**Table 1:** Comparison of mean Dice and VSI for THOMAS vs. proposed method for WMn-MPRAGE data (median volumes in mm3 are shown in parentheses and nuclei with <200 mm3 shaded, red bold indicates >10% change)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Dice** | | | | | | |  | **VSI** | | | | | | |
| **Disease** | **Control** | | **MS** | | **ET-7T** | | **ET-3T** |  | **Control** | | **MS** | | **ET-7T** | | **ET-3T** |
| **Nuclei (Volume)** | **THOMAS (n=13)** | **CNN (n=13)** | **THOMAS (n=15)** | **CNN (n=15)** | **THOMAS (n=12)** | **CNN (n=12)** | **CNN (n=12)** |  | **THOMAS (n=13)** | **CNN (n=13)** | **THOMAS (n=15)** | **CNN (n=15)** | **THOMAS (n=12)** | **CNN (n=12)** | **CNN (n=12)** |
| Thalamus (5515) | 0.92 | 0.92 | 0.92 | 0.92 | 0.88 | 0.90\* | 0.90 |  | 0.97 | 0.97 | 0.98 | 0.98 | 0.94 | 0.95 | 0.96 |
| Pul (1286) | 0.87 | 0.87 | 0.85 | 0.86\* | 0.84 | 0.85 | 0.84 |  | 0.96 | 0.96 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| VLp (882) | 0.79 | 0.79 | 0.79 | 0.78 | 0.75 | 0.80\* | 0.79 |  | 0.97\* | 0.94 | 0.93 | 0.93 | 0.89 | 0.94\* | 0.95 |
| MD-Pf (686) | 0.86 | 0.85 | 0.85 | 0.86 | 0.83 | 0.84 | 0.84 |  | 0.94 | 0.92 | 0.95 | 0.95 | 0.93 | 0.93 | 0.94 |
| VPl (346) | 0.68 | 0.71\* | 0.69 | 0.69 | 0.57 | **0.64\*** | 0.63 |  | 0.90 | 0.92 | 0.92 | 0.91 | 0.86 | 0.92 | 0.92 |
| VA (301) | 0.71 | 0.74\* | 0.69 | 0.72\* | 0.58 | **0.66\*** | 0.63 |  | 0.88 | 0.89 | 0.91 | 0.88 | 0.92 | 0.95 | 0.93 |
| AV (146) | 0.77 | 0.79 | 0.78 | 0.77 | 0.64 | **0.71\*** | 0.71 |  | 0.89 | 0.93 | 0.93 | 0.88 | 0.71 | **0.84\*** | 0.92 |
| VLa (121) | 0.65 | 0.71\* | 0.64 | 0.66 | 0.47 | **0.64\*** | 0.63 |  | 0.81 | **0.92\*** | 0.87 | 0.86 | 0.69 | **0.87\*** | 0.92 |
| CM (119) | 0.75 | 0.75 | 0.74 | 0.75 | 0.63 | 0.66 | 0.66 |  | 0.91 | 0.94 | 0.89 | 0.89 | 0.92 | 0.91 | 0.92 |
| LGN (115) | 0.75 | 0.76 | 0.71 | 0.69 | 0.55 | 0.59 | 0.59 |  | 0.91 | 0.92 | 0.91 | 0.89 | 0.82 | 0.88\* | 0.90 |
| MGN (76) | 0.68 | 0.74\* | 0.75 | 0.74 | 0.63 | 0.65 | 0.65 |  | 0.79 | **0.90\*** | 0.90 | 0.87 | 0.77 | 0.83 | 0.86 |
| MTT (49) | 0.67 | 0.71 | 0.69 | 0.71 | 0.67 | 0.66 | 0.64 |  | 0.91 | 0.88 | 0.91 | 0.89 | 0.89 | 0.87 | 0.89 |
| Hb (29) | 0.76 | 0.80\* | 0.72 | 0.76\* | 0.76 | 0.74 | 0.72 |  | 0.88 | 0.92 | 0.90 | 0.91 | 0.89 | 0.88 | 0.87 |

