MORRIS LEE, PHD

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COMPUTER VISION CONSULTANT

- Providing: (1) Latest artificial intelligence news to help your R&D. See **NEWSLETTER** & **TWITTER** (2) Consulting services in AI with in-depth expertise in computer vision.
- Recognized Innovator with 66 patents and Scientific Leader applying multidisciplinary talents in fields of computer vision, computer science, physics, electronics, and mathematics
- Strengthen a company's technological position by assessing technologies that might affect a company's businesses, by reports with actionable intelligence, and by filing patents for R&D inventions
- Identify critical obstacles in current state of Market Research, examine key business trends, and invent fast, flexible and agile tools enabling improvement in accuracy of viewership data and shopper behavior
- Inventor of Audio Fingerprinting technology employed in Nielsen TV Ratings and used worldwide as a gold standard
- Invent, develop, and apply new techniques for novel problems in Media Measurements across emerging media platforms

Key Strengths

Computer Vision — Vision Processing — Machine Learning — People Location & Tracking — Facial Recognition
Signal Processing — Research — 66 U.S. Patents — Multidiscipinary — Product & Process Innovation
Technology Transfer — Partnering Across Organization — Audio Recognition — Audio Fingerprint
Physics — Audience Measurement — Market Research — TV Ratings

Education

HARVARD UNIVERSITY, CAMBRIDGE, MA, 1984 - 1991
Ph.D. in Applied Mathematics and S.M. in Applied Mathematics
Doctoral thesis "Moment Methods For Recovering Affine Transformations In Computer Vision"

RENSSELAER POLYTECHNIC INSTITUTE, TROY, NY, 1980 - 1984
Master of Science (M.S.) in Mathematics and Master of Science (M.S.) in Physics
Bachelor of Science (B.S.) in Mathematics

Professional Overview

EYERIS, MOUNTAIN VIEW, CA — December 2022-Present
Computer Vision Researcher (consultant)
IN-CABIN SENSING AI FOR AUTONOMOUS AND HIGHLY AUTOMATED VEHICLES.

BONSAI TECHNOLOGY COMPANY, ROCKVILLE, MD — September 2022-Present
Computer Vision Researcher (consultant)
MAKING JOBSITES BETTER AND MORE PRODUCTIVE WITH BREAKTHROUGH TECHNOLOGY.

GOLDEN THREAD TECHNOLOGY, GAITHERSBURG, MD — September 2021-Present
Technology Advisor (consultant)
LOWERING ATHLETIC INJURY RISKS WITH PERSONALIZED GENETIC INSIGHTS

AI NEWS CLIPS, PALM HARBOR, FL — February 2021-Present
Founder
PROVIDING: (1) LATEST ARTIFICIAL INTELLIGENCE NEWS TO HELP YOUR R&D. SEE NEWSLETTER & TWITTER (2) CONSULTING SERVICES IN AI WITH IN-DEPTH EXPERTISE IN COMPUTER VISION.

NIELSEN, OLDSMAR, FL — June 1991-July 2020
Principal Research Engineer - Engineering R&D
Played a key role in development of Nielsen's audience-measurement technology, enabling Nielsen's TV ratings to stay current with constantly changing TV devices. Investigated and developed innovative technologies in machine learning,

computer vision, audio fingerprint, and signal processing for measuring the consumption of media (TV, Internet, radio) and in-store consumer behavior. Co-authored 66 US patents.

- Made significant contributions by innovating in face recognition, people tracking and video signature technologies, addressing major networks' and retailers' demand for more granular and accurate measuring.
- Improved people counting in images when faces are covered resulting in optimized audience measurement which estimates number of people exposed to media content.
- Innovated collection of retail customer data together with retail sales transactional data, identification of frequent shoppers using automatic face recognition system, and analysis of their purchases.
- Developed image processing techniques for enhancing recognition of distorted and cropped images, applied to objects in video, with potential to detect particular brand identifier or object present in product placement in a video.
- Worked closely with Mechanical, Electrical, and Software Engineering teams to develop and test new products and conduct multiple Pilot studies.
- Invented and developed Audio Fingerprinting technology enabling automated collection of TV viewership data. The technology works across all TV devices, improved accuracy and lowers the costs of consumers panels (hardware, labor and time), and considered a breakthrough in the TV audience measurement process.

HARVARD UNIVERSITY, HARVARD ROBOTICS LAB, CAMBRIDGE, MA 1985-1991
Research Assistant - thesis work, Datacube real-time image processor, robot to perform object tracking with stereo head

Areas of Expertise and Technologies

Technical & Programming Skills: Image Processing, Machine Learning, Artificial Intelligence, Deep Learning, Object Detection, Feature Detection

Data Analysis and Methodologies: Static and Moving Image Processing, Audio & Vision Processing Algorithms, Signal Processing, Neural Networks, Regression & Time Series Analysis, Clustering, Predictive modeling, Data Mining, Data Preprocessing, Linear & Logistic Regression, Multivariate Analysis

Awards and Recognition

Nielsen, "Engineering Emmy Award for Audience Television Measurement System", The National Academy of Television Arts and Sciences, 2009

U.S. Patents

Morris Lee's 66 U.S. patents and patent numbers (See link to patents and publications)

Computer Vision Patents

- Face recognition for audience measurement: 5550928, 5771307
- Counting and detect people in image using shoulder region: 8620088, 9237379
- Image classification by random features: 8351712, 8818112
- Image recognition
  - Object detection by color histogram: 8750613, 8953884
  - Recognize distorted images: 8897553, 9613290
  - Video recognition by color histograms: 8897554, 9158993, 9639772
- 3D/2D people count: 9020189, 9529451, 10049265, 10685221

Patents in Other Research Areas

- Location of people
  - Using a portable meter: 8650586, 9167298, 9118962
  - Ultrasonic people location: 7739705, 9094710, 9794619
- Identify broadcast content
  - Identify content using feature times: 7650616, 8065700
  - Audio fingerprint match by correlation: 8108887, 8887191, 9576197, 10009635, 10547877, 11025966
  - Determine viewing of recorded programs: 8065697, 8869187
  - Audio ID scaling factor: 10885543

- Audio recognition
  - Speech recognition for ad recognition: 10380166, 11138253
  - Video game audio detection: 9374629
- Shopper measurement
  - Count people by fuse counting and travel path: 8239277, 9269093
  - Protective guards for location tag: 7911347
- Audio level adjustment
  - Audio fingerprint threshold depends on noise: 8245249, 9124379
  - Variable AGC threshold: 9332305, 9680584
- Detect audio from another room
  - 2 mike sound direction: 9197930, 9503783, 9912990, 10057639, 10219034
  - Calculate distance using audio and radio waves: 8824242, 9217789
  - Detect audio from other room by reverberation: 9848222, 10264301, 10694234, 11184656
  - TV location by coefficient correlation: 9924224, 10735809
  - TV location by frequency nulls: 9747906, 10482890
- Internet metering from video output: 8090822, 8806006, 9602371
- Detect TV on/off using Naive Bayes: 8793717, 9294813
- Digital TV content fingerprints: 8255938, 9054820