TOWARDS MAPPING NEUROANATOMY ACROSS THE HUMAN LIFE SPAN

Shiva Keihaninejad 1, Rolf Heckemann 1, Daniel Rueckert2, Jo Hajnal3, Alexander Hammers 1,4

1 MRC Clinical Science Centre and Division of Neuroscience, 2 Department of Computing, 3 Imaging Sciences Department, Imperial College London, UK
4 Department of Clinical and Experimental Epilepsy, Institute of Neurology, UCL, Queen Square, London, UK

INTRODUCTION

Functional and structural imaging techniques play an increasingly important role in the diagnosis and management of neurological disease, as well as in neuroscience research. The amount of data produced frequently exceeds the capacity for visual analysis or manual segmentation. We have shown that the knowledge contained in 30 manually defined atlases, the Hammers\textsuperscript{\textregistered} atlases 1, can be used to automatically segment unseen MRI data sets 2 by propagating and fusing information from multiple atlases to a target.

The Hammers\textsuperscript{\textregistered} atlases

Within the group, 30 high-quality anatomical atlases based on MRI data of healthy young adults (Women = men; 20-54 years) have been created over the past decade. MRI brain data has been carefully manually segmented into 83 regions of interest.

APPLICATION IN PATHOLOGY

Automatic segmentation of brains with age-related or pathological changes, e.g. enlarged ventricles in Alzheimer\'s disease.

CONCLUSION

The presented method allows to automatically label MRIs of brains with pathologically enlarged ventricles. This will enable us to use this technique to track changes in volume and composition of neuroanatomical structures across the human lifespan and in disease.

REFERENCES