SYSTEM UTILITY AND USB ANTIVIRUS SOFTWARE

A PROJECT REPORT

Submitted by

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BACHELOR OF SCIENCE (B.Sc.Engg)
IN
COMPUTER SCIENCE AND ENGINEERING

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July, 2013

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A project submitted in partial fulfillment of the requirements for the degree of
"Bachelor of Science in Computer Science and Engineering"

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July, 2013

Abstract

System utilities are the core software functions that allow us to manage our computer in ways that we would find it inconceivable to be without. Antivirus is software used to prevent, detect and remove malware, such as: computer viruses, malicious BHOs, hijackers, ransomware, keyloggers, backdoors, rootkits, trojan horses, worms, malicious LSPs, dialers, fraudtools, adware and spyware. System utility and USB Antivirus most commonly used for speedup computer performance and system security. Most of the time Windows based system are slowed down by junk file, unused shortcut, unnecessary temporary file etc. and our system affected by virus from USB rather than internet. System utilities may be already included in our computer or downloaded from the Internet. No matter where we look, we can find plenty of system utility programs at little or no cost, but maximum system utilities and antivirus software are expensive for personal use, specially general user can't use this for cost or may use cracked version that pre-contain virus or malware. So we have introduced a free system utility and USB antivirus software and it is open source, anyone can contribute or learn our software. Basically it is designed for general users of third world countries. We have included all the facilities that support other professional system utility and USB antivirus software. The software has been built light weight interactive User Interface and it has Windows system based tools to manage our computer because it is easy to use and is familiar for general user. We have focused our contribution in totally professional manner. We interact via website, online support center and we notify our users for our product in case any update arises. "To err is human", we do have some lacking, it is simple, however provides greater facilities comparatively from other free utilities. Our system utility and USB antivirus is designed to optimize our computer for maximum performance and security. It will speed up, clean up, tune up, and secure our PC.

Acknowledgements

The authors show gratefulness to their supervisor, Lecturer **Md. Naimur Rahman** for his helpful contribution in their project work. His suggestions, encouragement and guidelines played a vital role in their thesis work. Lecturer **Md. Naimur Rahman** is an intellectual in creativity, analysis, and comprehension. He has been a great source of innovative ideas, profound knowledge and feedback all the time for authors.

The authors would like to hearty thanks to their parents and also their teachers and friends forgiving them mental support and inspiration in their working time.

The Authors

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Chapter 1

Introduction

In today's world everyone uses computer, we can't imagine our life without computer. Most of us use Windows based operating System (about 90% globally) for personal and office purpose. Windows operating system is easy, user friendly, grate UI design and most popular OS. However it has some drawbacks too. The major drawbacks of Windows OS are that it gets slowed down between a few days after a fresh installation and also has security problem. As it is the most commonly used OS, Hackers and other Virus creator makes it prey for spreading virus and malwares. Its security risk is growing proportionally with its increasing popularity. Hence, protection is the major demand. The Windows OS vendor Microsoft enhances their OS security and other third-party companies also work together for Windows security. For that reasons many companies released system utility and antivirus software. But most of them are not costly for personal use. We may find some freeware system utilities and antivirus softwares. Most of them are close source. Nevertheless some limited facilities open source system utilities software is available too. Subsequently, we decided to introduce an open source full featured system utilities and USB antivirus software.

Most of Windows systems get slowed down after a few days of uses and more often it is affected by viruses and malwares from USB removable storage devices. For speed up of its performance and security we present a system utility software and USB antivirus. It is totally free and open source. Anyone can develop our software under GPL v3 license .It is simple, fast, eye catching designed and has complete online support.

Our Project Feature:

- Advance Interactive user friendly & totally unique User Interface.
- Low memory consumption, runs under low configuration pc.
- Fast and flexible.
- Supports latest versions of Windows OS like: Windows 8, Windows 7 , Windows Vista and Windows XP (Design for Windows 8 and Windows 7)
- Auto update & online support services.
- Interactive website for users query.
- Open source: Everyone is most welcomed to develop our software. It is totally free under GPL v3.
- Includes powerful third-party open source software under GPL license.

- It is basically designed for general users, so it is easy to use. All Tools are based on Windows built-in utility, consequently it is familiar for user.
- **Disk cleaners** can find files that are unnecessary to computer operation, or take up considerable amounts of space. Disk cleaner helps the user to decide what to delete when their hard disk is full.
- **Disk defragmenters** can detect computer files whose contents are broken across several locations on the hard disk, and move the fragments to one location to increase efficiency.
- **Disk checkers** can scan operating hard drive.
- **Disk refresher** is a simple way to visit all part of hard disk, it provides faster access of our hard drive.
- **Registry cleaners** clean and optimize the Windows registry by removing old registry keys that are no longer in use.
- **Shortcut Fixer** fix broken shortcut and remove unused unnecessary file shortcuts.
- **Startup Manager** can manage what apps to run initially when Windows is started.
- **Auto Run manager**
- All Windows necessary tools are accumulated.
- **Provide visual customizer** by which we can decorate our pc more beautifully.
- **Memory testers** check for memory failures.
- **Optimize memory;** speed up our system by cleaning unnecessary services and program form RAM.
- **Network utilities** analyze the computer's network connectivity, configure network settings, check data transfer or log events.
- **System monitors** for monitoring resources and performance in a computer system.
- **System profilers** provide detailed information about the software installed and hardware attached to the computer.
- **System show** basic hardware, OS and user information.
- **Performance Monitor** is Windows built-in tools that show activity system CPU, RAM, Network, Disk performance.
- **Resources Monitor** show detailed real-time view available resources (CPU, RAM, Disk, and Network) and OS resources like services modules etc.
- Show total System Configuration
- **Device Manager** manage Windows all device include our computer.
- **Computer management** including disk management shared folder, event viewer, task scheduler etc.

