Sharik Ali Ansari

https://kunwarsharik.github.io/Website/index.html

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Research Areas

Computer Vision, Machine Learning, Deep Learning, HCI, Augmented Reality, Robotics.

Educational Background

***B.Tech*.** in Computer Science and Engineering from College of Engineering Roorkee. (July2015- July 2019) passed with First Division.

Research Advisor

Dr. Ankush Mittal, Ph.D., Director of Raman Classes, Ex Asst. Professor at NUS Singapore.
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Dr. Brij Mohan Singh, Ph.D., Director of College of Engineering Roorkee.
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Dr. Koteswar Rao Jerripothula, Ph.D., Nanyang Technological University, Asst. Professor at IIIT-Delhi.
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Publications

Sharik Ali Ansari, Koteswar Rao Jerripothula, Pragya Nagpal, and Ankush Mittal, "Eye-focused Detection of Bell's Palsy in Videos," in Canadian Conference on Artificial Intelligence (Canadian AI), 2021.

Bell's Palsy is a Neurological disorder in which the half side of the face appears to be paralysed. Due to paralysis certain changes occur in facial behavior. We identified these changes and using them as cues detected Bell's palsy with an accuracy of 94.7%.

Sharik Ali Ansari*, Koteswar Rao Jerripothula*, and Rahul Nijhawan, "A Vision-based Solution for Track Misalignment Detection", in SIBGRAPI Conference on Graphics, Patterns and Images (SIBGRAPI), 2021.

The aim is to detect Buckling and Hogging in railway tracks. Using exhaustive experimentation, we investigated which pretrained model is the best feature extractor and which ML algorithm is the best classifier for such work. Using transfer learning and an equation to balance bias and variance, we chose the best combination. We *contributed the first public dataset*, and we were the first ones to use deep learning for detecting misalignment in railway tracks

Sharik Ali Ansari, Koteswar Rao Jerripothula, Pragya Nagpal, Ankush Mittal. "Eyes-based Features for Detection of Neurological Disorders in Videos". Multimedia Tools and Applications Journal (MTAP). (In third review).

It aims to test the viability of Spatio-temporal eye features for neurological disorder detection. A framework is developed that helps us detect disorders in unconstrained environments, even in low dataset settings. And we were the first ones to automatically detect blepharospasm and cervical dystonia. We also *contributed 7 Video and Images Datasets*. Among them is the first public datasets for three disorders.

Koteswar Rao Jerripothula, Sharik Ali Ansari, Rahul Nijhawan, Ankush Mittal. "An Optimal Vision-based Potential Derailment Detection System". Multimedia Tools and Applications Journal (MTAP). (In second review).

This paper is an extension of track misalignment detection using computer vision paper. Stepping ahead, here we proposed a method to automatically detect not just hogging, buckling but also more serious problems like broken track, tree, poles, and electric line fall on track, landslide, water logging on track, human and animals on track, and mostly any possible problem that can occur on the railway track.

Sharik Ali Ansari, Koteswar Rao Jerripothula, Ankush Mittal. "Blink Normalness: A Novel Feature for Detecting Blepharospasm in Videos". IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2021.(Submitted)

Blepharospasm is a Neurological disorder in which the eyes contract involuntarily. In this disorder these eye contractions appear as tight long eye blinks. Using computer vision and deep learning techniques we developed a framework that detects this disorder in videos despite training in low dataset settings.

Sharik Ali Ansari; Rahul Nijhawan; Amit Agarwal; Anjali Gautam . "Towards preventing public mass shootings using transformer architecture for gun identification from Gunshot audio". Journal of Ambient Intelligence & Humanized Computing (AIHC).(Submitted)

We detected the type of gun using the audio produced when the shot is fired. An audio dataset using the YouTube video was created including 200 videos from which 1661 audios of gun, rifle, and none were manually trimmed. Using vision transformers on features extracted from these audios gave classification accuracy of 93.87%.

Sharik Ali Ansari, Rahul Nijhawan, Ankush Mittal. "Face-focused Detection of Cervical Dystonia in Videos". Multimedia Tools and Applications Journal (MTAP). (Submitted)

Cervical Dystonia(CD) is a neurological disorder in which neck muscles contract involuntarily causing the neck to rotate head towards side. When a person with CD talks to another person, his head is rotated to an angle and his iris is trying to look at the person he is talking to. We used this cue to detect this disorder using computer vision based handcrafted features. We also contributed the first dataset for it.

