Modern radiotherapy (RT) allows for highly conformal dose distributions, especially using techniques such as intensity modulated radiation therapy (IMRT) and volumetric arc therapy (VMAT), which lead to a decrease in radiation-related toxicity. These techniques are driven by precise segmentations of organs at risk and target structures. These segmentations can be performed using manual tools, which is a tedious process suffering from both inter-observer and intra-observer variability. Fully automated segmentation is technically challenging, and the results from available solutions are not always ideal, especially for tissue types that have poor contrast relative to neighboring structures. In the talk, we present the auto-segmentation algorithms recently implemented in Philips Pinnacle³ RT planning system. SPICE (Smart Probabilistic Image Contouring Engine), developed in a collaboration with UHN, is a fully automated hybrid approach which combines several deformable registration algorithms with model-based segmentation and probabilistic refinement to accurately segment normal and target tissues from head and neck, thorax, prostate, and abdominal CT images.

BIOGRAPHY

Vladimir Pekar received a Diploma in Computer Science from Taganrog Radio Engineering Institute (Taganrog, Russia) in 1991 and a PhD degree in Computer Science from the University of Hamburg, Germany, in 1998. He spent 3 years as a post-doctoral researcher at Philips Research Laboratories in Hamburg working in a collaborative project between Philips and the Medical University of Lübeck. In 2002, he joined Philips Research as a permanent research scientist and became Senior Scientist in 2004. Since April 2007, has been working at Philips Canada in a joint project with the University Health Network, Toronto, ON, pursuing research on radiation therapy planning, and became Research Program Manager for Philips Canada in 2012. Dr. Pekar’s scientific interests include computer-assisted medical image analysis and processing, physics-based modeling and visualization of medical data.