- **Backup** software can make copies of all information stored on a disk and restore either the entire disk (e.g. in an event of disk failure) or selected files (e.g. in an event of accidental deletion).
- **System Tweak** includes large number of Windows, security, multimedia, performance, Network and additional tweak.
- **Full feature USB antivirus,** protect our PC from USB virus.
- **Extended USB protection** such copy protection, USB ON/OFF system etc.

We don't claim to be the best. "***Rome was not built in a day***", Developing system software is always a difficult job and requires continuous effort. But then again we have tried our best to develop something which could be helpful for the general computer users.

Chapter 2

The Project and Its Development process

2.1 Project Basic Description

- **Project Objectives**
  - Develop powerful, fast and user friendly software.
  - Full online support.
  - Targeted to be helpful for general computer users.

- **Project Duration**

  The project was carried out between January 2013- December 2013.

- **Project Team**

  Team Name : Software-Art
  Team Member : Md. Hasibur Rashid
  Gazi Azizur Rahaman

  Supervisor : Md. Naimur Rahman.

- **Cost**

  Project development cost approximately 5000/- Taka.

- **Location**

  Patuakhali Science and Technology University,
  Dumki, Patuakhali -8602, Bangladesh.

2.2 Technology and Method

Technologies are used in our project:

Microsoft Blend: Microsoft Blend for Visual Studio (formerly Microsoft Expression Blend) is a user interface design tool developed by Microsoft for creating graphical interfaces for web and desktop applications that blend the features of these two types of applications. It is an interactive front-end for designing XAML-based interfaces for Windows Presentation Foundation and Silverlight applications. It was one of the applications in the Microsoft Expression Studio suite before it was discontinued. It uses XMAL for design that make good outlook of application. User can design the app in desiring mode. XMAL is the modern design approach for graphical user interface **[4] [5]**.

ASP.NET Framework:

ASP.NET is a server-side Web application framework designed for Web development to 0produce dynamic Web pages. It was developed by Microsoft to allow programmers to build dynamic web sites, web applications and web services. It was first released in January 2002 with version 1.0 of the .NET Framework, and is the successor to Microsoft's Active Server Pages (ASP) technology. ASP.NET is built on the Common Language Runtime (CLR), allowing programmers to write ASP.NET code using any supported .NET language **[2]**.

MVC:

The Model-View-Controller (MVC) architectural pattern separates an application into three main components: the model, the view, and the controller. The ASP.NET MVC framework provides an alternative to the ASP.NET Web Forms pattern for creating Web applications. The ASP.NET MVC framework is a lightweight, highly testable presentation framework that (as with Web Forms-based applications) is integrated with existing ASP.NET features, such as master pages and membership-based authentication. The MVC framework is defined in the **System.Web.Mvc** assembly **[9]**.

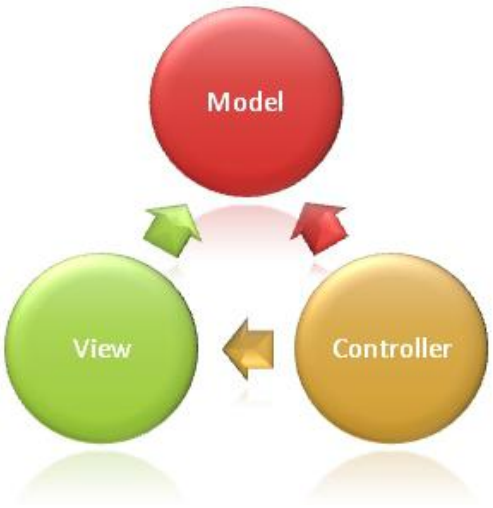


Fig 2.2.1: The MVC framework includes the following components

Models: Model objects are the parts of the application that implement the logic for the application's data domain. Often, model objects retrieve and store model state in a database. For example, a Product object might retrieve information from a database, operate on it, and then write updated information back to a Products table in a SQL Server database.

Views: Views are the components that display the application's user interface (UI). Typically, this UI is created from the model data. An example would be an edit view of a Products table that displays text boxes, drop-down lists, and check boxes based on the current state of a Products object.

Controllers: Controllers are the components that handle user interaction, work with the model, and ultimately select a view to render that displays UI. In an MVC application, the view only displays information; the controller handles and responds to user input and interaction. For example, the controller handles query-string values, and passes these values to the model, which in turn might use these values to query the database.

How ASP.NET MVC works:

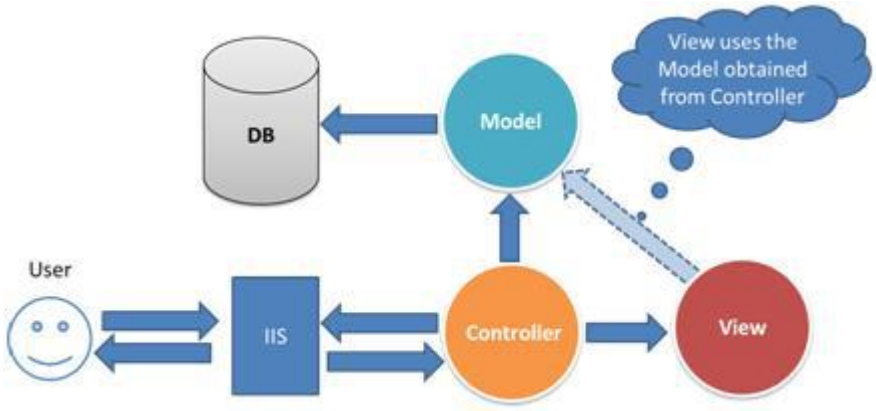


Figure 2.2.2: Procedure to View a request page to a user

1. User makes the request for some resource in server (by putting some URL in the browser).
2. Request comes to controller first (routing engine is the one who is responsible for deciding which request will be handled by which controller. In this article we won't talk in depth about this behavior).
3. Controller if required talk to model for data.
4. Model operates on database (or on some other data sources) and return data to controller.
5. Controller chooses the appropriate view (like say Customer view which will may contain some html tables, drop downs, textboxes…).
6. Controller passes the data (model data retrieved in step 4) to chosen view (in step 5), where data will be populated as per convenience.
7. Controller sends back view to the user.

