**EE 417 - Stereo Vision with Deep Learning**

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This repository contains all resources for the EE 417 final project, which explores classical and deep learning-based stereo depth estimation methods, including HITNet and StereoNet variants.

[**https://drive.google.com/drive/folders/1b9jX9jD3jS7GXJQG9c7owQVCR3NEA-vP?usp=sharing**](https://drive.google.com/drive/folders/1b9jX9jD3jS7GXJQG9c7owQVCR3NEA-vP?usp=sharing)

### **Folder & File Structure**

#### **Codes/**

Contains all the implementation notebooks and scripts:

* **Classical Approach.m:** MATLAB code for the classical stereo baseline using SGBM.
* **StereoNet Approach.ipynb:** Main notebook for all StereoNet variants (Tiny CNN, U-Net, ResNet).
* **Hybrid Approach.ipynb:** Combines geometry-based initialization with CNN-based refinement.
* **HITNET V1 Approach.ipynb:** Implements the original HITNet model with different encoders.
* **HITNet-V2/**: Contains updated models and cropped input experiments with custom encoder.

⚠️ **Note:** To run any notebook, one must adjust the dataset paths locally based on their directory structure.

#### **Datasets/**

Used datasets are :

* KITTI 2012 / 2015 dataset
* Middlebury stereo dataset
* Make sure to manually download and place them in appropriate subdirectories.

#### **Output Images/**

Includes all disparity outputs grouped by model:

* **Classical SGBM outputs** – classic/
* **HITNet variant outputs** – hitnet\_unet/, hitnet\_mobilenet/, hitnet\_custom/, hitnetv2/
* **StereoNet variant outputs** – stero\_unet/, stero\_resnet/, stero\_custom/, stereo\_resnet\_obj\_map/:

#### **Video Presentation/**

Contains three video files presenting parts of the project:

* 01\_Barış.mp4
* 02\_İpek.mp4
* 03\_Ozan.mp4
* For coherent video flow, one must follow this order while watching.

#### **EE 417 - Final Presentation.pptx**

The PowerPoint slide we used in the video recordings, which explains the project’s methodology, implementation, evaluation, and discussion points.

#### **EE 417 - Final Report.pdf**

The full project report covering methodology, implementations, and results.

#### **README.md**

This file. Provides navigation help for the project structure.

### **NOTE: Running the Code**

Make sure to:

* Update dataset paths inside the notebooks before running
* Use appropriate dependencies for deep learning libraries (e.g., TensorFlow, OpenCV)