HW 12 Part B Report Minh Nguyen

In [1]:
```
!python segment_video.py --input input/input.mp4 --model deeplabv3
```

```
USING DEEPLABV3 WITH MOBILENETV3 BACKBONE
/Users/ndminh/miniconda3/lib/python3.12/site-packages/torchvision/models/_utils.py:208: UserWarning: The parameter 'pretrained' is deprecated since 0.13 and may be removed in the future, please use 'weights' instead.
  warnings.warn(
/Users/ndminh/miniconda3/lib/python3.12/site-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight enum or `None` for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `weights=DeepLabV3_MobileNet_V3_Large_Weights.COCO_WITH_VOC_LABELS_V1`. You can also use `weights=DeepLabV3_MobileNet_V3_Large_Weights.DEFAULT` to get the most up-to-date weights.
  warnings.warn(msg)
Frame: 1, FPS:0.349 FPS
Frame: 2, FPS:0.516 FPS
Frame: 3, FPS:0.320 FPS
Frame: 4, FPS:0.342 FPS
Frame: 5, FPS:0.496 FPS
Frame: 6, FPS:0.551 FPS
Frame: 7, FPS:0.403 FPS
Frame: 8, FPS:0.413 FPS
Frame: 9, FPS:0.438 FPS
Frame: 10, FPS:0.434 FPS
Frame: 11, FPS:0.403 FPS
Frame: 12, FPS:0.450 FPS
Frame: 13, FPS:0.490 FPS
Frame: 14, FPS:0.521 FPS
Frame: 15, FPS:0.368 FPS
Frame: 16, FPS:0.457 FPS
Frame: 17, FPS:0.425 FPS
Frame: 18, FPS:0.449 FPS
Frame: 19, FPS:0.458 FPS
Frame: 20, FPS:0.469 FPS
Frame: 21, FPS:0.453 FPS
Frame: 22, FPS:0.544 FPS
Frame: 23, FPS:0.475 FPS
Frame: 24, FPS:0.388 FPS
Frame: 25, FPS:0.491 FPS
Frame: 26, FPS:0.419 FPS
Frame: 27, FPS:0.412 FPS
Frame: 28, FPS:0.487 FPS
Frame: 29, FPS:0.403 FPS
Frame: 30, FPS:0.388 FPS
Frame: 31, FPS:0.348 FPS
Frame: 32, FPS:0.366 FPS
Frame: 33, FPS:0.568 FPS
Frame: 34, FPS:0.503 FPS
Frame: 35, FPS:0.507 FPS
Frame: 36, FPS:0.578 FPS
Frame: 37, FPS:0.341 FPS
Frame: 38, FPS:0.568 FPS
Frame: 39, FPS:0.500 FPS
Frame: 40, FPS:0.446 FPS
Frame: 41, FPS:0.425 FPS
Frame: 42, FPS:0.479 FPS
Frame: 43, FPS:0.436 FPS
Frame: 44, FPS:0.540 FPS
```

Frame: 45, FPS:0.567 FPS
Frame: 46, FPS:0.341 FPS
Frame: 47, FPS:0.459 FPS
Frame: 48, FPS:0.550 FPS
Frame: 49, FPS:0.416 FPS
Frame: 50, FPS:0.471 FPS
Frame: 51, FPS:0.357 FPS
Frame: 52, FPS:0.554 FPS
Frame: 53, FPS:0.525 FPS
Frame: 54, FPS:0.404 FPS
Frame: 55, FPS:0.443 FPS
Frame: 56, FPS:0.400 FPS
Frame: 57, FPS:0.528 FPS
Frame: 58, FPS:0.454 FPS
Frame: 59, FPS:0.511 FPS
Frame: 60, FPS:0.401 FPS
Frame: 61, FPS:0.478 FPS
Frame: 62, FPS:0.436 FPS
Frame: 63, FPS:0.496 FPS
Frame: 64, FPS:0.459 FPS
Frame: 65, FPS:0.488 FPS
Frame: 66, FPS:0.526 FPS
Frame: 67, FPS:0.612 FPS
Frame: 68, FPS:0.550 FPS
Frame: 69, FPS:0.502 FPS
Frame: 70, FPS:0.441 FPS