Features of the ASP.NET MVC Framework:

- Separation of application tasks (input logic, business logic, and UI logic), testability, and test-driven development (TDD) by default.
- An extensible and pluggable framework. The components of the ASP.NET MVC framework are designed so that they can be easily replaced or customized.
- A powerful URL-mapping component that lets you build applications that have comprehensible and searchable URLs. URLs do not have to include file-name extensions, and are designed to support URL naming patterns that work well for search engine optimization (SEO) and representational state transfer (REST) addressing.
- Support for existing ASP.NET features. ASP.NET MVC lets you use features such as forms authentication and Windows authentication, URL authorization, membership and roles, output and data caching, session and profile state management, health monitoring, the configuration system, and the provider architecture.

MVC4: ASP.NET MVC 4 is a framework for building scalable, standards-based web applications using well-established design patterns and the power of the ASP.NET and the .NET framework. This new, fourth version of the framework focuses on making mobile web application development easier **[9]**.

New Features in MVC4:

ASP.NET MVC 4 puts its focus on making it easier to develop mobile web applications. In this hands-on lab, you will start with the MVC 4 Internet Application project template and create a Photo Gallery application. You will progressively enhance the application using jQuery Mobile together with MVC 4 new features, to make it work great across different mobile devices and desktop web browsers.

jQuery Mobile is an HTML5-based framework for developing web apps that are compatible with all popular mobile device platforms, including Windows Phone, iPhone, Android and so on. However, if you need specialization, MVC 4 also enables to serve different views for different devices and provide device-specific optimizations **[11]**.

ASP.NET MVC 4 projects now include Entity Framework 5. One of the great features in Entity Framework 5 is support for database migrations. This feature enables to easily evolve database schema using a code-focused migration while preserving the data in the database.

What is Razor?

- Razor is a markup syntax for adding server-based code to web pages
- Razor has the power of traditional ASP.NET markup, but is easier to learn, and easier to use
- Razor is a server side markup syntax much like ASP and PHP
- Razor supports C# and Visual Basic programming languages
- Used to create dynamic web pages with the C# or Visual Basic .NET programming languages.

Main Razor Syntax Rules for C#

- Razor code blocks are enclosed in @{ ... }
- Inline expressions (variables and functions) start with @
- Code statements end with semicolon
- Variables are declared with the var keyword
- Strings are enclosed with quotation marks
- C# code is case sensitive
- C# files have the extension .cshtml

Advantages of Razor:

- The idea behind Razor is to provide an optimized syntax for HTML generation using a code-focused templating approach, with minimal transition between HTML and code.
- The design reduces the number of characters and keystrokes, and enables a more fluid coding workflow by not requiring explicitly denoted server blocks within the HTML code.

Disadvantages: Not supported by modern visual editors, like Dreamweaver.

HTML5: HTML5 is a markup language for structuring and presenting content for the World Wide Web and a core technology of the Internet. It is the fifth revision of the HTML **[3] [11]**.

Browser Support for HTML5: no browsers have full HTML5 support. But all major browsers (Safari, Chrome, Firefox, Opera, and Internet Explorer) continue to add new HTML5 features to their latest versions.

HTML5-NEW Features:

- New parsing rules oriented towards flexible parsing and compatibility
- New elements – section, video, progress, nav, meter, time, aside, canvas
- New input attributes – dates and times, email, url
- New attributes – ping, charset, async
- Global attributes (that can be applied for every element) – id, tabindex, repeat
- Deprecated elements dropped – center, font, strike

CSS3: Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation semantics (the look and formatting) of a document written in a markup language. It's most common application is to style web pages written in HTML and XHTML. CSS3 is the version 3 of css, the latest version of it **[3] [11]**.

Why use CSS3: The biggest difference between CSS2 and CSS3 is that CSS3 has been split up into different sections, called modules. CSS2 was submitted as a single document with all the Cascading Style Sheets information within it. Because each of the modules is being worked on individually, it has a much wider range of browser support for CSS3 modules **[11]**.

2.3 Tools:

Tools that are used to develop our project:

Project Part	**Development Tools**	**Purpose**
Desktop software	Microsoft Expression Blend 4	Design
Desktop software	Microsoft Visual Studio 2012	Design and Code generate
Web	Microsoft Visual Web Expression 2012	Design and Development

Table 1: List of tools.

2.4 Programing Language:

We developed our project based on C# and XAML, web part based on C# ASP.Net MVC4, SQL, html 5, JS, and CSS 3.

2.5 Project Development Model

In our System Utility project we used **water fall model** for project development because our problem requirement are well known, clear and fixed , problem definition is stable, technology is known, no ambiguous requirement need and our project isn't huge. Thus, we decided to use this model as base **[6]**.

