Software Requirements Specification

McMaster-Carr Add-In for Autodesk Inventor (MAFI)
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Contents

1   Introduction

1.1   Purpose

The purpose of this document is to detail the requirements of the "McMaster-Carr Add-In for Autodesk Inventor". It will describe the purpose, features, and future goals of the software. Further, it will examine the interface of both it and its parent application to the extent that a user who is familiar with the parent application can understand the new software implementation. This document will also list any constraints present, such as required operation system. The overall intent of this document is to allow a user to determine if this product would be of use.

1.2   Document Conventions and Definitions

This document was created based on the IEEE guide to system requirement specifications [1]. The following describes all naming conventions used throughout the document:

- MAFI: The McMaster-Carr Add-In for (Autodesk) Inventor software.

- Inventor: The computer application "Autodesk Inventor 2019" developed by Autodesk, Inc.[2].

- McMaster: The online catalog available at www.mcmaster.com[3].

- API: Application programming interface.

- 3D model: A three dimensional representation of a physical object, as shown within a computer program such as Inventor.

- Add-in: A software that relies on a parent application in order to execute, typically embedded within the parent application, i.e. non-standalone.

- IProperties: A set of attributes embedded within each Inventor file such as part number, description and physical material.

- Button: A user interface element that executes a process of an application from a mouse click.

- .NET: A software framework developed by Microsoft that includes a large class library and provides language interoperability across several programming languages[4].

- CefSharp: A fast, fully embedded web browser for .NET applications[5].

1.3   Intended User

- Users of the program Autodesk Inventor 2019.

- Autodesk company employees who may want to further implement this software.

- Other parametric modelling application users who may want to implement similar software in another primary application.

1.4   Product Scope

MAFI will be an application add-in built for Inventor as a method for more efficiently connecting to, and retrieving models from, the McMaster database of 3D models that are used by mechanical designers. It will allow for a, direct, in-program access to the online catalog. Along with, "fast" conversion of the database file-type into something usable by an Inventor user. This is a software that should speed up design projects for engineers who use 3D models available from McMaster, within Inventor.

1.5   References

[1] "Ieee guide for software requirements specifications," *IEEE Std 830-1984*, pp. 1–26, Feb 1984.

[2] Autodesk, Inc., "Inventor | Mechanical Design And 3D CAD Software | Autodesk," https://www.autodesk.com/products/inventor/overview.

[3] McMaster-Carr Supply Company, "McMaster-Carr," https://www.mcmaster.com.

[4] Microsoft Corporation, ".NET Documentation | Microsoft Docs," https://docs.microsoft.com/en-us/dotnet/.

[5] A. Maitland, "CefSharp," https://cefsharp.github.io, v69.0.

[6] N. Quandt, "MAFI," https://github.com/nquandt/MAFI, v1.0.4.

2   General Description

2.1   Product Perspective

MAFI stems from a similar implementation within the application Fusion 360, which similar to Inventor, is developed by Autodesk, Inc.. Fusion 360 has a "button" within its interface that opens an embedded web browser directed at McMaster to allow for the user to search, find, and add a 3D model available from McMaster directly to their design project. MAFI aims to bring a similar interactive embedded system to Inventor. It is not a stand alone program, and runs from within Inventor, via the Inventor API for add-ins. A breakdown of MAFI's classes as would be implemented within Inventor is depicted in the following diagram:
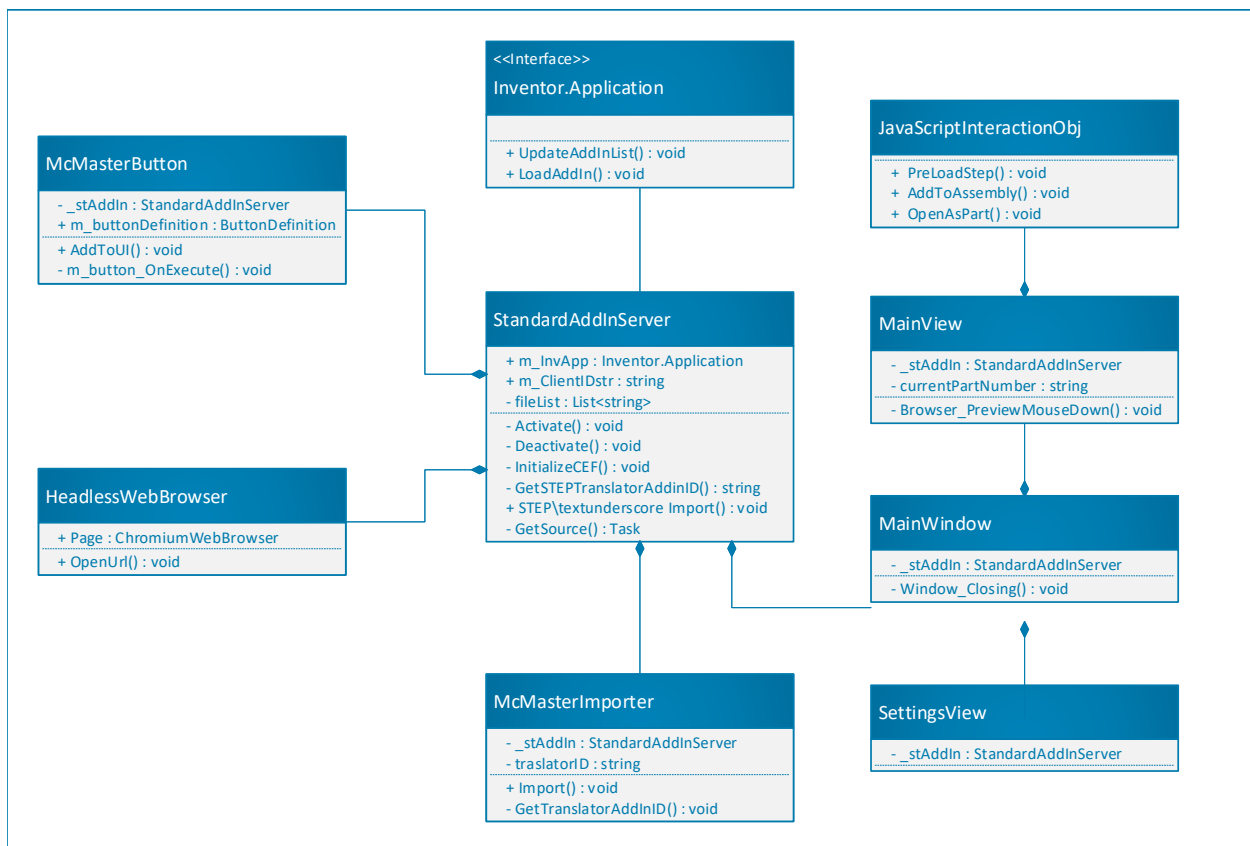