Frame: 71, FPS:0.491 FPS
Frame: 72, FPS:0.535 FPS
Frame: 73, FPS:0.395 FPS
Frame: 74, FPS:0.461 FPS
Frame: 75, FPS:0.461 FPS
Frame: 76, FPS:0.561 FPS
Frame: 77, FPS:0.544 FPS
Frame: 78, FPS:0.453 FPS
Frame: 79, FPS:0.453 FPS
Frame: 80, FPS:0.499 FPS
Frame: 81, FPS:0.558 FPS
Frame: 82, FPS:0.499 FPS
Frame: 83, FPS:0.381 FPS
Frame: 84, FPS:0.344 FPS
Frame: 85, FPS:0.419 FPS
Frame: 86, FPS:0.356 FPS
Frame: 87, FPS:0.436 FPS
Frame: 88, FPS:0.636 FPS
Frame: 89, FPS:0.518 FPS
Frame: 90, FPS:0.472 FPS
Frame: 91, FPS:0.579 FPS
Frame: 92, FPS:0.524 FPS
Frame: 93, FPS:0.546 FPS
Frame: 94, FPS:0.309 FPS
Frame: 95, FPS:0.359 FPS
Frame: 96, FPS:0.434 FPS
Frame: 97, FPS:0.611 FPS
Frame: 98, FPS:0.569 FPS
Frame: 99, FPS:0.525 FPS
Frame: 100, FPS:0.389 FPS

Frame: 101, FPS:0.425 FPS
Frame: 102, FPS:0.431 FPS
Frame: 103, FPS:0.474 FPS
Frame: 104, FPS:0.424 FPS
Frame: 105, FPS:0.470 FPS
Frame: 106, FPS:0.404 FPS
Frame: 107, FPS:0.476 FPS
Frame: 108, FPS:0.367 FPS
Frame: 109, FPS:0.344 FPS
Frame: 110, FPS:0.348 FPS
Frame: 111, FPS:0.302 FPS
Frame: 112, FPS:0.373 FPS
Frame: 113, FPS:0.345 FPS
Frame: 114, FPS:0.476 FPS
Frame: 115, FPS:0.345 FPS
Frame: 116, FPS:0.453 FPS
Frame: 117, FPS:0.304 FPS
Frame: 118, FPS:0.398 FPS
Frame: 119, FPS:0.326 FPS
Frame: 120, FPS:0.445 FPS
Frame: 121, FPS:0.493 FPS
Frame: 122, FPS:0.366 FPS
Frame: 123, FPS:0.491 FPS
Frame: 124, FPS:0.385 FPS
Frame: 125, FPS:0.354 FPS
Frame: 126, FPS:0.435 FPS
Frame: 127, FPS:0.369 FPS
Frame: 128, FPS:0.405 FPS
Frame: 129, FPS:0.467 FPS
Frame: 130, FPS:0.537 FPS
Frame: 131, FPS:0.416 FPS
Frame: 132, FPS:0.331 FPS
Frame: 133, FPS:0.474 FPS
Frame: 134, FPS:0.254 FPS
Frame: 135, FPS:0.548 FPS
Frame: 136, FPS:0.486 FPS
Frame: 137, FPS:0.350 FPS
Frame: 138, FPS:0.419 FPS
Frame: 139, FPS:0.469 FPS
Frame: 140, FPS:0.400 FPS
Frame: 141, FPS:0.357 FPS
Frame: 142, FPS:0.533 FPS
Frame: 143, FPS:0.394 FPS
Frame: 144, FPS:0.521 FPS
Frame: 145, FPS:0.336 FPS
Frame: 146, FPS:0.352 FPS
Frame: 147, FPS:0.495 FPS
Frame: 148, FPS:0.318 FPS
Frame: 149, FPS:0.423 FPS
Frame: 150, FPS:0.359 FPS
Frame: 151, FPS:0.486 FPS
Frame: 152, FPS:0.443 FPS
Frame: 153, FPS:0.396 FPS
Frame: 154, FPS:0.433 FPS
Frame: 155, FPS:0.356 FPS
Frame: 156, FPS:0.473 FPS

Frame: 157, FPS:0.472 FPS
Frame: 158, FPS:0.410 FPS
Frame: 159, FPS:0.409 FPS
Frame: 160, FPS:0.514 FPS
Frame: 161, FPS:0.414 FPS
Frame: 162, FPS:0.498 FPS
Frame: 163, FPS:0.426 FPS
Frame: 164, FPS:0.529 FPS
Frame: 165, FPS:0.447 FPS
Frame: 166, FPS:0.436 FPS
Frame: 167, FPS:0.519 FPS
Frame: 168, FPS:0.359 FPS