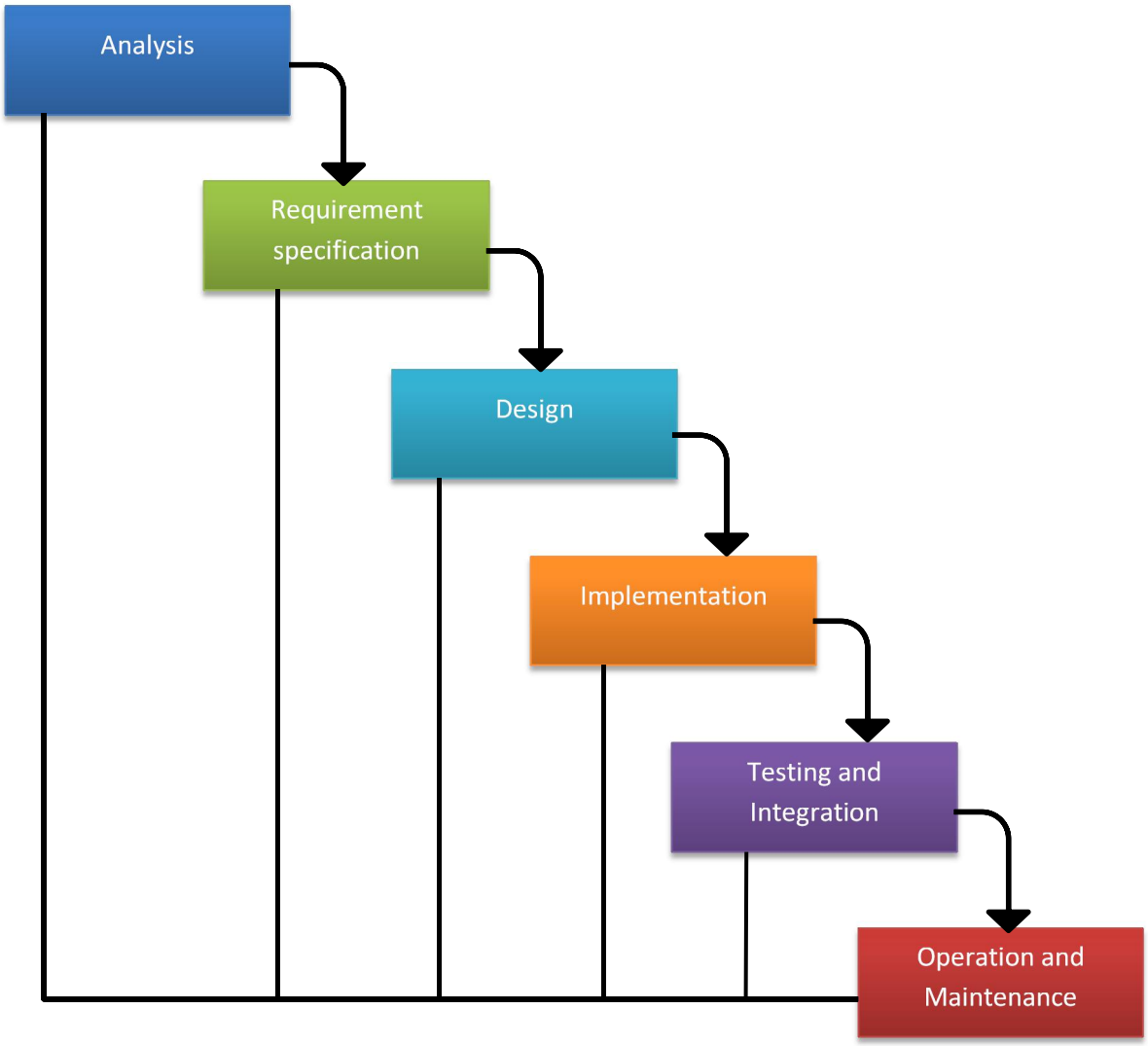


Fig 2.6.1: Water fall model.

2.6 Development Time

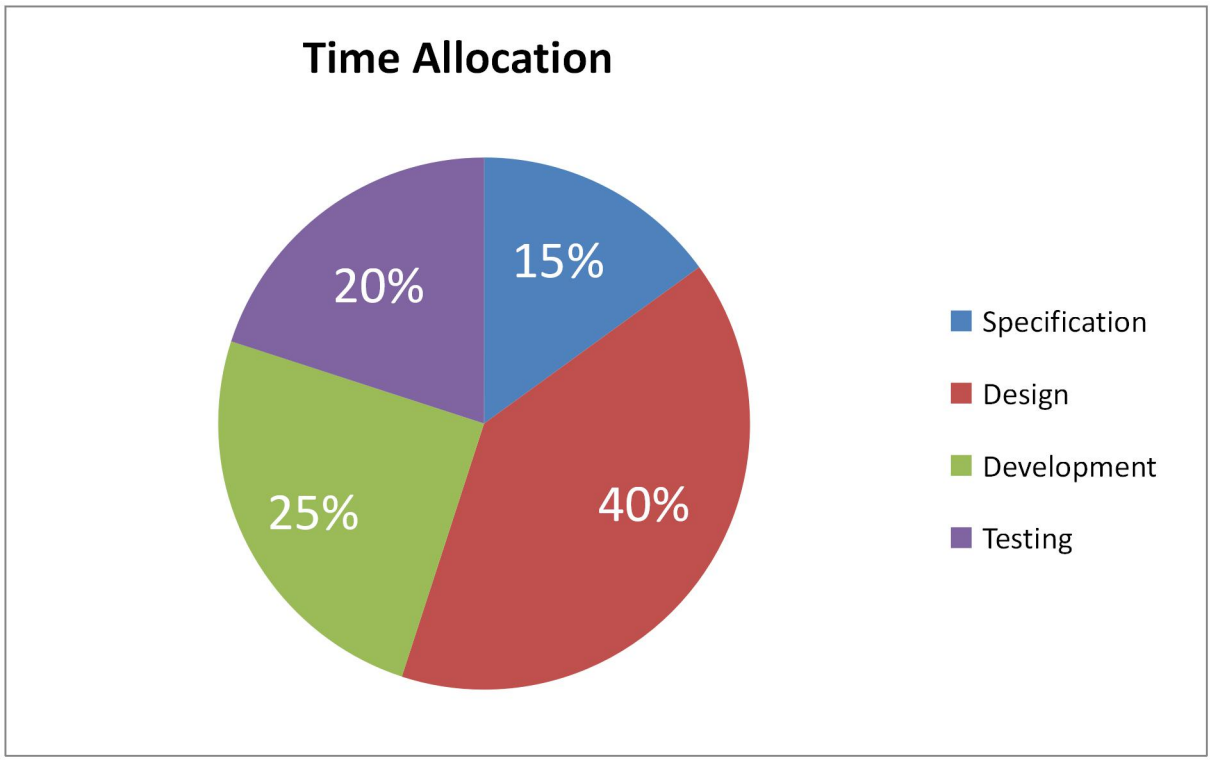


Fig 2.6.2: Time allocation of project development.