Sharik Ali Ansari, Rahul Nijhawan, Ankush Mittal. "Computer Vision to prevent Computer Vision Syndrome". Multimedia Tools and Applications Journal (MTAP).(Submitted)

Features like number of blinks, distance of eyes from the screen, iris movement, head angle, posture, brightness of environment, etc. are created using deep learning based facial landmark detection models and various image processing techniques. The final model gives the user recommendations about what is incorrect in his behavior while working with screens. It also tells how the user's eyes can be protected while working long hours on screens/monitors. An FPV dataset using a computer webcam that includes 72 videos of different age, gender people was created.

Recent Projects

Sharik Ali Ansari, Amit Agarwal. **Semantic matching of sentences using BERT(** Bidirectional Encoder Representation from Transformers): Using Transformer's ability to understand context of words, the meaning of sentence (between the word) can be vectorized. We used this to match whether the two sentences are semantically similar. Stanford Natural Language Inference (**SNLI**) Corpus is used for this project.

Sharik Ali Ansari, Ankush Mittal. **Violence Detection In Real-Life Situations:** It aims to detect violence on the road. Also, it detects whether women are involved in the situation. It measures the degree of violence '1' being scuffle and pushing, '2' being some object used to hit, and '3' being blood coming out. The framework uses

Deep convolutional neural networks as a backbone along with image processing. We annotated the kaggle Real life violence situation dataset.

Sharik Ali Ansari. **Virtual Mouse for smooth Interaction in Augmented Reality environment:** The aim is to create a device that can be used as a mouse in VR/AR environment. It uses MPU6050, a 3-axis 6 degree of freedom sensor. Using an HC05 BlueTooth module and a microcontroller, it sends movement information to the VR/AR device. The device fits on a finger tip. The speed of the cursor is proportional to the speed of hand. Almost all functions of a mouse are replicated successfully.

Sharik Ali Ansari. **COVID Full Body Intelligent Sanitization System:** It Aims to provide full-body sanitization. Two SG90 servos, one each for left and right movement, one MG995 servo for up-down movement, and one 12V 300 rpm dc motor for sanitizer mist generation, are used. All servos are modified for 360-degree rotation. To optimize the throwing of sanitizer mist, an ultrasonic sensor is used, which detects if the mist thrower is in front of the human body or not. If a human is detected in front, it throws the mist.

Patents

Sharik Ali Ansari, Rahul Nijhawan, Brij Mohan Singh**. Computer Vision Aided House Electricity Management System(Filed)**. As a better approach than using various sensors to detect if a human is present in a room not, we used an IR camera system with raspberry pi. The raspberry pi sends a couple of images per minute to a PC. On the PC, we detect human presence using deep learning. The effective area of devices like AC, heater, fan, etc., is programmed into the PC. If a human is outside the effective area of the device, the raspberry pi turns off the device. The results are amazing, upto 25% of electricity can be saved. It also allows disabled people to operate devices using hand-signs. Dataset was recorded from CCTV perspective, using multiple cameras.

Sharik Ali Ansari, Siddharth Jain, Brij Mohan Singh. **Temperature Controlled Utensils(Filed)**.The aim is to keep your food and beverages at the temperatures you want. A Microcontroller is used to process temperature data and operate heating and cooling units fitted inside the utensil. For power, depending upon the size of the utensil, 4 to 6 18650 lithium batteries are used.

My Custom Machine Learning Library

Raw codes for traditional Machine learning algorithms, ANN, CNN, RNN, Reinforcement learning algorithms, GANs and RPNN for in-depth research.

Awards

B.Tech. Full 4-year Tuition Fee Waiver Scholarship. Based on National College Entrance Exam (JEE-Mains).

Skills

Machine Learning, Computer Vision, IoT, Robotics, Virtual Reality, Augmented Reality, Parallel Programming, BASIC (Animation, Web Dev, Android Dev).

Tools

Anaconda-python, OpenCL, OpenCV, Google Colab, CUDA, Dev C++, WEKA, Orange, ArduinoIDE, Raspberry pi, Amazon AWS, Adobe Photoshop, Adobe Illustrator, Blender, HTML/CSS, android studio,Wireshark.

Experience

Internship on topic "Convolutional Neural Networks" at Indraprastha Institute of Information Technology, Delhi (June 01-Aug 15, 2020).

Internship on topic "Testing Viability of ML Ensembles for Epileptical seizure detection" at RWX Technologies. (May 15-July 15, 2018).

Teaching

Research Assistant at IIIT-Delhi and IIIT-Allahabad *(Aug 2019-present)*.

Technical Certifications

Data Science for Engineers, *Indian Institute of Technology Madras (NPTEL)*.

Data Mining, *Indian Institute of Technology Kharagpur (NPTEL)*.

Cloud Computing, *Indian Institute of Technology Kharagpur (NPTEL)*.