Frame: 169, FPS:0.356 FPS
Frame: 170, FPS:0.483 FPS
Frame: 171, FPS:0.369 FPS
Frame: 172, FPS:0.456 FPS
Frame: 173, FPS:0.406 FPS
Frame: 174, FPS:0.540 FPS
Frame: 175, FPS:0.392 FPS
Frame: 176, FPS:0.370 FPS
Frame: 177, FPS:0.460 FPS
Frame: 178, FPS:0.502 FPS
Frame: 179, FPS:0.515 FPS
Frame: 180, FPS:0.504 FPS
Frame: 181, FPS:0.571 FPS
Frame: 182, FPS:0.446 FPS
Frame: 183, FPS:0.412 FPS
Frame: 184, FPS:0.507 FPS
Frame: 185, FPS:0.456 FPS
Frame: 186, FPS:0.467 FPS
Frame: 187, FPS:0.471 FPS
Frame: 188, FPS:0.486 FPS
Frame: 189, FPS:0.368 FPS
Frame: 190, FPS:0.393 FPS
Frame: 191, FPS:0.356 FPS
Frame: 192, FPS:0.554 FPS
Frame: 193, FPS:0.494 FPS
Frame: 194, FPS:0.531 FPS
Frame: 195, FPS:0.513 FPS
Frame: 196, FPS:0.442 FPS
Frame: 197, FPS:0.488 FPS
Frame: 198, FPS:0.456 FPS
Frame: 199, FPS:0.574 FPS
Frame: 200, FPS:0.514 FPS
Frame: 201, FPS:0.386 FPS
Frame: 202, FPS:0.556 FPS
Frame: 203, FPS:0.470 FPS
Frame: 204, FPS:0.506 FPS
Frame: 205, FPS:0.524 FPS
Frame: 206, FPS:0.501 FPS
Frame: 207, FPS:0.416 FPS
Frame: 208, FPS:0.567 FPS
Frame: 209, FPS:0.402 FPS
Frame: 210, FPS:0.411 FPS
Frame: 211, FPS:0.402 FPS
Frame: 212, FPS:0.417 FPS

```
Frame: 213, FPS:0.489 FPS
Frame: 214, FPS:0.476 FPS
Frame: 215, FPS:0.546 FPS
Frame: 216, FPS:0.480 FPS
Frame: 217, FPS:0.412 FPS
Frame: 218, FPS:0.572 FPS
Frame: 219, FPS:0.421 FPS
Frame: 220, FPS:0.332 FPS
Frame: 221, FPS:0.467 FPS
Frame: 222, FPS:0.397 FPS
Frame: 223, FPS:0.553 FPS
Frame: 224, FPS:0.389 FPS
Frame: 225, FPS:0.414 FPS
Frame: 226, FPS:0.543 FPS
Frame: 227, FPS:0.465 FPS
Frame: 228, FPS:0.481 FPS
Frame: 229, FPS:0.374 FPS
Frame: 230, FPS:0.310 FPS
Frame: 231, FPS:0.491 FPS
Frame: 232, FPS:0.420 FPS
Frame: 233, FPS:0.392 FPS
Frame: 234, FPS:0.408 FPS
Frame: 235, FPS:0.479 FPS
Frame: 236, FPS:0.538 FPS
Frame: 237, FPS:0.382 FPS
Frame: 238, FPS:0.354 FPS
Frame: 239, FPS:0.446 FPS
Frame: 240, FPS:0.400 FPS
Frame: 241, FPS:0.487 FPS
Frame: 242, FPS:0.466 FPS
Frame: 243, FPS:0.312 FPS
Frame: 244, FPS:0.407 FPS
Frame: 245, FPS:0.408 FPS
Frame: 246, FPS:0.355 FPS
Frame: 247, FPS:0.417 FPS
Frame: 248, FPS:0.445 FPS
Frame: 249, FPS:0.383 FPS
Frame: 250, FPS:0.399 FPS
Frame: 251, FPS:0.413 FPS
Frame: 252, FPS:0.398 FPS
Frame: 253, FPS:0.538 FPS
Frame: 254, FPS:0.455 FPS
Frame: 255, FPS:0.462 FPS
Frame: 256, FPS:0.376 FPS
Frame: 257, FPS:0.396 FPS
Frame: 258, FPS:0.398 FPS
Frame: 259, FPS:0.368 FPS
Frame: 260, FPS:0.375 FPS
Frame: 261, FPS:0.413 FPS
Frame: 262, FPS:0.447 FPS
Frame: 263, FPS:0.371 FPS
Frame: 264, FPS:0.351 FPS
