Light Field Reconstruction Using Shearlet Transform in TensorFlow
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Motivation
* Shearlet Transform is the state-of-the-art method for Densely-Sampled Light Field (DSLF) Reconstruction from Sparsely-Sampled Light Fields (SSLFs) using Epipolar-Plane Image (EPI) sparsification in shearlet domain [1, 2]
* The flexible architecture of TensorFlow allows for the easy deployment of ST across different platforms (CPUs, GPUs, TPUs) running varying operating systems with high efficiency and accuracy

Methodology
Shearlet Transform (ST)
* Pre-shearing
* Shearlet system construction
* Sparsity regularization
* Post-shearing

ST in TensorFlow
* tf.estimator API
* tf.signal module
* batching

Deployment
Local machine
* One GPU (Nvidia Titan Xp)
* Input SSLF size: 512×608×128×3
* Batch size: 4
* Tool: TensorFlow Serving

Google Cloud Platform (GCP)
* One Kubernetes cluster with 4 nodes
* Each node is equipped with a GPU (Nvidia Tesla K80)
* Each node runs a pod for serving ST (with gRPC)
* ServiceType: NodePort (better than LoadBalancer)
* Batch from the client with a batch size of 4
* Server location: St. Ghislain, Belgium (europe-west1-b)

Reference