

Joseph Fernandez

Problem Solver. Algorithm Researcher for Computer Vision and Machine Learning

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SUMMARY

- **18 years Hands-on Software Development**
- **Hobbyist in the Finance domain using Machine Learning for Time-Series**
 - Good with XGBoost, Random Forest, Kernel Density Estimation
 - Hands-on with scikit-learn, pandas, xgboost, hyperopt
 - Currently using Pyro (which uses PyTorch as its backend) for Bayesian Neural Network and Density Estimator using Normalizing Flows
- **8 years in Machine Learning driven Computer Vision for front-facing and surround-view automotive camera systems**
- **Primary Inventor of 4 Deep Learning methods**
- **Sole Developer of Computer Vision algorithms:**
 - **Vehicle Detection**
 - **Parking Line Detection**
 - **LaneDeparture Warning**
 - **Automatic Headlamp Control**
- **Architect and Lead Developer of :**
 - **Fleet Management Software**
 - **Object Oriented Media Player GUI**
 - **Multi-threaded device driver validation framework**
 - **Multi-Core and Multi-threaded Vision Processor Validation framework**

EXPERIENCE

Valeo, Ireland — Algorithm Research Engineer

APRIL 2018 - PRESENT (3 years 5 months)

Parking line detection using Random Forests (Python and C++)

- Cleaning data
- Feature Engineering

SKILLS

Machine Learning
Computer Vision
Python (sklearn, pyro, pandas, opencv, numpy, matplotlib)
C++
Mathematics

PATENTS

Vehicle detection
Crash prevention for an automotive vehicle
Scene classification in a driving support system
Automated parking
Object Detection

PUBLICATIONS

Formal Software Architectural Styles

PRESENTATIONS

Deep Learning beyond CNN presented at AtlanTec, 2018
Slides and video at <https://drive.google.com/drive/u/1/folders/1oby3I8GWpmZ8OtRRb-lrNcvdZH3hqjXo>

- Model training
- Model evaluation by cross-validation
- Model Visualization (Decision Tree)
- KPI improvements

Synthetic Data generation using python opencv, numpy and pandas

Kerb border detection from CNN contours using Computer Vision algorithms

- Contour processing
- Interest point detection
- Line merging
- Boundary detection

Self, Home — Hobbyist in Machine Learning for Time Series

AUGUST 2019 - PRESENT (2 years)

Time Series Analysis of financial data using a pipeline of generative and discriminative machine learning models

- Bayesian Neural Network in Pyro (Deep Probabilistic Modeling using PyTorch)
- Deep Density Estimator in Pyro using Normalizing Flows
- Kernel Density Estimation as generative model
- XGBoost, Random Forest as discriminative models
- Cleaning data
- Feature Engineering
- Model Training
- Model Selection using cross-validation
- Parameter and Hyper-parameter tuning using Hyperopt and GridSearchCV
- Feature importance / elimination using RFECV
- Python scikit-learn, pandas, matplotlib and selenium

Valeo, Ireland — Computer Vision DSP Engineer

JUNE 2014 - MARCH 2018 (3 years 10 months)

For Parking space detection: DSP Software development in C++

- Optimization
- Custom memory allocators
- Problem-solving in the car and on bench

For Pedestrian detection: DSP Software development in C++

Analog Devices, Bangalore — Senior Software Engineer

AUGUST 2010 - MAY 2014 (3 years 10 months)

Vehicle Detection

- Invented a method for hypothesis generation (Patent in Object Detection)
- HOG-SVM for hypothesis validation

AWARDS

Recognition for ADAS Support in China region.

2nd in Best Engineer Contest

1st in 2 quiz contests

1st in All-India General Knowledge Test

LANGUAGES

English (Full Professional)

German (Elementary)

- Algorithm design, prototype, port to embedded, optimize and validate

Automatic Headlamp control

- Algorithm design, prototype, port to embedded, optimize and validate

ADAS Framework development

Led customer engagement in China for design win

Line based ADAS algorithm and platform development

Object Oriented validation framework for ADAS Vision Processor

Infineon Technologies, Bangalore — Technical Consultant

NOVEMBER 2009 - JULY 2010 (9 months)

Validation of AutoSAR device driver

Mistral Solutions Pvt. Ltd., Bangalore — Module Lead

JUNE 2005 - NOVEMBER 2009 (4 years 6 months)

Vehicle tracking solution

- Technical Lead and primary developer
- Multi-threaded C on eCos / ARM7 platform
- GSM, GPS

Media Player GUI

- Technical Lead and primary developer
- Object Oriented C++ / Qt on Linux / i.MX31 platform

Static Code analyzer in C++

Robert Bosch India Ltd., Bangalore — Senior Software Engineer

JUNE 2003 - MAY 2005 (2 years)

Multi-threaded Test Framework for device drivers in Car Navigation Systems

HMI Development for Car Navigation Systems

EDUCATION

Cochin University of Science and Technology, Kerala, India — B.Tech, Electronics and Communication

1997 - DEC 2001

St. Xaviers High School, Ahmedabad, India — School Leaving Certificate

1994 - 1996