Frame: 265, FPS:0.312 FPS
Frame: 266, FPS:0.472 FPS
Frame: 267, FPS:0.415 FPS
Frame: 268, FPS:0.364 FPS
```

```
Frame: 269, FPS:0.426 FPS
Frame: 270, FPS:0.390 FPS
Frame: 271, FPS:0.368 FPS
Frame: 272, FPS:0.465 FPS
Frame: 273, FPS:0.389 FPS
Frame: 274, FPS:0.378 FPS
Frame: 275, FPS:0.370 FPS
Frame: 276, FPS:0.403 FPS
Frame: 277, FPS:0.418 FPS
Frame: 278, FPS:0.424 FPS
Frame: 279, FPS:0.470 FPS
Frame: 280, FPS:0.553 FPS
Frame: 281, FPS:0.333 FPS
Frame: 282, FPS:0.398 FPS
Frame: 283, FPS:0.481 FPS
Frame: 284, FPS:0.395 FPS
Average FPS: 0.443
```

In [2]:
```
!python segment_video.py --input input/input.mp4 --model lraspp
```

```
USING LITE R-ASPP WITH MOBILENETV3 BACKBONE
/Users/ndminh/miniconda3/lib/python3.12/site-packages/torchvision/models/_utils.py:208: UserWarning: The parameter 'pretrained' is deprecated since 0.13 and may be removed in the future, please use 'weights' instead.
  warnings.warn(
/Users/ndminh/miniconda3/lib/python3.12/site-packages/torchvision/models/_utils.py:223: UserWarning: Arguments other than a weight enum or `None` for 'weights' are deprecated since 0.13 and may be removed in the future. The current behavior is equivalent to passing `weights=LRASPP_MobileNet_V3_Large_Weights.COCO_WITH_VOC_LABELS_V1`. You can also use `weights=LRASPP_MobileNet_V3_Large_Weights.DEFAULT` to get the most up-to-date weights.
  warnings.warn(msg)
Frame: 1, FPS:0.437 FPS
Frame: 2, FPS:0.585 FPS
Frame: 3, FPS:0.479 FPS
Frame: 4, FPS:0.565 FPS
Frame: 5, FPS:0.383 FPS
Frame: 6, FPS:0.433 FPS
Frame: 7, FPS:0.610 FPS
Frame: 8, FPS:0.371 FPS
Frame: 9, FPS:0.416 FPS
Frame: 10, FPS:0.423 FPS
Frame: 11, FPS:0.577 FPS
Frame: 12, FPS:0.465 FPS
Frame: 13, FPS:0.414 FPS
Frame: 14, FPS:0.514 FPS
Frame: 15, FPS:0.384 FPS
Frame: 16, FPS:0.424 FPS
Frame: 17, FPS:0.546 FPS
Frame: 18, FPS:0.527 FPS
Frame: 19, FPS:0.587 FPS
Frame: 20, FPS:0.405 FPS
Frame: 21, FPS:0.445 FPS
Frame: 22, FPS:0.415 FPS
Frame: 23, FPS:0.511 FPS
Frame: 24, FPS:0.471 FPS
Frame: 25, FPS:0.395 FPS
Frame: 26, FPS:0.455 FPS
Frame: 27, FPS:0.428 FPS
Frame: 28, FPS:0.514 FPS
Frame: 29, FPS:0.470 FPS
Frame: 30, FPS:0.445 FPS
Frame: 31, FPS:0.475 FPS
Frame: 32, FPS:0.447 FPS
Frame: 33, FPS:0.592 FPS
Frame: 34, FPS:0.651 FPS
Frame: 35, FPS:0.422 FPS
Frame: 36, FPS:0.457 FPS
Frame: 37, FPS:0.488 FPS
Frame: 38, FPS:0.490 FPS
Frame: 39, FPS:0.382 FPS
Frame: 40, FPS:0.533 FPS
Frame: 41, FPS:0.451 FPS
Frame: 42, FPS:0.516 FPS
Frame: 43, FPS:0.686 FPS
Frame: 44, FPS:0.517 FPS
```

Frame: 45, FPS:0.398 FPS
Frame: 46, FPS:0.521 FPS