Figure 1: Reduced Class Diagram of MAFI

2.2   Product Functionality

MAFI will add a "button" to the ribbon interface of Inventor. Clicking this "button" will open an embedded web browser directed to www.mcmaster.com. From this browser the user can explore the McMaster catalog. Once the user has decided on a part they wish to retrieve a model for, the user can navigate to the "Add to Assembly" button that has been injected into the web browser page. This will execute a process that will convert, save, and open the selected part's 3D model.
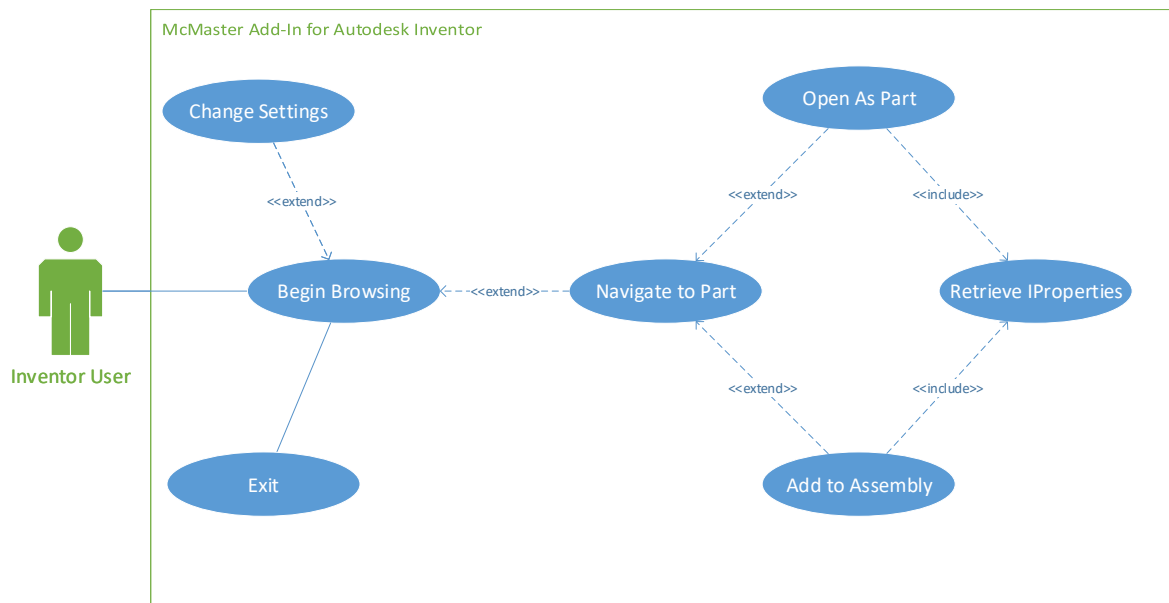
Figure 2: Use Case Diagram for User of MAFI

During this process the part information data that is provided by the catalog will be added into the saved Inventor file, within it's "IProperties". The user is then able to continue browsing or exit the browser. The user is now able to use this file however they choose, as it has been saved to their files, and added to the project.

