

Krasoń Agata¹, Kopera Barbara¹, Hołowko Wacław^{2,3}, Mazurkiewicz Michał. **FatLiver software for assessment of hepatic steatosis.** 1Silesian University of Technology, Biomedical Engineering Department, Poland. 2Medical Warsaw University, Poland. 3Medical Warsaw Hospital, Poland.

Objective : Software for assessment of hepatic steatosis. FatLiver software helps pathologists and surgeons make decision about donor for the liver transplantation by computing level of steatosis. Our solution is more accurate than visual estimation and allows to avoid principal subjective pathologist's errors.

Clinical needs: Macrovesicular steatosis in more than 30% of the liver is major risk factor for liver transplantation. High fat content has been linked to increase graft failure and short survival after transplantation. An accurate assessment of the large droplet is crucial for graft translatability which is currently based on pathologists.

Method: Fully automatic approach for detection and computation steatosis area in macroscoping images of the liver. Our solution is based on simple and very robust algorithms like bilateral filtering, region growing segmentation, shape attributes computation (elongation, perimeter, area, roundness). Finally from the number of kernels and steatosis area quotient is calculated. Test version of algorithm was developed in Matlab. Final Fatliver is still developing based on ITK/VTK/Qt - open source libraries. Algorithms were performed on set of 14 fresh frozen liver tissues images.

Preliminary results: For these set of test images results are very satisfying. First test's results shows that bigger fat content than larger divergence between visual and morphometric method. For the moment, results are verified by one pathologist. But It is still required validation by set of experts.

Conclusion & perspectives: Test version of our approach is done in Matlab. We verified our preliminary results with one medical doctor and medical student. FatLiver software is still developed. We expect to finish first release of application and use as research tool, performed validation results procedure. It needs to perform very carefully validation procedure and compare results between visual and medical imaging method. It will require to improve algorithms in different cases.