Frame: 47, FPS:0.449 FPS
Frame: 48, FPS:0.407 FPS
Frame: 49, FPS:0.604 FPS
Frame: 50, FPS:0.404 FPS
Frame: 51, FPS:0.578 FPS
Frame: 52, FPS:0.497 FPS
Frame: 53, FPS:0.549 FPS
Frame: 54, FPS:0.409 FPS
Frame: 55, FPS:0.402 FPS
Frame: 56, FPS:0.482 FPS
Frame: 57, FPS:0.413 FPS
Frame: 58, FPS:0.470 FPS
Frame: 59, FPS:0.409 FPS
Frame: 60, FPS:0.599 FPS
Frame: 61, FPS:0.654 FPS
Frame: 62, FPS:0.514 FPS
Frame: 63, FPS:0.449 FPS
Frame: 64, FPS:0.490 FPS
Frame: 65, FPS:0.403 FPS
Frame: 66, FPS:0.427 FPS
Frame: 67, FPS:0.706 FPS
Frame: 68, FPS:0.408 FPS
Frame: 69, FPS:0.476 FPS
Frame: 70, FPS:0.504 FPS
Frame: 71, FPS:0.538 FPS
Frame: 72, FPS:0.382 FPS
Frame: 73, FPS:0.527 FPS
Frame: 74, FPS:0.444 FPS
Frame: 75, FPS:0.542 FPS
Frame: 76, FPS:0.493 FPS
Frame: 77, FPS:0.521 FPS
Frame: 78, FPS:0.520 FPS
Frame: 79, FPS:0.587 FPS
Frame: 80, FPS:0.569 FPS
Frame: 81, FPS:0.404 FPS
Frame: 82, FPS:0.437 FPS
Frame: 83, FPS:0.545 FPS
Frame: 84, FPS:0.362 FPS
Frame: 85, FPS:0.428 FPS
Frame: 86, FPS:0.485 FPS
Frame: 87, FPS:0.470 FPS
Frame: 88, FPS:0.401 FPS
Frame: 89, FPS:0.417 FPS
Frame: 90, FPS:0.448 FPS
Frame: 91, FPS:0.438 FPS
Frame: 92, FPS:0.394 FPS
Frame: 93, FPS:0.402 FPS
Frame: 94, FPS:0.532 FPS
Frame: 95, FPS:0.516 FPS
Frame: 96, FPS:0.429 FPS
Frame: 97, FPS:0.537 FPS
Frame: 98, FPS:0.374 FPS
Frame: 99, FPS:0.513 FPS
Frame: 100, FPS:0.512 FPS

Frame: 101, FPS:0.554 FPS
Frame: 102, FPS:0.623 FPS
Frame: 103, FPS:0.627 FPS
Frame: 104, FPS:0.461 FPS
Frame: 105, FPS:0.456 FPS
Frame: 106, FPS:0.521 FPS
Frame: 107, FPS:0.469 FPS
Frame: 108, FPS:0.496 FPS
Frame: 109, FPS:0.606 FPS
Frame: 110, FPS:0.432 FPS
Frame: 111, FPS:0.559 FPS
Frame: 112, FPS:0.648 FPS
Frame: 113, FPS:0.600 FPS
Frame: 114, FPS:0.559 FPS
Frame: 115, FPS:0.391 FPS
Frame: 116, FPS:0.423 FPS
Frame: 117, FPS:0.481 FPS
Frame: 118, FPS:0.530 FPS
Frame: 119, FPS:0.499 FPS
Frame: 120, FPS:0.448 FPS
Frame: 121, FPS:0.414 FPS
Frame: 122, FPS:0.552 FPS
Frame: 123, FPS:0.550 FPS
Frame: 124, FPS:0.421 FPS
Frame: 125, FPS:0.394 FPS
Frame: 126, FPS:0.413 FPS
Frame: 127, FPS:0.475 FPS
Frame: 128, FPS:0.521 FPS
Frame: 129, FPS:0.475 FPS
Frame: 130, FPS:0.484 FPS
Frame: 131, FPS:0.462 FPS
Frame: 132, FPS:0.532 FPS
Frame: 133, FPS:0.406 FPS
Frame: 134, FPS:0.401 FPS
Frame: 135, FPS:0.583 FPS
Frame: 136, FPS:0.461 FPS
Frame: 137, FPS:0.542 FPS
Frame: 138, FPS:0.440 FPS
Frame: 139, FPS:0.380 FPS
Frame: 140, FPS:0.447 FPS
Frame: 141, FPS:0.456 FPS
Frame: 142, FPS:0.574 FPS
Frame: 143, FPS:0.476 FPS
Frame: 144, FPS:0.595 FPS
Frame: 145, FPS:0.448 FPS
