Arda Goktogan

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About Me

I am a newly graduated computer scientist, passionate about machine learning applications in computer vision and natural language processing. I am eager to further develop my work at the intersection of computer vision, NLP, and social sciences.

Education

- **Bilkent University** — Ankara, Turkey
  *Bachelor's Degree in Computer Science; GPA: **3.85/4** (ranked 8/160)* — *September 2017 - June 2022*

Research and Work Experience

- **Computer Vision Research** — ArgosAI - Ankara
  Computer Vision Engineer - Advisor: Yigit Ozen — *Feb 2022 - Current*
  - **Transformer based video classification** : I worked on the development of transformer-based video classification for detecting foreign objects in airport runways.
  - **Temporal image segmentation** : I worked on the development of MaskRCNN-based image segmentation with a temporal backbone for detecting foreign objects in airport runways.
- **Turkish Natural Language Processing Research** — Koc University AI Lab - Remote
  Student Researcher - Advisor: Deniz Yuret — *Feb 2021 - Current*
  - **Turkish Spellchecker** : I worked on the development of a Hunspell based state of art Turkish spell checker for LibreOffice: (github.com/tdd-ai/hunspell-tr)
  - **Turkish NLP Benchmark** : Developed an extensive benchmark called Mukayese (mukayese.tdd.ai). In this benchmarking platform, I worked on the preparation of POS tagging, named entity recognition, and spell-checking tasks. These studies include dataset preparations, evaluation methods, and training baselines for those tasks. (github.com/alisafaya/mukayese).
- **Computer Vision Research** — Bilkent University OzerLab - Ankara
  Student Researcher - Advisor: Sedat Ozer — *2020 Summer*
  - **Red Sea data visualization** : I worked on the implementation of an optical flow algorithm on 3D Salinity and Temperature data of the Red Sea.
  - **Segmentation of aerial images** : I worked on image segmentation using Mask-RCNN model variations for segmenting very small instances on aerial images. After summer, we attended a wide area motion imaginary competition as a team of 4.
- **Robotics and Computer Vision Research** — Bilkent University OzerLab - Ankara
  Student Researcher - Advisor: Sedat Ozer — *October 2020 - May 2021*
  - **Path Planning Algorithms** : I worked on the implementation of path planning algorithms PRM, RRT, and RRT* and their theoretical features such as probabilistic completeness and asymptotic optimality. Then I developed a new path-planning algorithm using the similarity domains of a map. This method can find safer paths (far from obstacles) compared to previous methods.
- **Computer Vision Internship** — Büyütech - Ankara
  Intern - Advisor: Oguz Cakmak — *2021 Summer*
  - **Lane Detection** : I researched and tested deep learning based lane detection models, and tested those trained models for images taken on Turkey roads. After deciding on a suitable model, I converted the given python code (implemented using PyTorch library) into C++ code (using libTorch library) for increased performance. Finally, I run this C++ code on the Xavier NX developer board. My C++ implementation of the model is approximately 15 times faster than the original python implementation.
- **Natural Language Processing Research** — Koc University AI Lab - Istanbul
  Intern - Advisor: Deniz Yuret — *2019 Summer*
  - **Julia Implementation of XLNet** : I studied the implementation of RNN models for NLP tasks. Then I implemented the pretraining method XLNet for NLP tasks called XLNet using Julia and Knet. (github.com/KnetML/xlnet.jl). Knet is the Koç University deep learning framework implemented in Julia by Deniz Yuret and collaborators.
- **High School Competitive Programming Studies** — High Scool - Izmir
  Competitor - Advisor: Arjan Skuka — *2014-2016*
  - **Algorithms** : I worked on data structure, algorithms, and mathematics related to computer science. These studies include data structures, discrete mathematics, graphics, and dynamic programming algorithms. I attended national competitive programming exams for two years.

Projects

- **Message Distortion** : I designed and implemented a Chinese whisper like setup with neural agents to understand the both quantitative and qualitative properties of the distorted messages while it is propagating in the network. This study can be further used as a metric for natural language generation. (Examining Message Distortion in Propagating Information: A Q&A-Based Approach)
- **Greenation** : We implemented a vehicle routing application that finds the path with minimum CO2 emission. I have taken a group leader role in this project and worked on the implementation of graph algorithms and graph data engineering. The Greenation platform serves both personal usage and company usage which plans one-to-one and one-to-many routes respectively. (greenation-app.com)
- **Emoci** : As a team of 5, we implemented an Emoji prediction algorithm from tweets. We worked on Naive Bayes, SVM, RRN, and LSTM classifier implementations for this task for the Machine Learning course project. (github.com/ardofski/CS-464-Emoci)
- **Image Captioning** : As a team of 4, we implemented image captioning algorithms based on RNN (with and without attention). Secondly, I worked on a transformer-based image captioning model. In this project, I worked on the Flickr dataset and achieved a 40 BLEU 1 score.
- **Slay the Spire** : As a team of 6, we implemented slay the spire game which is a card-based strategy game. I have taken a group leader role in this project and worked on the implementation of game logic. I improved my communication skills as well as Java and Object Oriented programming skills. (github.com/ardofski/1C-SS)

Publications

Ozer, Sedat, Karen Bemis, Weiping Hua, Arda Goktogan, Melike Aydogan, Kevin Guo, Dujuan Kang, Li Liu, and Deborah Silver (Oct. 2020). "The Use of 3D Optical Flow, Feature-Tracking and Token-Tracking Petri Nets to Analyze and Visualize Multiple Scales of Ocean Eddies". In: *IEEE SciVis Contest* 2. URL: https://kaust-vislab.github.io/SciVis2020/results.html.

Safaya, Ali, Emirhan Kurtuluş, Arda Goktogan, and Deniz Yuret (May 2022). "Mukayese: Turkish NLP Strikes Back". In: *Findings of the Association for Computational Linguistics: ACL 2022*. Dublin, Ireland: Association for Computational Linguistics, pp. 846–863. DOI: 10.18653/v1/2022.findings-acl.69. URL: https://aclanthology.org/2022.findings-acl.69.

Honors and Awards

- Teknofest Turkish Natural Language Processing 1st Place , 2021
- Ranked 240 out of 2 million participants in the Turkey Undergraduate Placement Examinations, 2017
- Bilkent University Comprehensive Scholarship , 2017 - 2022
- ABRSM, Grade 7 Guitar. , Feb 2014

Computer Skills

- **Programming Skills:** : Java, python, C, C++ , Julia, Matlab
- **Libraries:** : PyTorch, OpenCV, TensorFlow, Keras
- **Others:** : Linux, Latex

Interests

- **Water Polo:** : I Played as a Point player in the university team for 5 years, and I was the team captain in the last year.
- **Chess:** : I competed in the regional individual chess tournaments and get several achievements.

Languages

- Turkish (mothertongue), English (Fluent)