2.2.1   Step by Step of Use Case

1. Begin Browsing McMaster by clicking the "Browse" button in Inventor.

   - User may choose to modify settings at any time following the start of browsing.

2. User chooses either to navigate to the desired part, or exits which may be done at any time from now on.

3. If navigating to part, user chooses to either open as an individual part, to add the part directly into the assembly of various parts.

4. Either choice will result in the retrieval of IProperties for the part.

5. Return to step 2 until user chooses to exit.

2.3   Operating Environment

MAFI will run in any Windows 64-bit environment that is capable of running the Inventor application. It is built on .NET Framework 4.7.2. Provided that Inventor has been properly installed, no additional software should be required except for the .dll library and .addin manifest provided for MAFI installation, as will be outlined in the MAFI Installation Guide.
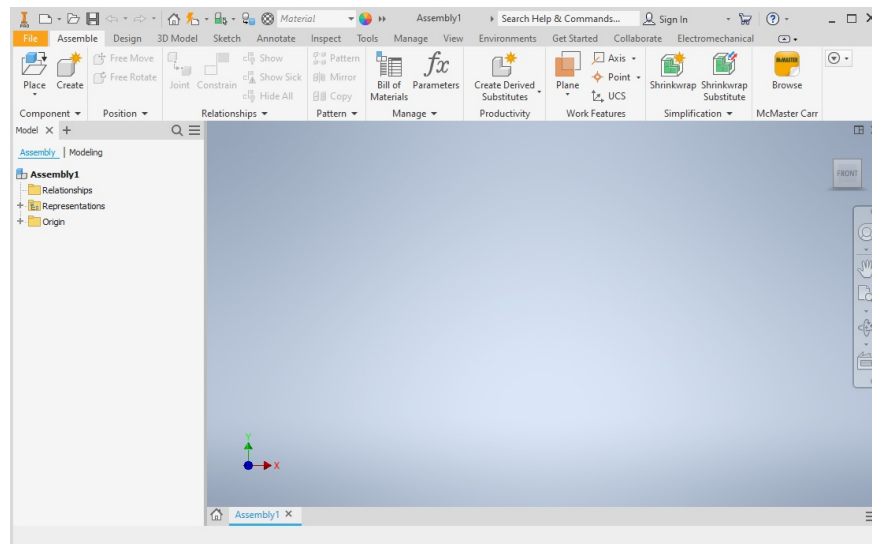
2.4   User Interface

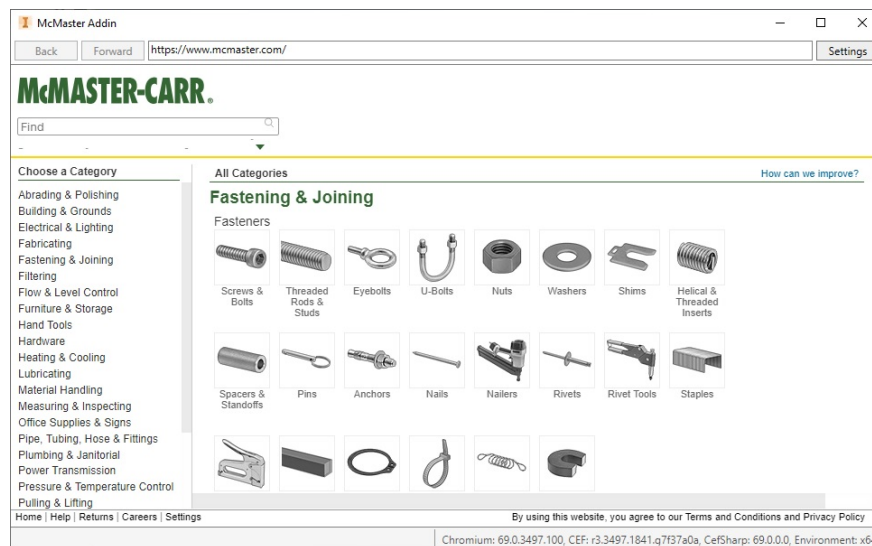Figure 3: A new button should be added to the Inventor UI, similar to this image (button on the far right).

Figure 4: The embedded browser should follow from this demo browser.

Figure 5: This is the McMaster "ordering" section, this should be replaced for user iteraction with add-in

3 Code Repository

3.1 Changes Tracking and Code Manifest

All code shall be kept in a github repository to maintain proper change history, and accessibility from anywhere.[6] Further, this allows for the project to maintain one overarching version, and that any future changes can be made without "bricking" the software.

4 Supplementary Documentation

4.1 Tools for the Creation of Documents and Diagrams

1. Visual Studio Code 1.40.0 https://code.visualstudio.com/

2. MiKTeX 2.9.7100 https://miktex.org/

3. Visio Professional 2019 https://products.office.com/Microsoft/Visio

4.2 Tools for Development of Software

1. Visual Studio Community 2019 16.3.8 https://visualstudio.microsoft.com/vs/community/