-Generated Holography. To overcome this challenge, we introduce an innovative Hologram-to-Hologram Super-Resolution network (H2HSR) powered by deep learning. Our encoder-decoder architecture, featuring a novel up-sampling block in the decoder, is adaptable to diverse backbone networks. Employing two critical loss functions, data fidelity and perceptual loss, we guide H2HSR to attain pixel-wise accuracy and perceptual quality. Rigorous evaluations, using the MIT-CGH-4K dataset, demonstrate H2HSR's consistent superiority over

conventional interpolation methods and a prior GAN-based approach. Particularly, in conjunction with the SwinIR encoder, H2HSR achieves a remarkable 8.46% PSNR enhancement and a 9.30% SSIM increase compared to the previous GAN-based method.

Seminar Topic 3: Hospital Outpatient Volume Prediction Model Based on Gated Recurrent Unit Optimized by the Modified Cheetah Optimizer

Abstract:

Precise outpatient volume prediction holds significant importance in hospital management. While the Gated Recurrent Unit (GRU) is a frequently utilized deep learning technique for forecasting hospital outpatient volumes, creating a proficient GRU model necessitates the fine-tuning of pertinent GRU parameters. The adjustment of suchparameters relies heavily on an individual's practical experience and prior knowledge. The recently proposed Cheetah optimizer is a novel intelligent algorithm with unique optimization capabilities. The Cheetah optimizer holds significant research potential; however, additional investigations are warranted, as it may be vulnerable to issues related to local optimization. In the present study, the selection of hyperparameters for the GRU model was optimized through the utilization of the Modified Cheetah Optimization (MCO) algorithm, and a combined MCO-GRU model was established. Using the Successive Variational Mode Decomposition (SVMD) method to decompose outpatient volume sample data, the parameters of the GRU model were optimized with the MCO method to construct a hybrid forecasting model. This yielded the smallest Root Mean Square Error (RMSE) for the proposed model, with a value of 0.0843. Additionally, the results indicate that in comparison to SVMD, Long Short-Term Memory (LSTM), GRU, Particle Swarm Optimization-GRU (PSO-GRU), and Cheetah Optimization-GRU (CO-GRU), the proposed model significantly enhanced the accuracy of outpatient volume forecasting.

Final Seminar Topic:

Signature of Guide:Date: