Ömer Köse

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EDUCATION

- **Middle East Technical University**   Ankara, Turkey
  Bachelor of Science - Computer Engineering, CGPA 3.90/4.00   *September 2018 - July 2023*
  Related Courses: *Digital Geometry Processing (Graduate), Computational Geometry (Graduate), Deep Learning (Graduate), Scientific Computing, Computer Graphics II, Finite Element Methods for Partial Differential Equations: Theory and Applications (Graduate)*

SKILLS SUMMARY

- **Programming**: C, C++, C#, Python, MATLAB, LaTeX
- **Frameworks**: OpenGL, Eigen, PyTorch, Taichi
- **Tools**: GIT, Unix/Linux, VIM, Unity
- **Communication**: Turkish, English, German (A2.1)

EXPERIENCE

- **Simon Fraser University - iVizLab**   Vancouver, Canada (Remote)
  Researcher   *January 2023 - Present*
  - Currently, I am working as a Researcher at iVizLab (Simon Fraser University), collaborating with Meehae Song and Nouf Abukhodair on the classification of artworks with neural networks.

- **Esri**   Redlands, California, US (Remote)
  Core Graphics Engineer   *December 2022 - Present*
  - Currently, I am working as a Full-Time Core Graphics Engineer on ArcGIS Pro Software.

- **TUBITAK**   Ankara, Turkey
  Research Assistant, Supervised by Professor Yusuf Sahillioglu and Sinan Kalkan   *October 2021 - Present*
  - Currently, I am working as a Research Assistant at TUBITAK, collaborating with Güneş Sucu under the supervision of Professor Sinan Kalkan and Yusuf Sahillioğlu on shape matching with neural networks.

- **Max Planck Institute for Informatics**   Saarland, Germany
  Research Assistant, Supervised by Professor Rhaleb Zayer   *June 2021 - January 2022*
  - Worked on mesh flattening under a high number of user defined position constraints. Extended the framework to map a face texture on a face mesh. A pre-trained neural network was used to extract face features from the face texture.
  - Developed a framework in MATLAB which provides a user interface and flattens the mesh. Also, developed a visualizer in C++ with OpenGL to visualize textures on the meshes using the UV coordinates obtained in MATLAB.

- **Middle East Technical University**   Ankara, Turkey
  Research Assistant, Supervised by Professor Yusuf Sahillioglu   *July 2021 - October 2021*
  - Worked on mesh morphing. Explored the effect of different coordinate systems, such as Cage Coordinates and Mean Value Coordinates, on mesh morphing problem. Different interpolation techniques like linear, bilinear, trilinear and non-linear (employing De Casteljau's Algorithm to evaluate Bézier curves) interpolation were used to obtain the morph based on the reduced basis projected vertices of the original two shapes.
  - Developed a framework in C++ to get the morphed mesh. Geometry Central and Eigen libraries were used to obtain needed data structures, operators, and solvers. Visualized the results using the Polyscope library.

- **Middle East Technical University**   Ankara, Turkey
  Research Assistant, Supervised by Professor Yusuf Sahillioglu   *January 2021 - June 2021*
  - Worked on geodesics on triangle meshes. Focused on improving graph-based approach towards approximating geodesics. Constructed different graphs to straighten the geodesics locally on each triangle face. Worked on a post-processing step to straighten the geodesics.
  - Developed a framework in C++ to get the geodesics. Geometry Central library was used to obtain needed data structures and operators. Visualized the results using the Polyscope library.

PUBLICATIONS

- **FanNet: A Mesh Convolution Operator for Learning Dense Maps**
  Gunes Sucu, Omer Kose, Yusuf Sahillioglu, Sinan Kalkan   *To Be Resubmitted in Summer 2023*
  - Was submitted to SGP 2022 but rejected. Working on an improved version to comply with the major revisions required. Planning to resubmit in Summer 2023 to Computers & Graphics Journal.

Projects

- **Ray Marching with Signed Distance Functions**: Implemented a renderer using OpenGL that uses Ray Marching with Signed Distance Functions with my teammate. Project implementation can be found here

- **Eulerian Fluid Simulation**: Implemented an Eulerian Fluid Simulation in Python/Taichi where grid is represented by a staggered MAC Grid. Project implementation can be found here

- **CENG501 Deep Learning Course Term Project**: Implemented SMG: A Shuffling Gradient-Based Method with Momentum paper published at ICML 2021 conference with my teammate. Implemented the paper in Python using PyTorch. The networks were trained on Google Colab. Project implementation and the report can be found here

- **CENG789 Geometry Processing Course Term Project**: Implemented The Heat Method for Distance Computation published at ACM Transactions on Graphics 2013 for triangle meshes. Implemented the paper in C++ using Geometry Central and Eigen libraries for their data structures, operators, and solvers, Polyscope for Visualization. Implementation can be found here

- **Procedural Terrain Generator**: Currently developing an engine in C++ with OpenGL. The engine procedurally generates a terrain of different biomes depending on different heights. Implementation can be found here

- **Ray Tracer**: Developed a Ray Tracer in C++ following Peter Shirley's *Ray Tracing in One Weekend* series. Implementation can be found here

- **Rasterizer**: Developed a Software Rasterizer in C++ following Dimitry Sokolov's *Tiny Renderer* wiki. Implementation can be found here

Contributions

- **Signals and Systems Book Contribution**: I have contributed to a book on Signals and Systems currently being written by Prof. Emre Akbas and Prof. Fatos Yarman Vural, to be used in the Signals and Systems course. I fixed syntax errors appearing in the Jupyter Book format and plotting new figures. I also proofread the Fourier Analysis chapters for possible errors and the parts that might be hard to understand for future readers.

Extracurricular Activities

- **Global Gamejam 2019**: I worked as the only developer of a three-people team where we worked on an action-adventure game. As the only developer, I have developed all the core features and systems. Also, I have ported to game to the Unity Web so that it is playable at here

- **BTK Gamejam 2019**: I worked as a developer of a four people team where we worked on a platformer game for the jam. With the other developer, we developed all the core features of the game. We also presented our finished game on the stage.