2.7 Implementation

The name of our system utility software is **System Engineer**. Here we have discussed how and what it does. It is based on C#.Net Framework and XAML. Total interface has been designed by Microsoft Expression Blend 4.

Home: In home menu three different tabs are listed, the first is **'Information'** which shows system and user information of user pc. The second **'Oneclick cleaner'** perform junk file, unnecessary registry clean, memory optimize and hard disk fresh up. And the third one is '**Performance'** that provides some tools based on windows which helpful for increasing system performance.

Fig 2.7.1: System Engineer Main window, Information tab

Fig 2.7.2: System Engineer Main window, Performance tab

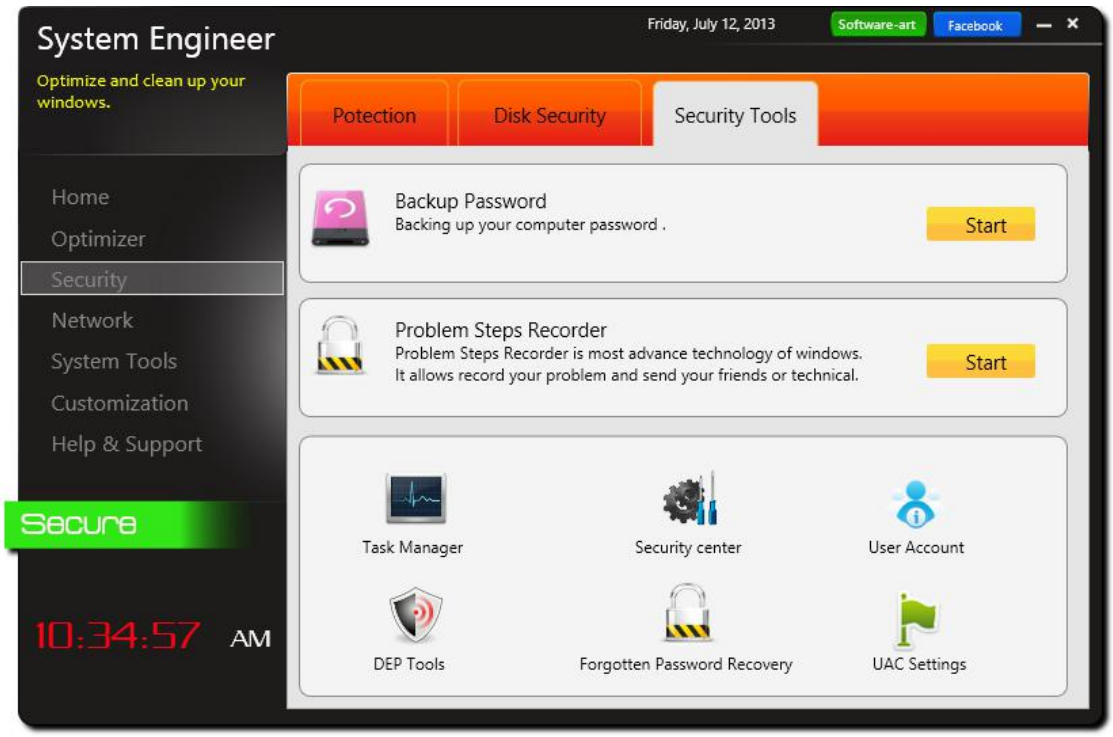
Optimizer: Optimizes windows system. Here are four different tabs listed, fist 'Spped **up'** include Junkfile cleaner, registry cleaner, memory optimizer, system restore. The second 'Disk **optimizer'** includes Disk defragment, disk error checker, disk cleaner, disk fresher. The third is **'Optimizer'** include Startup manager, Uninstaller and some other tools. And the fourth tab 'Tools' include some necessary tools.

Fig 2.7.3: System Engineer Optimize window, Optimizer tab

Fig 2.7.4: System Engineer Optimizer window, Disk Optimizer tab

Security: Protects the computer from unknown threats like virus and malware. It has three tabs. First tab is '**Protection**' tab include Windows Malware scanner, MS Essential or Defender (Only Windows 7 and 8). Second tab '**Disk security'**includes autorun manager, Disk protection, Bitlocker encryption system. Third tab **'Security Tools'** tab include taskmanager, backup manager, security center, problem step recorder, DEP tools UAC settings etc.

Fig 2.7.5: System Engineer Security window, Protection tab



Net

Fig 2.7.6: System Engineer Security window, Security Tools tab

work: It includes three tabs. First tab **'Network optimization '**tab includes Windows Remote Assistance, network optimization, network information etc. Second tab **'Network Tools'** tab includes Network and sharing center, Remote desktop, Internet option, Network home group etc. The third tab **'Network tweak'** tab includes Network monitor, IP configuration, windows update, System information, share folder etc.

