CVision: Research results

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Pruning Depth Estimation Models

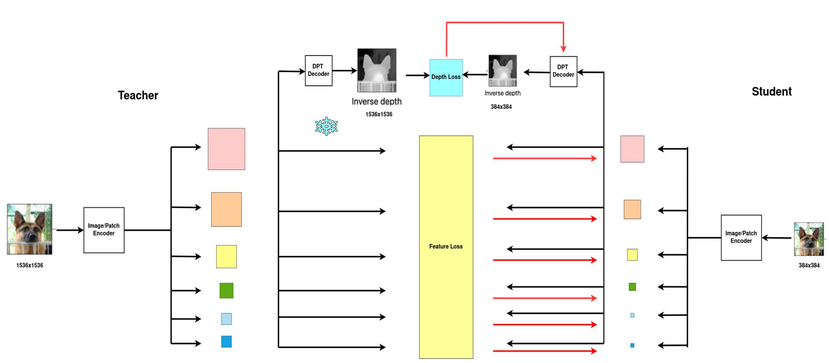

Fig 8. Depth Pro distillation architecture

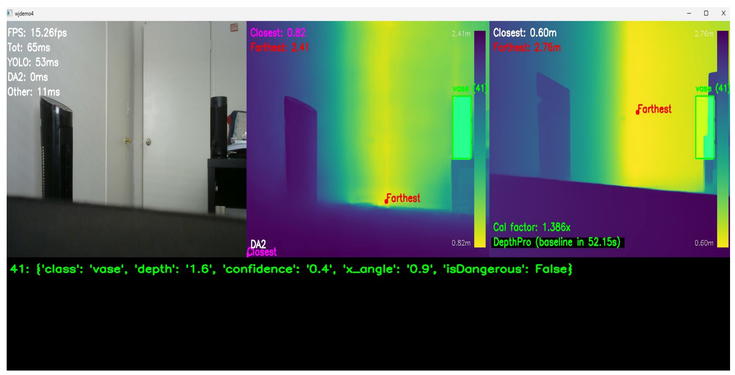

Fig 9. Depth map visualization modes

As depth monocular depth estimation was the biggest bottleneck, we tried to make it faster by distillation, and more accurate by calibrating with a more accurate depth map.

Multiview Depth Maps

Combined multiple views to improve monocular depth estimation by using a modified UNet that refines the center frame from three depth map inputs.

A secondary network developed estimates camera pose and frame continuity.

Both were integrated into a single model to refine monocular depth estimation accuracy.

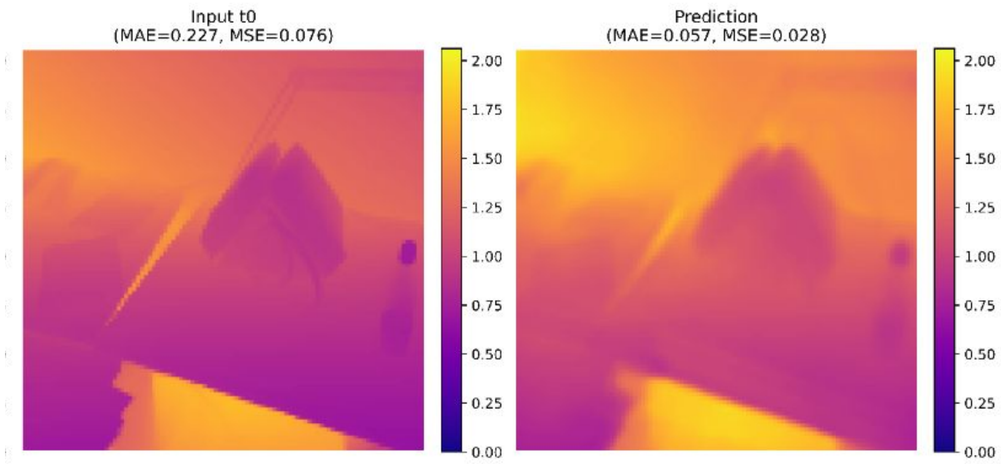

Fig 11. Prediction results. Left is input and right is prediction.

Word Semantics

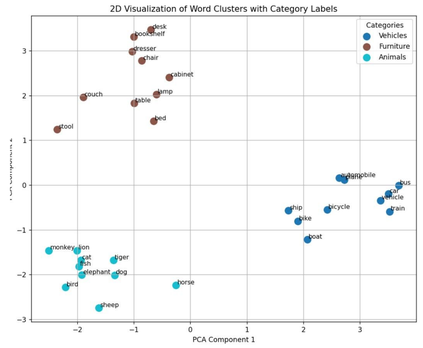

Fig 11. GloVe groupings

Used a refined cosine similarity approach to calculate semantic similarities between identified objects and those in the predefined "danger" category.

Custom YOLO Model

Fig 12. Pothole detection

Received access to pedestrian specific dataset and trained custom YOLO model to detect important objects like potholes, braille guide blocks, and crosswalks.