Hani YOUSFI

An R&D Engineer passionate about cutting-edge technologies and solving real-world problems, with a solid background in Computer Vision and Artificial Intelligence, seeking a new challenging adventure

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WORK EXPERIENCE

R&D Engineer

09/2018 – Ongoing

Novel-TI

Sfax, Tunisia

Novel-TI is an IT company working in IoT & Robotics fields.

Developing a Deep-Learning-based OCR:

The project is about building and deploying an Optical Character Recognition system based on Deep Learning Algorithms.

Achieved Tasks:

- Design the architecture of the project.
- Process different data types (images, text) using multiple techniques (thresholding, binarization, reformatting, cleaning).
- Use different techniques of Data Augmentation to balance the datasets.
- Build several classification and detection models based on different Machine Learning and CNN architectures (KNN, Random Forest, SVM, AlexNet, VGG, Inception, ResNet ...).
- Detect the text in the images using Character Detection and Segmentation Algorithms (EAST, CTPN).
- Extract the text using Recurrent Neural Networks.
- Process and verify the extracted information.
- Deploy the system into production as API.

Keywords: Linux, Git, Python, Pandas, OpenCV, Regex, TensorFlow, Django, Docker, Nginx, PostgreSQL

Building object detection and recognition modules for a Robot:

Develop real time advanced lane-finding and obstacle avoiding algorithms with OpenCV (Python & C++) using color transforms, gradient thresholding and different mathematical & geometrical approaches.

Achieved Tasks:

- Process and label the RGB-D images and videos.
- Develop efficient line detector using image processing (Hough Transform, Line Segment Detector) and Deep Learning (LCNN) techniques.
- Build object detection modules to improve the autonomous robot navigation.
- Optimize the algorithms to overcome environmental challenges (shadows, luminosity, distortion ...)
- Improve the algorithms accuracy by integrating depth measurements.

Keywords: Linux, Git, ODROID boards, *C++, Python, LibRealSense SDK, OpenCV*

Developing hand tracking models for an interactive video game:

Contribute to video game development by designing and building several tracking models based on Transfer Learning technique, to successfully detect and track hands in videos streamed by cameras.

Achieved Tasks:

- Collect and process training dataset using OpenCV, Labelimg.
- Build detection and tracking algorithms using computer vision techniques (contours detection, background subtraction, …).
- Train detection models using SSD and Faster R-CNN architectures.
- Optimize, integrate and deploy the modules on Jetson board.

Keywords: Linux, Git, Jetson board, *Python, OpenCV, TensorFlow, Nvidia-TensorRT, NumPy*

Designing and building a Real Time Soccer Ball Tracking System:

Collaborate with an R&D team to build a Goal Line Technology system that detects, tracks soccer balls and decides whether it is a goal or not in real time.

Achieved tasks:

- Analyze and process video and image data.
- Implement different detection and tracking approaches (using Deep Learning and simple image processing techniques).
- Optimize the models to run on different platforms (PC, Jetson Nano).
- Improve the system's speed by optimizing the algorithms using Cuda.
- Enhance the performance by integrating depth map.
- Integrate LiDAR Measurements to improve the system's accuracy.
- Build asynchronous tasks to connect the slaves to the master.
- Connect the system to a server to save the results and perform the analysis after each game.

Keywords: Linux, Git, Jetson boards, *Python, C++, OpenCV, TensorFlow, DarkNet (YOLO), CUDA, Cudnn, LibRealSense SDK, sockets, Django*

SKILLS

Good Experience:

Linux | Single Board Computers | Python | Git | Computer Vision | Machine Learning | Deep Learning | Neural Networks | TensorFlow | OpenCV | NumPy | Pandas | Keras | Docker | Regex | Django | PostgreSQL | MySQL

Exposure:

C++ | C | PyTorch | MongoDB | ROS

EDUCATION

Master's Engineering Degree: Networks and Telecommunications
09/2015 – 07/2018

National School of Electronics and Telecommunications of Sfax (ENET'COM) *Sfax-Tunisia*

Preparatory Diploma for Engineering Studies: Math and Physics
09/2012 – 06/2015

Faculty of Sciences of Monastir (FSM) *Monastir-Tunisia*

PERSONAL PROJECTS

The rest of the projects are available on my GitHub account.

ML_OCR
An OCR based on Machine Learning and Recurrent Neural Nets.

This project is designed for recognizing sequence-like words in images. The model consists of a CNN stage extracting features which are fed to an RNN stage (LSTM) and a CTC loss.

Link: github.com/maky-hnou/ML_OCR

Keywords: Python, TensorFlow, OpenCV, NumPy

Signature Extractor (Contribution)
A super lightweight algorithm for signature extraction.

This project aims to extract handwritten signatures from scanned documents using different image processing techniques.

Link: github.com/maky-hnou/signature_extractor

Keywords: Python, OpenCV, Scikit-Image

Video_Face_Recognition
A simple algorithm for Face Recognition based on video streaming

This project represents a simple app aiming to recognize faces from a video streaming.

Link: github.com/maky-hnou/Video_Face_Recognition

Keywords: Python, OpenCV, Flask, Haar Cascade, Raspberry Pi

Awesome_Snake_AI
An AI outperforming humans in playing Snake game.

This project is an implementation of various algorithms and techniques (graph theory, Machine Learning…) all combined together to create an AI that outperforms human skills in playing the Snake game.

Link: github.com/maky-hnou/Awesome_Snake_AI

Keywords: Python, Pygame, graph theory, Machine Learning, TensorFlow

Dog_Breed_Classifier_API
A REST API that classifies dog images.

This project represents an API developed using Django Framework that takes images as input, feeds it to an InceptionV3 classifier (built using TensorFlow) and displays the dog breed in addition to other information.

It is also to mention that the API is deployed on Heroku.

Link: dog-classifier-api.herokuapp.com/Dog_Breed_Classifier/imagemodel/

Link: github.com/maky-hnou/Dog_Classifier_API

Keywords: Python, OpenCV, Django, TensorFlow, PostgreSQL

Urban_Sounds_Classification
A sound classifier built and trained using Tensorflow 2.

This project is designed to classify audio files based on their extracted spectrograms.

Link: github.com/maky-hnou/Urban_Sounds_Classification

Keywords: Python, Spectrogram, Deep Learning, Keras

LANGUAGES

Arabic
Native

English
Full Professional Proficiency

French
Full Professional Proficiency

German
Elementary Proficiency

INTERESTS

Reading | Movies | Video games