Graduation Project proposal

Company:
Supervisor(s) at company (name + e-mail addresses):
Mathijs Schuts
Mathijs.schuts@philips.com

University
Supervisor(s) at university (name + e-mail addresses; TU/e will look for suitable supervisors if left blank):
Jurgen Vinju
j.j.vinju@tue.nl

Project title (or topic):
Improving the maintainability of legacy source code.

Short project description:
IGT Systems creates X-ray scanner for the treatment of cardio and vascular diseases. At MDC-SW, we manage and control the table and a C-arc that holds the X-ray generator and X-ray detector. We create software that aligns the X-ray beam with respect to the patient.

In this masters project we will investigate how to automatically migrate large scale C++ software from the existing OS abstraction layer to a different abstraction layer, namely POSIX and modern C++11 language constructs. The challenge is to automate as much as possible of this migration while keeping a tab on preserving semantics (both execution time limits as well as functional properties).

Technical assignment:
1) Requirements analysis: make an inventory of what constructs should be and can be replaced.
2) Design and implement the transformation (refactoring) using the Rascal meta-programming language.
3) Evaluate the automated transformation: is it complete? Does it always generate correct code? Different evaluation methods are allowed ((semi-) formal proofs, empirical evidence, and everything in between).

Business assignment*:
We have to support multiple product lines.
Per product line we have >1 MLOC.

The expected benefits are improved maintainability of the code, but this is not an evaluation question of the project.

*This part is only relevant for graduation projects carried out by students of the EIT ICT Labs (www.ictlabs.eu) variant of the Embedded Systems program. In addition to the MSc thesis about the technical aspects of their graduation project, these students need to write a short additional report discussing the business-related aspects of their graduation project. Please fill in this part if you wish your project proposal to be considered for this option.