

Summary

I completed my Master's studies in the Computer Engineering Department, Middle East Technical University (Turkey). I am currently working as a software engineer at MilSoft Software Technologies. I am interested in developing fast and unique solutions for new problems.

Education

Middle East Technical University

Master's degree in Computer Engineering

Thesis Title: Tool Detection in the Wild

cGPA: 3.93/4.00

ANKARA, TURKEY

2017 – 2020

Middle East Technical University

Bachelor degree in Computer Engineering

Grad Project: NAR

cGPA: 3.11/4.00

ANKARA, TURKEY

2012 – 2017

Experience

Software Engineer

MilSoft Software Technologies

- Developed modular software adaptors which lets different products communicate and work together. These adaptors also encapsulates existing software products and provide interfaces to other products

ANKARA, TURKEY

July '20 – present

Research And Teaching Assistant

Computer Engineering Department, Middle East Technical University

I have been TA for the following courses

- **Computer Organization:** Created a homework which would teach students how to apply best optimization practices (even compiler optimization practices).
- **Int. to Security in Computing:** Designed and implemented a SQL injection capture the flag challenge for students.
- **Computer Engineering Design:** Acted as a team lead for 2 different projects, and guided them on a weekly basis.

ANKARA, TURKEY

Jan '18 – July '20

Researcher

Kovan Research Lab

- Worked with **Assoc. Prof. Sinan Kalkan** on tool detection for robotics and computer applications using deep learning and creating a tool dataset.
- Worked with **Assoc. Prof. Sinan Kalkan** on trajectory generation by using CycleGANs created from LSTMs. This project still on development and code is on [Github](#).
- Worked with **Assoc. Prof. Sinan Kalkan** on and perception module for **Apprentice** project which tracks objects in the scene along with hands and gaze of the human.

ANKARA, TURKEY

June '17 – July '20

Research Intern

Halmstad University

- Worked with **Asst. Prof. Eren E. Aksoy** on image generation from a point cloud, which was supported by Volvo.
- Created a CycleGAN pipeline similar to pix2pix for mapping from point cloud space to rgb space.
- Currently this project still in development and first version of it is available on [Github](#).

HALMSTAD, SWEDEN

June '19 – Sep '19

Undergraduate Intern

Kovan Research Lab

- Worked with **Assoc. Prof. Erol Sahin** to create multi UAV controller on top of the Hector_quadrotor ROS package and implemented my own PID controller for it. The code is available on [Github](#).
- Worked with **Assoc. Prof. Erol Sahin** on iCub humanoid robot, Yarp, Kinect, and Visualeyez motion capture technologies to create a program that captures human emotion from the photo and reflects it on iCub's face. The code is available on [Github](#).

ANKARA, TURKEY

June '16 – Sep '16

- Worked on a project that gathered blacklisted URLs from different sources by using a Python script and classified them according to their source trust rating in a PostgreSQL database.
- Worked on their OS(which is on CentOS) to create a mechanism for handling blacklisted URLs.

Projects

Apprentice (Cirak in Turkish) Research Project

SafetyWatchdog

Created a framework that would help the user when s/he is working near or with a robot. It is implemented in ROS with C++. To achieve that, we used safety regions for human and robot. These regions are defined in the system as real world planes, and robot acts differently in each safety region. For example, in areas that are shared with a human user robot decrease its speed to make it safe for the human user.

github.com/metu-kovan/SafetyWatchdog

Trajectory Transfer

I created a pipeline for transferring trajectory information while retaining visual similarity between actors with varying Degrees of Freedom. To this end, I generated my dataset using the Gazebo simulation tool, in which I created controllers and models. Then by using that data, I trained my LSTM-CycleGAN model. LSTM is chosen to encode time series knowledge of movement.

github.com/fatihcankurnaz/LSTM-CycleGAN

ALET

Robots collaborating with humans in realistic environments need to be able to detect the tools that can be used and manipulated. However, there is no available dataset or study that addresses this challenge in real settings. We fill this gap with a dataset for detecting different types of tools. The scenes we consider introduce several challenges for object detection, including the small scale of the tools, their articulated nature, occlusion, inter-class invariance, etc. In addition to that, we provide a novel, practical safety use-case with a deep network which checks whether the human worker is wearing the safety helmet, mask, glass, and glove tools.

github.com/metu-kovan/METU-ALET In this work, I created synthetic images by utilizing domain randomization methodologies in Unity3d Game Engine, tested the dataset on deep object detectors (including Faster R-CNN, Cascade R-CNN, RetinaNet, YOLOv3, RepPoint Detection and FreeAnchor), created safety detection model and evaluated safety detection subset over that model.

github.com/metu-kovan/METU-ALET

Graduation Project

NAR

We have worked on creating a distributed peer-to-peer cloud service as a senior project. We developed the project with cross-compatibility on C++ with Boost Library. For the database, we adapted p2p database solutions, and we utilized our hole-punching mechanism for p2p file transfer. I worked in the database management and file system of the project. Developed a peer to peer database which would ensure accessibility of data by creating redundancy over the p2p network.

github.com/fatihcankurnaz/nar

Personal Projects

Doldur

Currently working with two more friends on developing a social service platform for university students which would enable them to access different course-related resources, and share their past experiences and sources. This service is in the development phase, and we are using AngularJs, Node.js, and Python.

Human trajectory generation by using C-GAN

By using real-life human keypoint information for training I created a human trajectory generator which generates trajectories given a starting point and ending point. These starting and ending points are given to GAN as conditions.

github.com/fatihcankurnaz/CGANHumanTrajectory

Malware detection from binary files by using CNN

Binaries of executables can contain important knowledge related to what these binaries does. In this work, I used binaries as images and classified them by using a novel CNN network.

github.com/fatihcankurnaz/KerasRnnBinary

Publications

Fatih Can Kurnaz, Burak Hocaoglu, Mert Kaan Yilmaz, Idil Sulo and Sinan Kalkan: *ALET (Automated Labeling of Equipment and Tools): A Dataset for Tool Detection and Human Worker Safety Detection*, ACVR2020.

Fatih Can Kurnaz, Yunus Terzioglu, Sera Buyukgoz and Erol Sahin: *ROS Tabanlı Bağımsız Güvenlik Bekcisi Modülü*, TORK2018 (In Turkish)

Skills

Technical knowledge:

Programming Languages: Python, C++, C, R, Matlab, Javascript

Frameworks: Pytorch, Tensorflow, Keras, ROS, Unity, Gazebo, AngularJS

Natural languages: Turkish (*native*), English (*proficient*), German (*basic*).

Honors and Awards

Earned the **2nd Highest** departmental cGPA in Master's Degree in METU.

Student with **Highest** GPA in 2017 Fall semester of undergraduate studies in METU.

Student with **Highest** GPA in 2017 Spring of undergraduate studies in METU.