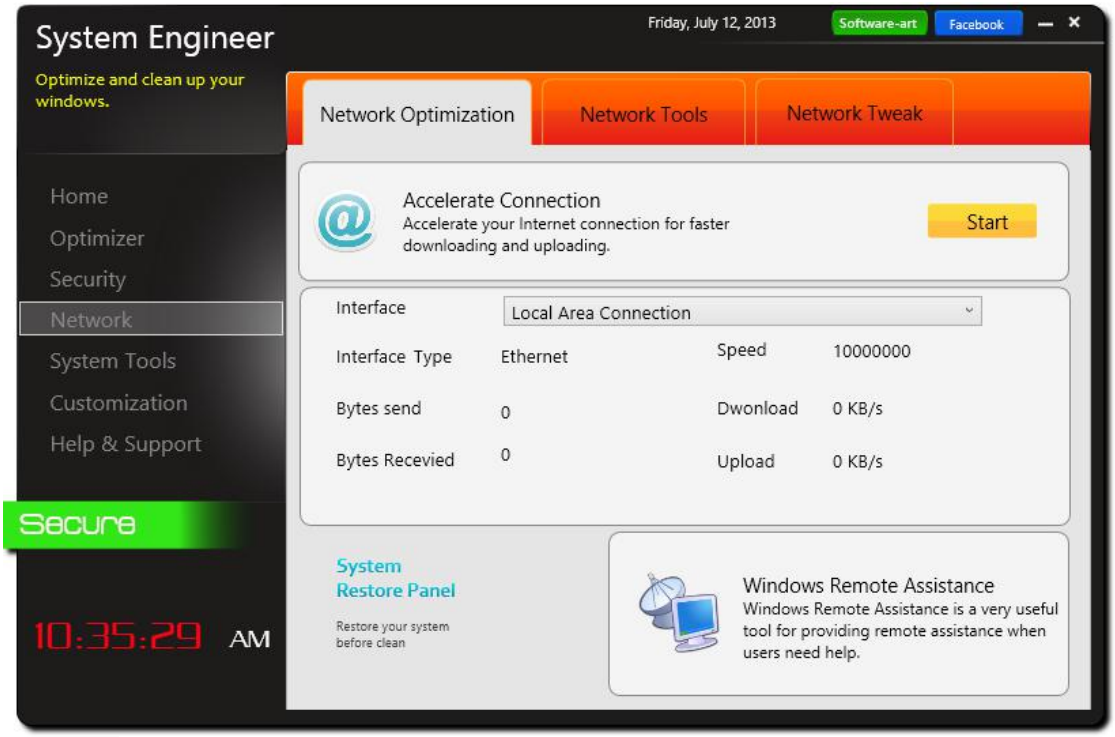


Fig 2.7.7: System Engineer Network window, Network Optimizer tab

Fig 2.7.8: System Engineer Network window, Network Tools tab

System Tools: includes accumulated all windows tools and some third-party tools under GPL v3.

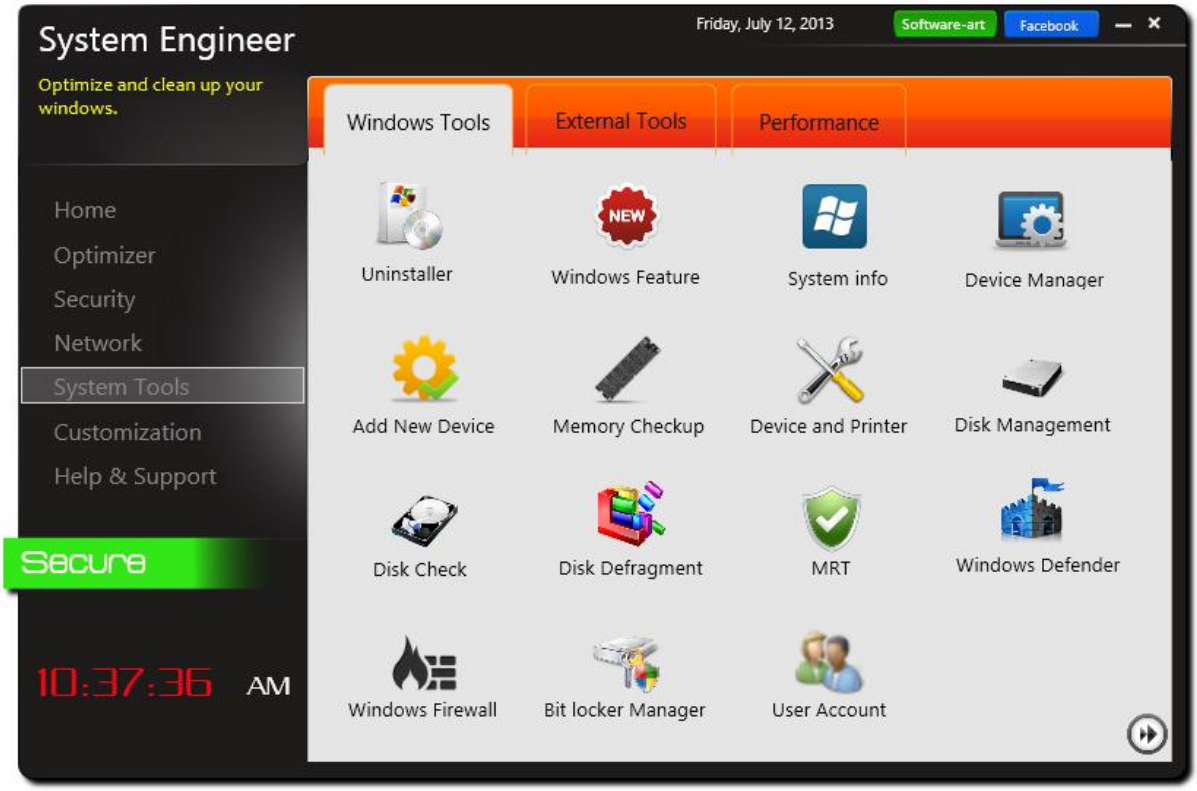


Fig 2.7.9: System Engineer System Tools window, Windows Tools tab

Fig 2.7.10: System Engineer System Tools window, External Tools tab

Customization: customizes the visual and windows setting. System tweaked provides greater facility to speed up the computer and it also provide network, multimedia, performance, security tweak.

