Tomislav Rekic

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An experienced computer vision engineer with a master's degree in robotics & AI. Skilled with both traditional and deep ML and CV algorithms. Primarly focused on Python, Pytorch, OpenCV and Linux. Adaptable and eager to grow.

Education

Faculty of Electrical Engineering, Computer Science and Information Technology Osijek — *Osijek, Croatia*

- Master's degree in Robotics and Artificial Intelligence
  Graduate University Study Programme in Computer Engineering - Robotics and AI — *Oct 2019 - Sep 2022*
- Bachelor's degree in Computer Science
  Undergraduate University Study Programme in Computer Engineering — *Jul 2016 - Sep 2019*

Publications

Visual Quality Inspection of Rotors and Stators — *Osijek, Croatia*

T. Rekić, I. Beissmann, A. Ćebo and F. Novoselnik — *2022*

- **2022 International Conference on Smart Systems and Technologies (SST)**
- **Pages:** 319-324
- **DOI:** 10.1109/SST55530.2022.9954883

Work Experience

Protostar Labs — *Osijek, Croatia*

Computer Vision Research Engineer — *Aug 2021 - Jun 2023*

- Developed multiple automated visual quality inspection systems based either on deep learning and classical computer vision. Systems are optimized for deployment on edge devices which ensures constant up-time and increases security of data. Clients are satisfied and report reduced downtime in manufacturing. Systems are deployed in industries such as automotive, boat, food and wood industry. Deep learning methods of quality inspection include Object detection and Anomaly detection.
- Worked on drone vision systems. Their tasks ranged from detection of warehouse items to using SLAM-assisted navigation. QR, barcode and ArUco marker readers are used to identify each object.
- Created custom datasets using tools such as Roboflow. Utilized data preparation, feature engineering, data annotation and data augmentation, keeping best practices in mind. Evaluated machine learning models, expanded datasets and modified model architecture to achieve desired results.
- **General skills:** Machine Learning, Computer Vision, Software development
- **Technical skills:** Python, Pytorch, Linux, Bash scripting, ROS, GPS devices, Sensors and other hardware
- **Other skills:** Project managment, Git, Jira, BitBucket

Protostar Labs — *Osijek, Croatia*

Computer Vision Engineer Intern — *Sep 2020 - Nov 2020*

- Developed multiple computer vision algorithms for detecting faults on MDF boards for Iverpan and rated their performance. Algoritms ranged from classical to deep learning methods.
- Created a custom dataset and trained a YOLOv5 network to detect products with missing top covers.
- Implemented the Mask RCNN to train and run interference on custom synthetic Fruits dataset.

Projects

Robotic Palletization using Computer Vision — *Feb 2022 - Sep 2022*

- Developed a system for robotic palletization using computer vision algorithms.
- Robotic system consisted of a UR5 robot arm, a Robotiq 3-Finger gripper and Intel RealSense LIDAR camera. System was developed in ROS, Gazebo was used for simulation and Open3D was used for processing point clouds.
- Implemented RANSAC, DBSCAN and ICP which together formed a pipeline for 3D detection in point clouds.
- **Technical Skills:** Working with UR5 and Robotiq 3-F, ROS, Open3D

Sorting Machine

Jun 2020 - Sep 2020

- Led a team of six to create an object sorting machine.
- Objects could be sorted by size, shape, colour and weight.
- Sorting machine used a series of actuators, which powered the conveyor belt, vibrating plane and gates. Size, shape and colour of the object were determined by a CNN using the camera as input. Weight of the object was measured using a load cell.
- Raspberry Pi 4 was used to run the CNN, STM32 blue pill was used to control the actuators and sensors. Numerous electronic circuits helped to power the actuators and create laser trip-wires.
- **Technical Skills:** Machine design and construction, Electronics, CNN, Raspberry Pi, STM32
- **Soft Skills:** Leadership, Time management, Documentation and Presentation

AI Agent for Pong

Jun 2020 - Jul 2020

- Trained an AI agent to play a game of Pong.
- Agent was initialized using Supervised Learning, and then refined using Reinforcement Learning.
- Agent environment was provided by OpenAI Gym. PyTorch was used for deep network implementation.
- **Technical Skills:** OpenAI Gym, PyTorch

Android app for image classification

Feb 2019 - Sep 2019

- Made an app which uses the MobileNetV2 CNN to classify pictures of animals.
- CNN was trained in TensorFlow using Transfer Learning. TFLite was used to run the model on Android.
- Taken pictures and other data were stored locally in a SQL database.
- **Technical Skills:** Android, CNN, TensorFlow, TFLite, SQL

Skills

Python	PyTorch, OpenCV, NumPy, Open3D, Kornia, Tensorflow, SQLAlchemy, ...
Robotics	ROS, Gazebo, RViz
Familliar with	C/C++, SQL, Java, XML, LaTeX, Yocto Project
Tools in everyday use	Git, BitBucket, Jira
OS	Linux and Windows

Languages

English	Professional proficiency
Croatian	Native proficiency