Chapter 7

Conclusions and future work

7.1 Conclusions

A novel method for correction of blurring in PET images of the lungs due to respiratory motion using CT data has been evaluated in this master's thesis. The results show that the method partially corrects this blurring, reducing the lesion's center of gravity position error between a 60% and a 70% and the lesion's volume increment in a 33%.

Even if the blurring is not completely corrected, this improvement contributes to reducing the planning tumor volume (PTV, the region that is treated with radiotherapy in order to reduce the lesion's size).Nnot so big security margins are required to ensure that the whole tumor is radiated. A maximum voxel value (standard uptake value) closer to the "real" one (the one from the sharp gated image) was also recovered with the compensating method. This value helps the physician to discern benign and malign tumors.

There has been a very important limitation in this master's thesis work, and it is that the images were not acquired with an hybrid PET/CT scanner. Even if one can align the PET and CT images a posteriori, it should be possible to get much better results with such a scanner.

7.2 Future work

The first step to continue in this thesis work's direction is to try the algorithm with images acquired by an hybrid PET-CT scanner. It would also be very important to extensively test the algorithm with several different patients, tumor locations, and even scanner models.

Another possible experiment to perform would be to apply the transformations from the CT co-registration on the projection data, prior to recon-

struction.

It would finally be interesting to study how the number of phases in which the respiratory cycle is divided affects the system's performance. The fewer phases the better, as the X-ray dose delivered to the patient in each CT scan is quite large.