Fig 2.7.11: System Engineer Customization window, Windows Tweak tab

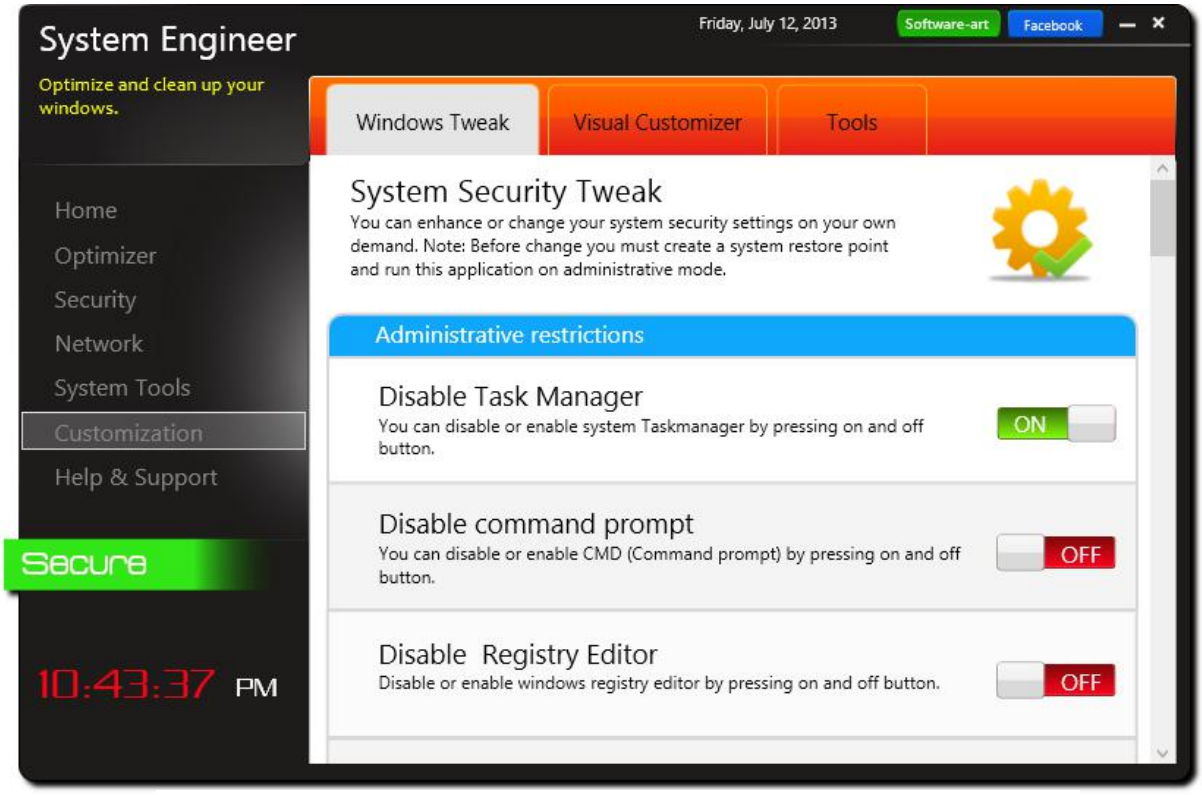


Fig 2.7.12: System Engineer Customization window, Security Tweak tab

Help and Support: includes license conditions, user help and support manual, application settings, and developer details.

Fig 2.7.13: System Engineer Help and Support window, about tab

Software-art website: To give full service like other utility software company, we design and develop a website. From this site, online users can download both free and PRO software. They can update their version, repair licenses. For this website we used ASP.NET Framework, MVC, Razor View Engine technologies. To design we used Microsoft Visual Studio Web Expression 2012. Our website contains that given bellow.

Home: First page is HOME. The users see the most rating products in our HOME page. The first product contains a little description about it. Other products contain their title and image.

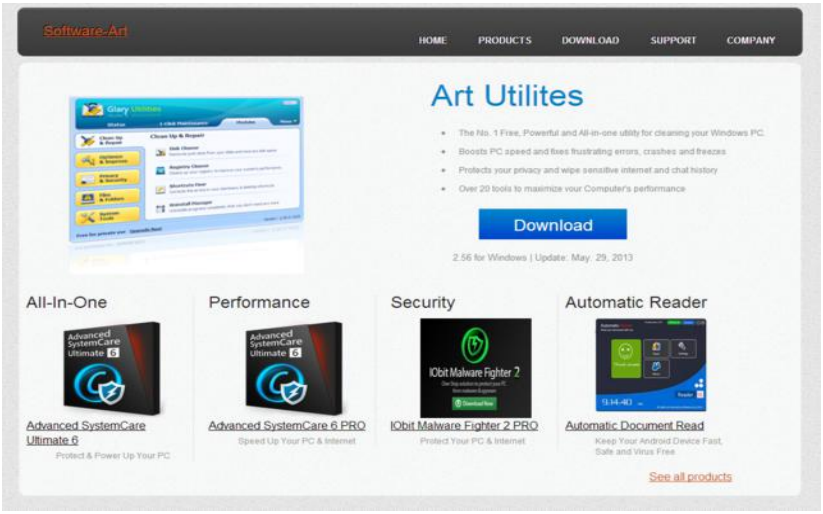


Fig 2.7.14: Home page

Product: All products are grouped in their categories. Product categories are utility, performance, protection and mobile. If anyone to know details about a product, he/she can click the product.