Frame: 146, FPS:0.394 FPS
Frame: 147, FPS:0.424 FPS
Frame: 148, FPS:0.392 FPS
Frame: 149, FPS:0.443 FPS
Frame: 150, FPS:0.582 FPS
Frame: 151, FPS:0.498 FPS
Frame: 152, FPS:0.403 FPS
Frame: 153, FPS:0.437 FPS
Frame: 154, FPS:0.403 FPS
Frame: 155, FPS:0.455 FPS
Frame: 156, FPS:0.447 FPS

```
Frame: 157, FPS:0.559 FPS
Frame: 158, FPS:0.532 FPS
Frame: 159, FPS:0.384 FPS
Frame: 160, FPS:0.390 FPS
Frame: 161, FPS:0.551 FPS
Frame: 162, FPS:0.483 FPS
Frame: 163, FPS:0.607 FPS
Frame: 164, FPS:0.433 FPS
Frame: 165, FPS:0.469 FPS
Frame: 166, FPS:0.523 FPS
Frame: 167, FPS:0.415 FPS
Frame: 168, FPS:0.401 FPS
Frame: 169, FPS:0.607 FPS
Frame: 170, FPS:0.618 FPS
Frame: 171, FPS:0.395 FPS
Frame: 172, FPS:0.420 FPS
Frame: 173, FPS:0.629 FPS
Frame: 174, FPS:0.445 FPS
Frame: 175, FPS:0.716 FPS
Frame: 176, FPS:0.404 FPS
Frame: 177, FPS:0.494 FPS
Frame: 178, FPS:0.429 FPS
Frame: 179, FPS:0.370 FPS
Frame: 180, FPS:0.387 FPS
Frame: 181, FPS:0.457 FPS
Frame: 182, FPS:0.754 FPS
Frame: 183, FPS:0.597 FPS
Frame: 184, FPS:0.436 FPS
Frame: 185, FPS:0.391 FPS
Frame: 186, FPS:0.546 FPS
Frame: 187, FPS:0.389 FPS
Frame: 188, FPS:0.621 FPS
Frame: 189, FPS:0.559 FPS
Frame: 190, FPS:0.484 FPS
Frame: 191, FPS:0.497 FPS
Frame: 192, FPS:0.390 FPS
Frame: 193, FPS:0.532 FPS
Frame: 194, FPS:0.462 FPS
Frame: 195, FPS:0.385 FPS
Frame: 196, FPS:0.423 FPS
Frame: 197, FPS:0.572 FPS
Frame: 198, FPS:0.428 FPS
Frame: 199, FPS:0.466 FPS
Frame: 200, FPS:0.391 FPS
Frame: 201, FPS:0.521 FPS
Frame: 202, FPS:0.616 FPS
Frame: 203, FPS:0.653 FPS
Frame: 204, FPS:0.390 FPS
Frame: 205, FPS:0.366 FPS
Frame: 206, FPS:0.442 FPS
Frame: 207, FPS:0.659 FPS
Frame: 208, FPS:0.665 FPS
Frame: 209, FPS:0.564 FPS
Frame: 210, FPS:0.385 FPS
Frame: 211, FPS:0.437 FPS
Frame: 212, FPS:0.387 FPS
```

```
Frame: 213, FPS:0.609 FPS
Frame: 214, FPS:0.380 FPS
Frame: 215, FPS:0.397 FPS
Frame: 216, FPS:0.557 FPS
Frame: 217, FPS:0.429 FPS
Frame: 218, FPS:0.444 FPS
Frame: 219, FPS:0.489 FPS
Frame: 220, FPS:0.481 FPS
Frame: 221, FPS:0.488 FPS
Frame: 222, FPS:0.426 FPS
Frame: 223, FPS:0.446 FPS
Frame: 224, FPS:0.412 FPS
Frame: 225, FPS:0.434 FPS
Frame: 226, FPS:0.586 FPS
Frame: 227, FPS:0.697 FPS
Frame: 228, FPS:0.467 FPS
Frame: 229, FPS:0.468 FPS
Frame: 230, FPS:0.517 FPS
Frame: 231, FPS:0.612 FPS
Frame: 232, FPS:0.610 FPS
Frame: 233, FPS:0.521 FPS
Frame: 234, FPS:0.515 FPS
Frame: 235, FPS:0.533 FPS
Frame: 236, FPS:0.563 FPS
Frame: 237, FPS:0.665 FPS
Frame: 238, FPS:0.577 FPS
Frame: 239, FPS:0.459 FPS
Frame: 240, FPS:0.718 FPS
Frame: 241, FPS:0.626 FPS