\* p < 0.05 THOMAS vs. CNN

**Table 2:** Comparison of mean Dice and VSI for FreeSurfer vs. proposed method for CSFn-MPRAGE data (median volumes in mm3 are shown in parentheses and nuclei with <200 mm3 shaded, red bold indicates >20% change)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Dice** | | | | | |  | **VSI** | | | | | |
| **Disease** | **Control** | | **MS** | | **ET** | |  | **Control** | | **MS** | | **ET** | |
| **Nuclei (volume)** | **FreeSurfer (n=5)** | **CNN (n=6)** | **FreeSurfer (n=14)** | **CNN (n=15)** | **FreeSurfer (n=11)** | **CNN (n=12)** |  | **FreeSurfer (n=5)** | **CNN (n=6)** | **FreeSurfer (n=14)** | **CNN (n=15)** | **FreeSurfer (n=11)** | **CNN (n=12)** |
| Thalamus (5279) | 0.81 | 0.90\* | 0.82 | 0.90\* | 0.86 | 0.90\* |  | 0.90 | 0.96 | 0.88 | 0.97\* | 0.94 | 0.96 |
| Pul (1202) | 0.69 | **0.83\*** | 0.67 | **0.83\*** | 0.70 | **0.83\*** |  | 0.93 | 0.94 | 0.84 | 0.93\* | 0.88 | 0.93 |
| VLp (843) | 0.54 | **0.79\*** | 0.57 | **0.78\*** | 0.56 | **0.79\*** |  | 0.96 | 0.94 | 0.93 | 0.93 | 0.92 | 0.93 |
| MD-Pf (670) | 0.56 | **0.83\*** | 0.63 | **0.84\*** | 0.68 | **0.83\*** |  | 0.85 | 0.94 | 0.79 | 0.93\* | 0.92 | 0.95 |
| VPl (337) | 0.45 | **0.64\*** | 0.45 | **0.66\*** | 0.45 | **0.65\*** |  | 0.58 | **0.87\*** | 0.57 | **0.88\*** | 0.58 | **0.94\*** |
| VA (286) | 0.40 | **0.71\*** | 0.45 | **0.71\*** | 0.48 | **0.67\*** |  | 0.75 | 0.88 | 0.81 | 0.88\* | 0.77 | 0.92\* |
| AV (138) | 0.37 | **0.77\*** | 0.38 | **0.71\*** | 0.47 | **0.70\*** |  | 0.94 | 0.91 | 0.86 | 0.85 | 0.89 | 0.90 |
| VLa (116) | 0.21 | **0.64\*** | 0.20 | **0.61\*** | 0.19 | **0.65\*** |  | 0.28 | **0.89\*** | 0.28 | **0.88\*** | 0.31 | **0.90\*** |
| CM (110) | 0.33 | **0.67\*** | 0.42 | **0.69\*** | 0.35 | **0.65\*** |  | 0.59 | **0.87\*** | 0.60 | **0.90\*** | 0.49 | **0.88\*** |
| LGN (108) | 0.08 | **0.64\*** | 0.09 | **0.59\*** | 0.20 | **0.53\*** |  | 0.81 | 0.80 | 0.83 | 0.78 | 0.87 | 0.85 |
| MGN (70) | 0.04 | **0.67\*** | 0.06 | **0.69\*** | 0.07 | **0.65\*** |  | 0.77 | 0.87 | 0.77 | 0.83 | 0.87 | 0.88 |
| MTT (49) |  | 0.50 |  | 0.58 |  | 0.60 |  |  | 0.85 |  | 0.85 |  | 0.89 |
| Hb (28) |  | 0.67 |  | 0.67 |  | 0.69 |  |  | 0.87 |  | 0.84 |  | 0.87 |

\* p < 0.05 FreeSurfer vs. CNN