COMPSIG NITT

Dear friends! COMPSIG NITT is a monthly newsletter to share the research work done in the Pattern recognition and computational intelligence laboratory, Department of Electronics and Communication Engineering, National Institute of Technology Trichy.

Concepts, Ideas pertaining to Computational intelligence, Pattern recognition and Signal processing are also included in this newsletter.

We expect the feedback, comments and articles from you all.

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Team members

1. Dr. E.S.Gopi, Co-ordinator.
2. G.JayaBrindha, Ph.D. Scholar.
3. Neema. M, Ph.D. Scholar.
4. Rajasekharreddy Poreddy, Ph.D Scholar.
5. Vineetha Yogesh, M.Tech, Communication systems.
6. Shaik Mahammad, M.Tech, Communication systems.
7. Sankar N Nair, M.Tech, Communication systems.
8. Anita Kumari, M.Tech, Communication systems.

SR-CLASS-GAN: A WAY TO CLASSIFY LOW RESOLUTION IMAGES

Comparison between cropped and zoomed in versions of low res, high res, Bicubic, SRGAN images
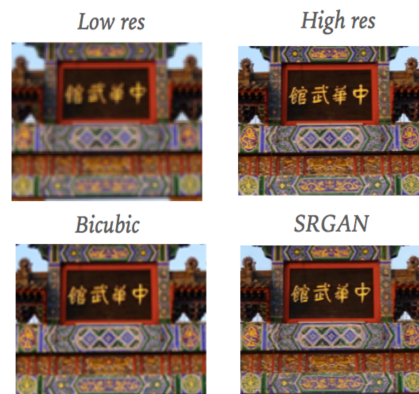
Classifying low resolution images is one of the challenging tasks in deep learning. Usually a low resolution image is super resolved to a high resolution image and is then classified to improve the classification accuracy. A novel deep learning model, SR-CLASS-GAN: a generator discriminator architecture which combines the tasks of super resolution and classification in a single model is implemented. Usually a discriminator determines whether the input image to the discriminator is real or fake. But in the SR-CLASS-GAN model, the discriminator not only determines whether the image is real or fake but also classifies the image. Experimental analysis shows that SR-CLASS-GAN achieves an accuracy of 99.23% and 67.4% for MNIST and CIFAR 10 datasets respectively.

Project team members: S. Rahul Vallivel, C. Ravi Sundaram and I. Sangeetkumar

REAL TIME 3D MODEL RECONSTRUCTION USING 3D LSTM

Inspired by the recent success of methods that employ shape priors to achieve 3D reconstructions, a recurrent neural network (RNN) architecture called the 3D Recurrent Reconstruction Neural Network (3D-R2N2) is used here. The network learns a mapping from images of objects to their underlying 3D shapes from a large collection of synthetic data available in the dataset. The network takes in one or more images of an object instance from arbitrary viewpoints and outputs a reconstruction of the object in the form of a 3D occupancy grid. Unlike most of the previous works, this network does not require any image annotations or object class labels for training or testing. The 3D model is predicted from the multi-view input images and compared with the ground truth 3D model (refer figure).

Project team members: S. Vignesh, Santhana Bharathi N and Sudharshann D
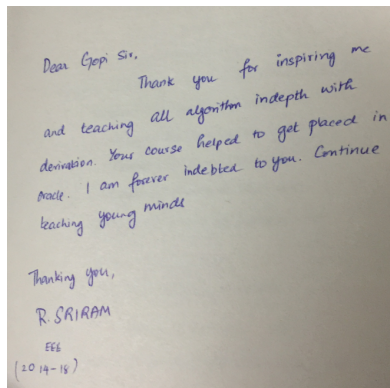
GENERAL VIDEO GAME CONTROLLER

Video game controllers are intelligent agents designed to play games optimally to result in a win in the minimum number of moves. General video game controller(GVGAI) project aims to create an agent that can play optimally across a wide range of video games. Reinforcement learning algorithms like Monte Carlo Tree Search(MCTS) and Genetic Algorithm are used to create such agents. The MCTS algorithms and the enhancements proposed in our work make simulations of future game states by taking random actions. The search tree this generates is used to judge the next best action at each stage. There are many fundamental properties of the MCTS algorithm that make its performance low. Some of these inherent properties can be tweaked as proposed in the enhancements like Breadth First Tree Initialization(BFTI) and Loss Avoidance(LA). This project is aimed at achieving true AI as opposed to game specific AI, which can make and learn decisions without the need of physically coding intelligent decisions.

Project team members: G Vijay and Srijith Nair

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Pattern Recognition and Computational Intelligence Course Feedback

- Content is good and could easily grasp.
- Very useful as an introductory course to pattern recognition techniques.
- This course gave me an exposure to learn about various mathematical tools required for pattern recognition. This may be useful for my research in the future.
- This course gave me way to do final project. I'm very interested to study this machine learning concepts.

- As machine learning is trending these days, PRCI helps in learning some of the algorithms exposing the students to the basics which are required for ML.
- Strongly beneficial for those who took time to understand the concept in class. Great initiative.
- This course is very well taught by sir and it will definitely help in future as artificial intelligence is being applied in every field in today's world.
- Content is good and subject is scoring.
- Good course. It was excellent, very informative.

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On-going Research

- Constructing a Sunflower plant database and perform off-type identification using deep learning techniques
- Application of machine learning techniques in next generation wireless communication
- Classification of Music composition styles using probabilistic generative model
- Computational Intelligence for channel estimation of Massive MIMO systems
- Investigation of Empirical Match Algorithm for latent sequence estimation in HMM and its applications in 5G Technology

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Feedback

COMPSIG NITT invites articles and innovative ideas from readers for the Reader's Space column. We expect feedback and comments to monthly newsletter COMPSIG NITT . Readers can share their views in our facebook page, "COMPSIG-NITT". Those who are interested can be a part of the facebook group.
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Quotes

"Don't fear for facing failure in the first attempt because even the great Maths starts with "ZERO" only." — Dr. A.P.J.Abdul Kalam