MARK KAHOUSH

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Education

📅 08/2019 – 05/2022   📍 Atlanta, Georgia

Georgia Institute of Technology
Candidate for Bachelor of Science in Computer Science
Concentrations: Artificial Intelligence, Devices
GPA - 4.0/4.0

📅 Summer 2017 & Summer 2018   📍 Stanford, California

Research

📅 09/2020 – PRESENT   📍 Atlanta, Georgia

Georgia Institute of Technology
- Developed model to automated highway maintenance.
- Leverage convoluted neural network using Keras to automatically process drone images to detect areas with mowed grass and areas with unmowed grass, as well damage signs or pavements.
- Obtained average F1 score of 98%, average precision of 99%, and average recall of 96%
- In collaboration with and funded by the Georgia Department of Transportation.
- Technologies used: UAVs, Python, Keras, OpenCV, C++, CloudCompare, MeshLab.

📅 01/2020 – 09/2020   📍 Atlanta, Georgia

Georgia Institute of Technology
- Conducted research on accurate and optimum methods to automatically filling occlusions in point cloud data.
- Engineered deep learning model using Tensorflow to detect and predict voxels that appropriately fill in holes
- Obtained average F1 score of 69%, average voxel precision of 78%, and average recall of 63%.
- Technologies used: Laser scanner, C++, Tensorflow, python, CloudCompare

Publications

📅 09/2021 Mark Kahoush, Yosuke Yajima, Seongyong Kim, Jingdao Chen, Jisoo Park, Steven Kangisser, Javier Irizarry, and Yong K. Cho Joint 2D-3D Semantic Segmentation and Change Estimation for Aerial Monitoring of Highway Infrastructure. ISPRS 2021. (in progress) – **First Author**.

📅 07/2021 Yosuke Yajima, Mark Kahoush, Seongyong Kim, Jingdao Chen, Jisoo Park, Steven Kangisser, Javier Irizarry, and Yong K. Cho AI-driven 3D Point Cloud-Based Highway Infrastructure Monitoring System using UAV. I3CE 2021 https://www.researchgate.net/publication/353750565_AI-driven_3D_Point_Cloud-Based_Highway_Infrastructure_Monitoring_System_using_UAV – **Second author.**

📅 07/2021 Mark Kahoush, Yosuke Yajima, Seongyong Kim, Jingdao Chen, Jisoo Park, Steven Kangisser, Javier Irizarry, and Yong K. Cho Analysis of Flight Parameters on UAV Semantic Segmentation Performance for Highway Infrastructure Monitoring. i3CE 2021 https://www.researchgate.net/publication/353817712_Analysis_of_Flight_Parameters_on_UAV_Semantic_Segmentation_Performance_for_Highway_Infrastructure_Monitoring – **First author**.

📅 09/2020 Chen, J.; Yi, J.S.K.; Kahoush, M.; Cho, E.S.; Cho, Y.K. Point Cloud Scene Completion of Obstructed Building Facades with Generative Adversarial Inpainting. Sensors 2020, 20, 5029. https://doi.org/10.3390/s20185029 – **Third author**.

Skills

SOFTWARE SKILLS
Java C++, HTML, CSS, Python, MatLab, C, Javascript

CONCEPTS
Object-Oriented Programming, Data Structures, Linear Algebra, Discrete Math, Multi-variable Math, AI, Computer Architecture, Linux, Machine Learning.

LANGUAGES
English   Spanish   Greek

Projects

📅 2021 **2D image to 3D point cloud back projection (Python)** – **Personal project**
- Converts a 2D image back into its 3D point cloud. It uses CloudCompare to register the geo-referenced point cloud, and saves the intrinsic and extrinsic camera properties of the point cloud.
- Using the geo registered point cloud and the camera properties it can convert a multiple 2D images into one 3D point cloud.
- For optimization duplicate points where filtered and down sampling was applied. Output accuracy of 97%.

📅 2021 **Co-Labelling images and point clouds (Python, C++)** – **Group project**
- Programmed an algorithm to co-label 2D images from 3D point clouds. Uses a structure-from-motion algorithm to combine information from multiple images and build a 3D point cloud. Then used the camera projection equation to map each 3D point to a 2D pixel.
- Accuracy of 100%.

📅 2021 **Image-Segmentation using ML(Python)** – **Group project**
- Developed an automated convoluted neural network with Keras used to segment images in 9 different highway related classes. Uses a modified version of U-Net architecture and tested with UAV scanned images.
- Model compared with geometry-based methods using OpenCV. Preformed 450 times better than geometric methods, yielding an accuracy of 98%.

📅 2020 **Scene Completion of 3D point clouds (Python, C++)** – Group project
- Oversaw the development of a new method for performing point cloud scene completion of building facades using orthographic projection and generative adversarial inpainting methods.
- Point cloud is first converted into the 2D structured representation of depth and color images using an orthographic projection. 2D inpainting process is applied using generative-adversarial network based on Pix2Pix.
- Compared to other state of the art methods, the developed model preformed 11% better. With accuracy of 69%.

📅 2020 **DealDiner (Python, HTML, CSS, Flask)** – **Group Project**
- Computed a web app that budgets users' food, clothing, and books on a weekly schedule for Georgia Tech students. App displayed with GUI allowing user to choose what they would like to purchase. Used Georgia Tech's API to successfully display appropriate shops user can go to with their current meal plan, budget, and campus dollars.
- Improved schedule of 60% of users who used the application.

📅 2020 **Youtube-Summarizer (Python, HTML, CSS)** – **Personal Project**
- Developed a YouTube summarizer that uses Youtube API to obtain video transcript and leverage a NLP algorithm to summarize it to 25% of its original size by prioritizing key words in the video. Uses HTML, CSS, and Flask for web framework and GUI to display results.
- 80% of non-repeated content displayed in video is displayed accurately by the algorithm.

📅 2018 **Multi-variable Calculator (MatLab)** – **Course Project**
- Engineered a calculator that takes a multi-variable function from user and using GUI integrates or differentiates the function.
- Provides a choice to plot differentiated, integrated or unchanged graph, in a cartesian, surf or mesh form.

Work experience

09/2017 – 03/2018   Athens, Greece

Consolidated Contractors Company

- Formatted PCs, installing company policies & generating PCs images; Backing and Restoring data.
- Tested and troubleshooted new PCs; Mined data and used database to save them and pull reports from.
- Technologies languages used: JavaScript, Nodejs, HTML, CSS, and MongoDB.

Awards

Fall 2019, Spring 2020, Summer 2020   Atlanta, Georgia
Fall 2020, Spring 2021 & Summer 2021

Georgia Institute of Technology

Faculty Honors: Awarded for getting 4.0 GPA