

Title: Visual Programming Backend for a Mobile Robot

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Abstract: In this work, the author designs and implements a solution for programming small mobile robots using a visual programming language. A suitable visual programming front-end is selected and back-end layers are created that allow execution of the program in a mobile robot. The author designs and implements a virtual machine that runs alongside the original robot firmware on an 8-bit microcontroller with limited resources. A code generator layer compiles the visual representation of the program into a sequence of bytecode instructions that is interpreted on board of the mobile robot. The solution supports typical features of procedural programming languages, in particular: variables, expressions, conditional statements, loops, static arrays, function calls and recursion. The emphasis is put on robustness of the implementation. To verify and maintain code quality, methods of automated software testing are used.

Keywords: visual programming language, virtual machine, mobile robot, Blockly