Ilker Bozcan

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Experience

- **Aarhus University** — Aarhus, Denmark
  Ph.D. Researcher — *Oct 2011 - present*
  - **Object Detection**: Designed and implemented variants of tiny object detectors (Yolo-Tiny, MobileNetV2-SSDLite) for pedestrian and human detection in aerial images captured by UAVs. Trained the networks using a custom collected dataset from scratch and also using transfer learning. Created a benchmark comparing performances of tiny object detectors on aerial images and natural images (well-known datasets such as MS COCO, Pascal). Submitted the work to the top robotic conference in the world, IEEE International Conference on Robotics and Automation (ICRA) 2020.
  - **Anomaly Detection**: Designed and developed a machine learning based anomaly detection method for aerial surveillance using UAVs. For this, implemented Variational Autoencoder based deep neural network fusing an aerial image and a GPS label. Submitted the work to the top robotic conference in the world, ICRA 2020.
  - **Data Collection**: Analyzed requirements of new aerial image dataset for object detection. Collected the dataset using UAVs equipped with a camera. Labelled the dataset using Amazon Mechanical Turk and created a baseline training and testing the state-of-the-art object detectors (e.g., FasterRCNN, YOLOv3) on the collected dataset.
  - **ML Pipeline Optimization**: Optimized data streaming process for on-board computers (Jetson TX1/TX2).
- **Baumeister AI** — Berlin, Germany
  Deep Learning Engineer - Remote — *Nov 2018 - present*
  - **Problem Formulation**: Formulated hand-drawn sketch and text recognition problem as an ML problem. Proposed a machine learning hypothesis for the problem, and this hypothesis has been implemented in the MVP.
  - **Analyzing Data Collection and Labeling**: Analyzed requirements of datasets to train and evaluate models. Gave consultation to data team during the process of creating artificial datasets, collecting real dataset and labeling. Conducted quality and consistency assessments for the collected data.
  - **Data Preprocessing**: Used OpenCV and scikit-image for reading large data, denoising, scaling and morphology operations. Split the data into training and evaluation subsets. Developed metrics to evaluate the trained models.
  - **Designed and Implemented Models**: Designed custom deep learning models from scratch for the formulated problems. Implemented them using Keras, Tensorflow and PyTorch. Also re-implemented existing state-of-the-art models in the literature for benchmarking.
  - **Trained and Evaluated Models**: Trained deep learning models on the collected data on Amazon Web Service EC2 instances. Conducted hyper-parameter search for the models. Designed a training pipeline (e.g., saving models, early stopping, re-training them with new data) for efficient use of EC2 instances.
  - **Built End-to-End Vision Module of MVP**: Delivered end-to-end vision module for the MVP. Integrated different models into the module for robust pipeline. Used OpenCV and scikit-image for post-processing. Evaluated end-to-end pipeline using a diverse set of test cases.
  - **Deployment**: Implemented a Python API of the vision module for the back-end team.
  - **Knowledge Sharing and Documentation**: Documented the research, methods and results on Confluence. Added documentation strings (docstring) to the codes with heavy comments. Committed code changes regularly on Bitbucket. Managed pull requests.
  - **Team and Individual Work**: Conducted individual research for the problem. Worked closely with product managers to validate the development process, and with the backend team for deployment. Attended weekly meetings on Skype, and communicated on Slack with team members. Helped new employees to adapt to the work.

Education

- **Aarhus University** — Aarhus, Denmark
  Ph.D. in Deep Learning and Computer Vision for Robotics — *Oct. 2018 – present*
- **Middle East Technical University** — Ankara, Turkey
  Master of Science in Computer Engineering; focused on Machine Learning and Robotics — *Sep. 2016 – Sep. 2018*
- **Middle East Technical University** — Ankara, Turkey
  Bachelor of Computer Engineering — *Sep. 2011 – Jun. 2016*

Projects

- **Dataset Manipulation Tool**: Open source python tool to loading, analyzing and processing large datasets.
- **Classical Machine Learning Library**: A Python library including implementation of classical machine learning algorithms.
- **Deep Learning Experiments Scheduler**: A tool for long-run training experiments.