

Table 3. Dynamic Adaptation. Under the varying distribution in the streaming source, the proposed Dynamic Memory (DM) and Selective Memory (SM) enable the identification of the critical samples and thereby enhance the segmentation performance. Specifically, SM significantly outperforms other methods on complex structures such as the Esophagus and small structures such as the Adrenal Gland.

| Sequential-Site Dataset [20] | | | | | | |
|------------------------------|--------|--------|--------|---------------|--------|-----------|
| Strategy | LM | DM | SM | SM | SM | Prevalent |
| Sampling Rate S | 100 | 100 | 100 | 100 | 100 | - |
| Memory Size N | 128 | 128 | 128 | 128 | 128 | - |
| Top K% | - | - | 12.5% | 25% | 50% | - |
| Spleen | 0.9506 | 0.9543 | 0.9553 | 0.9449 | 0.9542 | 0.9268 |
| Right Kidney | 0.8961 | 0.9236 | 0.9239 | 0.9202 | 0.9122 | 0.9189 |
| Left Kidney | 0.8972 | 0.9172 | 0.9145 | 0.9138 | 0.9052 | 0.9149 |
| Gall Bladder | 0.2205 | 0.6747 | 0.5367 | 0.5906 | 0.6325 | 0.3671 |
| Esophagus | 0.0004 | 0.1588 | 0.4376 | 0.4044 | 0.4537 | 0.0395 |
| Liver | 0.9615 | 0.9673 | 0.9668 | 0.9665 | 0.9632 | 0.9630 |
| Stomach | 0.5802 | 0.7705 | 0.7313 | 0.7890 | 0.7467 | 0.7785 |
| Aorta | 0.4895 | 0.6063 | 0.6751 | 0.5687 | 0.6633 | 0.7676 |
| Postcava | 0.2098 | 0.5373 | 0.6191 | 0.5444 | 0.5239 | 0.6433 |
| Vein | 0.0000 | 0.0370 | 0.0000 | 0.0000 | 0.0000 | 0.2310 |
| Pancreas | 0.6669 | 0.8028 | 0.8249 | 0.8112 | 0.7766 | 0.7376 |
| Right Adrenal Gland | 0.0000 | 0.0000 | 0.5830 | 0.5942 | 0.4307 | 0.0000 |
| Left Adrenal Gland | 0.0000 | 0.0000 | 0.5625 | 0.5126 | 0.4716 | 0.0000 |
| Duodenum | 0.1204 | 0.4293 | 0.4000 | 0.4987 | 0.5251 | 0.3599 |
| Hepatic Vessel | 0.4678 | 0.5571 | 0.5769 | 0.5524 | 0.5731 | 0.5063 |
| Right Lung | 0.7002 | 0.4919 | 0.5432 | 0.6112 | 0.5529 | 0.7617 |
| Left Lung | 0.8771 | 0.6187 | 0.7965 | 0.7162 | 0.7859 | 0.9102 |
| Colon | 0.0008 | 0.0003 | 0.0185 | 0.0352 | 0.0187 | 0.4986 |
| Intestine | 0.0000 | 0.0849 | 0.1081 | 0.2765 | 0.3648 | 0.4610 |
| Rectum | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0102 | 0.0000 |
| Bladder | 0.6383 | 0.5397 | 0.7316 | 0.7701 | 0.7722 | 0.7517 |
| Prostate | 0.0009 | 0.0923 | 0.1066 | 0.2276 | 0.0471 | 0.0000 |
| Left Head of Femur | 0.0000 | 0.0000 | 0.0000 | 0.0772 | 0.0000 | 0.0000 |
| Right Head of Femur | 0.0000 | 0.0000 | 0.0000 | 0.0690 | 0.0000 | 0.4190 |
| Celiac Truck | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Kidney Tumor | 0.2417 | 0.2936 | 0.2483 | 0.3258 | 0.3204 | 0.3781 |
| Kidney Cyst | 0.0268 | 0.0059 | 0.0729 | 0.2920 | 0.0056 | 0.1751 |
| Liver Tumor | 0.3579 | 0.5753 | 0.5755 | 0.6059 | 0.5817 | 0.6219 |
| Pancreas Tumor | 0.1643 | 0.2823 | 0.2957 | 0.3435 | 0.3560 | 0.2058 |
| Hepatic Vessel Tumor | 0.5717 | 0.6659 | 0.6516 | 0.6618 | 0.6713 | 0.5930 |
| Lung Tumor | 0.1910 | 0.1845 | 0.2862 | 0.1981 | 0.1516 | 0.3233 |
| Colon Tumor | 0.2377 | 0.1797 | 0.2751 | 0.2874 | 0.3106 | 0.1667 |
| Tumor Average Dice | 0.2559 | 0.3125 | 0.3436 | 0.3878 | 0.3426 | 0.3520 |
| Organ Average Dice | 0.3471 | 0.4066 | 0.4805 | 0.4958 | 0.4834 | 0.4783 |
| Average Dice | 0.3272 | 0.3860 | 0.4505 | 0.4722 | 0.4525 | 0.4506 |

Table 4. Data Efficiency. By integrating linear memory into the prevalent training paradigm, we enable training on continual data streams without the need to revisit old data, thereby enhancing data efficiency. The results demonstrate that the linear memory trained on continual data streams achieves comparable performance to the prevalent training paradigm.

| Proprietary Dataset [39,26] | | | | |
|-----------------------------|---------------|---------------|---------------|------------|
| Strategy | Linear Memory | Linear Memory | Linear Memory | Repeatedly |
| Sampling Rate S | 100 | 100 | 100 | - |
| Memory Size N | 64 | 128 | 256 | - |
| Aorta | 0.8865 | 0.8893 | 0.8890 | 0.8848 |
| R Adrenal Gland | 0.7530 | 0.7534 | 0.7501 | 0.7491 |
| L Adrenal Gland | 0.7001 | 0.6980 | 0.6962 | 0.6964 |
| Celiac Truck | 0.5403 | 0.5428 | 0.5385 | 0.5610 |
| Colon | 0.6915 | 0.6946 | 0.6992 | 0.7196 |
| Duodenum | 0.7907 | 0.7903 | 0.7878 | 0.7896 |
| Gall Bladder | 0.8866 | 0.8888 | 0.8860 | 0.8886 |
| Postcava | 0.8129 | 0.8088 | 0.8161 | 0.8164 |
| Right Kidney | 0.9535 | 0.9536 | 0.9551 | 0.9527 |
| Left Kidney | 0.9473 | 0.9477 | 0.9475 | 0.9460 |
| Liver | 0.9715 | 0.9712 | 0.9717 | 0.9708 |
| Pancreas | 0.8699 | 0.8683 | 0.8703 | 0.8688 |
| Intestine | 0.6047 | 0.6088 | 0.6144 | 0.6375 |
| Spleen | 0.9664 | 0.9661 | 0.9663 | 0.9641 |
| Stomach | 0.9512 | 0.9509 | 0.9506 | 0.9453 |
| Average Dice | 0.8217 | 0.8222 | 0.8225 | 0.8260 |