Frame: 242, FPS:0.452 FPS
Frame: 243, FPS:0.463 FPS
Frame: 244, FPS:0.435 FPS
Frame: 245, FPS:0.754 FPS
Frame: 246, FPS:0.546 FPS
Frame: 247, FPS:0.452 FPS
Frame: 248, FPS:0.451 FPS
Frame: 249, FPS:0.618 FPS
Frame: 250, FPS:0.432 FPS
Frame: 251, FPS:0.537 FPS
Frame: 252, FPS:0.573 FPS
Frame: 253, FPS:0.549 FPS
Frame: 254, FPS:0.715 FPS
Frame: 255, FPS:0.645 FPS
Frame: 256, FPS:0.467 FPS
Frame: 257, FPS:0.473 FPS
Frame: 258, FPS:0.513 FPS
Frame: 259, FPS:0.470 FPS
Frame: 260, FPS:0.468 FPS
Frame: 261, FPS:0.468 FPS
Frame: 262, FPS:0.632 FPS
Frame: 263, FPS:0.681 FPS
Frame: 264, FPS:0.656 FPS
Frame: 265, FPS:0.713 FPS
Frame: 266, FPS:0.766 FPS
Frame: 267, FPS:0.539 FPS
Frame: 268, FPS:0.779 FPS
```

```
Frame: 269, FPS:0.719 FPS
Frame: 270, FPS:0.738 FPS
Frame: 271, FPS:0.476 FPS
Frame: 272, FPS:0.671 FPS
Frame: 273, FPS:0.524 FPS
Frame: 274, FPS:0.562 FPS
Frame: 275, FPS:0.657 FPS
Frame: 276, FPS:0.473 FPS
Frame: 277, FPS:0.451 FPS
Frame: 278, FPS:0.425 FPS
Frame: 279, FPS:0.497 FPS
Frame: 280, FPS:0.693 FPS
Frame: 281, FPS:0.643 FPS
Frame: 282, FPS:0.511 FPS
Frame: 283, FPS:0.568 FPS
Frame: 284, FPS:0.539 FPS
Average FPS: 0.501
```

5. Which model seems to perform better?

- Lite R-ASPP model performs better than the DeepLabV3 model from my visual inspection. The output video segmented with LRASPP have the higher overall and average FPS (0.539 FPS compared to 0.395 FPS with DeepLabV3). The reason why both of them achieved low FPS is that the models are running on CPU, which is not optimized for deep learning tasks, compared to GPU (cuda specifically).
- Both models have segmented the objects pretty well, especially the people in the video. However, the DeepLabV3 model seems to perform better when it comes to the table, couch, pillows. But the difference is not significant, and it is hard to notice without a side-by-side comparison.
- Another thing I noticed is the LASPP output video is slightly larger than the DeepLabV3 output video (6.3 MB and 5.8 MB, respectively).

6. What is the main difference DeepLabV3 and LR-ASPP?

- The main difference between DeepLabV3 and Lite R-ASPP is the model complexity and computational cost.
- DeepLabV3 is a more complex model with more layers and parameters, which results in better performance but requires more computational resources.
- Lite R-ASPP is a simplified version designed for lightweight semantic segmentation. It is faster and more efficient in real-time performance but may sacrifice some accuracy compared to DeepLabV3.