*Florida International University*

*School of Computing and Information Sciences*

Software Engineering Focus

Feature Document

User Story ID 129

**Name: Research Code Migration**

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**Project: Hemodynamic Imaging of Lower Extremity Ulcers**

**Product Owner(s)**: Dr. Fang

**Mentor(s)**: Dr. Godavarty

**Instructor**: Masoud Sadjadi

**User Story Name: Code Migration**

* Description: **As a NIROS developer I want to investigate the most efficient option to migrate the code from Matlab to a lower level language, so the device and code can be patented, and so it can be run through a microcontroller instead of a laptop.**

NIROS is a device used for capturing images of wounds from diabetic patients and then analyzing them. Currently, the images are processed and analyzed using software written in Matlab through a laptop. We want to migrate the code to another programming language, so it can be patented and ported to a microcontroller.

We have chosen Python and C# as the programming languages. C# will be used to control the device and acquire data, and Python will be used to process and analyze it. Here are some advantages of using Python and C# as the native language

Python and C# are actual programming language, unlike Matlab, which is a linear algebra package. It is therefore much more dynamic since you can add non-numerical capabilities easily.

Python is widely used in the area of data science. Libraries like NumPy and Pandas exist for data analysis. Libraries like scikit-learn exits for machine learning. The Python distribution “Anaconda” will be used, which specializes in data analytics.

Although not as fast as a lower level language like C, bottlenecks can be addressed by interfacing with other languages. For example, OpenCV is an open source software library that has python bindings to algorithms that are implemented in C.

ActiveX is the software development kit currently used to control the camera. It is written in C#, so working with this language directly simplifies things and eliminates the need to use and interface and wrap the code in another host language.