YEN TIEN WU

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SUMMARY

- Deep Learning Specialization Certificated, and profound experience in Machine Learning, Neural Network, Computer Vision (CV), Nature Language Processing (NLP), and Image Processing.
- Well-versed in python Scikit-learn, Support Vector Machine (SVM), Principal Component Analysis (PCA), K-Nearest Neighbors (K-NN), Bayes, Decision Tree & Random Forest.

CORE STRENGTH

- Machine Learning / Data Analysis / Statistics
- Deep Learning / CNN / RNN / LSTM / GRU / NLP / GANs
- Python / R / SQL / Octave / MatLab
- Numpy / Pandas / Matplotlib / SciKit-Learn / TensorFlow / Keras / OpenCV / PIL / Torch
- Apache / Spark ; C / C++ ; CUDA

PROJECT ACHIEVEMENT

Deep Learning / Neural Network / Computer Vision / CNN / OpenCV

- Neural Network Developing: coding from scratch. Forward/Backward propagation, with Xavier/He initialization, L2/ dropout regularization, gradient checking to verify backpropagation. Mini-Batch Gradient descent, Momentum and ADAM Optimization. Practice 3-layers NN in speedy batch gradient descent in ADAM optimization algorithm, increase accuracy 14.3% within 10,000 epochs.
- ResNet-50 for classification model, recognizing SIGN language. Keras \ Tensorflow. Build and train ResNet-50 to deal with vanish gradient in very deep network, with both identity block and convolutional blocks for 50 layers to improve 8.6% accuracy.
- VGG-19 Neural Style Transfer (NST), using a pre-trained ConvNet VGG-19 to generate artistic images. The built model computes content cost and style cost, gram matrices using the hidden layer activations; optimize algorithm and updates the pixel values for NST artistic image generating.
- Object Detection YOLO. Keras and TensorFlow applied to run input image through a CNN and filter YOLO boxes by score-threshold and Intersection over Union (IoU) 0.5 of Non-Max Suppression (NMS) to deal with bounding box for car detection with YOLOv2.
- OpenCV: real-time computer vision. Apply Harr-Like Filter Cascade XML Classifier with Integral Image, and optimize scale factor as threshold to maximize precision for face and smile detection in real time.

Deep Learning / Neural Network / RNN / GRU / LSTM / NLP

- Trigger Word Detection: use uni-directional RNN with 1D convolution for pre-processing spectrogram, and two GRU layers with dropout, following dense + sigmoid layers, and a final time-distributed dense to call the detection of trigger word.
- NLP Analogy Word and Gender De-Bias: implement cosine similarity to predict word analogy using a pre-trained Word Embedding vector set. Apply equalization algorithm for gender-specific words to de-bias.
- LSTM + Word Embedding: Emojifier. Pad all input word sequences in the same length. Use Keras Embedding layer, initialized with GloVe 50-demisional vectors, output to LSTM network x2, softmax to predict word expression in emoji.

Machine Learning / Data Analysis / Statistics

- Apply PCA (Principal Component Analysis) Algorithm with 95% variance retained. Logistic regression with regularization to statistical analyze web defect versus manufacture process conditions. model trend and predict the optimal processing window for PL25 film product. Lead cross-functional teams to achieve manufacture Six Sigma project. Yield improvement +8.79%. Profit increase ×20.6 time. Turn the large quantities product from low profit to high profit. Annual President Award 2016.
- Anomaly Detection with adjusting threshold in multivariate Gaussian distribution, distinguish spatially domain from optical image time-of-flight velocity-mapping domain, to eliminate background noise sourcing from direct laser photolysis. Maximal 5.5% enhancement of image signal improvement.

- Support Vector Machine to classify various processing conditions and predict the distinguishing issue at annealing of YCL80 film. Multi-linear regression to build the surface model to display the trend of film curvature in MD versus TD processing. Predict the optimal annealing process in 8% relaxation to sufficiently improve the dimension stability. Achieve zero customer reject rate. Division Head Award 2017.
- Statistical Analysis of Image Data in Polynomial Regression for Quality Control Optimum. Cost-Effectively apply automated photocopier to scan QC material usage specimens and digitize the record. Use python PIL library to size and quantize material impurity in image pixels. Supervised training polynomial regression of QC material data vs practical manufacture feedback to standardize boundary condition for optimal cavitated film in various gauges.
- SQL daily and historical QC data, mapping dictionary 200+ film product types and 1000+ formula specification. Regression analysis to predict specific COPP and Polybond mixing ratio to meet expected customer required WVTR and OTR for new product development.

Image Processing

- 2D image processing in MatLab programming to perform 3-dimension interpretation in chemical physics. With time-slice velocity mapping image technology, combining density-to-flux for image reconstruction. Mathematic formulate Quantum Physics to decipher Laser Photolysis of Chemical Reaction. Publication: *Journal of Chemical Physics*, (129) 154302 "Imaging the pair-correlated dynamics and isotope effects of the $Cl+CH_2D_2$ reaction".
- Image Process for Quantum Physic mode-specific dynamics in chemical reaction, to solve overlapped image. Publication: "Disentangling mode-specific reaction dynamics from overlapped images". *Phys. Chem. Chem. Phys.*, (9) 250.
- Algorithm developing for hyperparameters tuning to improving Fourier transform signal-to-noise ratio of MRI medical imaging, coding filtering algorithm and size compressing methods in image processing program, UVa radiology and medical imaging department.

WORK & VOLUNTEER

- INTEPLAST, TX 2012-Present Staff Process Engineer
  Machine Learning, Six Sigma Project, and Optical Film Process
- UNIVERSITY VIRGINIA HOSPITAL, VA 20010-2012 Volunteer
  Department of Radiology & Medical Imaging
- UNIVERSITY OF VIRGINIA, VA 2008-2011 Research Assistant
  Physical Chemistry, helium nano-droplet chemical spectroscopy quantum physics
- SINICA, Institute of Atomic and Molecular Science, 2005-2008 Research Member
  Electro-Optics Laboratory, quantum physics of chemical reaction & image processing

EUDCATION

- Georgia Institute of Technology, Master on going, Computer Science
- University of Virginia, Master GPA3.88 Physical Chemistry
- National Sun Yat Sen University, Bachelor

CERTIFICATES

- **Deep Learning Specialization** by deeplearning.ai, # CEA4PSWHTC8L
- **Machine Learning** by Stanford University, Coursera # DLE725X5EGEL
- Machine Learning: Hands-On **Python** & **R** in **Data Science**, Udemy # UC-MD0DK1RV
- **Data Science**: Deep Learning in Python, Udemy # UC-VTN29QBT
- Structuring Machine Learning Projects by deeplearning.ai, Coursera # HLJQQBHJ3TV4
- **Neural Networks** and **Deep Learning** by deeplearning.ai, Coursera # BZ3XKTZUFLYW
- Improving Deep Neural Networks: Hyperparameter tuning, Regularization and Optimization, Coursera # DBVN8A7L8XJJ
- **Sequence Models** by deeplearning.ai, Coursera # F4SH85CVW49X
- **Convolutional Neural Networks** by deeplearning.ai, Coursera # QJKD26RVLS3Y
- **Deep Learning** and **Computer Vision: OpenCV, SSD & GANs** by Udemy # UC-D3AGCSLQ

GitHub https://github.com/YETI-WU