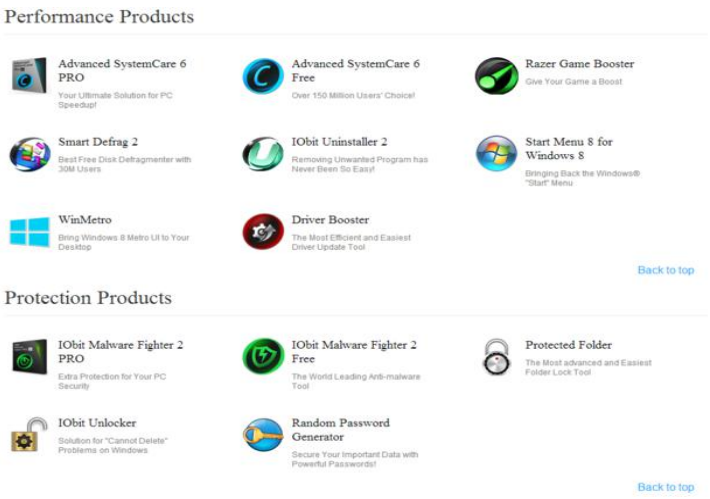


Fig 2.7.15: Product page

Support: The users may need some help or may have questions. It contains most frequently asked question about our products and service. We would like to hear the compliment or complaints. Users also may suggest about our products that give online feedback. One may lose his or her license, he or she can get new license according to term and policy. Those features are in SUPPORT page.

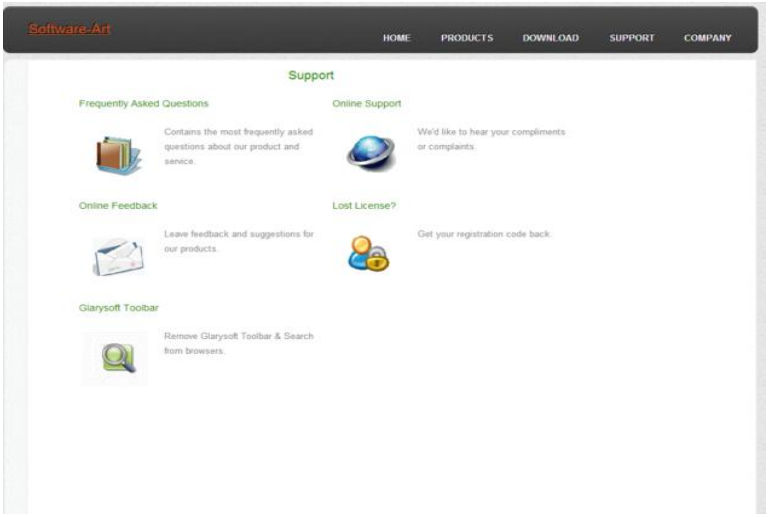


Fig 2.7.16: Support page

COMPANY: Company vision, products line, contact and blog are held in COMPANY page. Software-art is committed to produce the best possible products to enhance both personal and professional computing experiences. We aims to provide highly efficient and reliable software that are easy to approach and use by both novices and experts to keep computer running smoothly and error-free, improve system performance greatly, ensure personal and corporate security.

Fig 2.7.17: Company page

Chapter 3

Analysis and Result

3.1 Result and Comparison

Comparison with System Engineer, C-Cleaner, Glary Utilities, Tune Up, Advance System Care.

	C Cleaner	Glary Utilities (Pro)	Tune up (Pro)	Advance system care	System Engineer
Junk file cleaner	Yes	Yes	Yes	Yes	Yes
Registry cleaner	Yes	Yes	Yes	Yes	Yes
Disk Repair	No	Yes	Yes	Yes	Yes
Disk Defragment	No	Yes	Yes	Yes	Yes
Startup Manager	Yes	Yes	Yes	Yes	Yes
Uninstaller	Yes	Yes	Yes	Yes	Yes
Disk Checker	No	Yes	Yes	Yes	Yes
System File repair	No	No	No	No	Yes
Memory Optimizer	No	Yes	Yes	Yes	Yes
Network Connection checker	No	No	Yes	Yes	Yes
Network optimizer	No	No	Yes	Yes	Yes
Windows Tools	Yes	Yes	Yes	No	Yes
External Tools	No	No	No	No	Yes
Security Tools	No	No	Yes	No	Yes
Visual personalization	No	No	Yes	No	Yes
System Tweak	No	No	No	No	Yes
USB Antivirus	No	No	No	No	Yes
Online Support	Yes	Yes	Yes	Yes	Yes
Open source	No	No	No	No	Yes

Table 2: Comparison between System Engineer and others utility.

3.2 Beneficiaries

The main beneficiaries of this project are general users. They may use this software free for personal or business purpose. This project is open sources so it is helpful for developer and student who want to develop System Utility software and antivirus. It is also helpful for technician because this software provide error diagnosis and solving feature.

3.3 Future work

In future very firstly we would complete our unfinished tasks and enhance **System Engineer**, moreover we would include customize uninstaller, startup manager, and many more system tweak and other necessary tools.

We will introduce our website based on ASP.Net MVC4. And publish it with complete features.

The key challenge in future is to build a USB antivirus. We would include some system tweak; Windows repairing option, USB enable disable protection services and provide extended facilities from other traditional USB antivirus. The model for our upcoming USB antivirus has been shown below.

Fig 3.3.1: USB Antivirus demo model

Chapter 4

Conclusion

4.1 Concluding review

To build a System Utility is always a difficult task. We have tried our best to develop a nice looking, powerful, smart, user friendly, secure and open source freeware software for personal or professional use. We assume it might prove to be helpful for general users, those who have very little knowledge about computer. Nowadays, we may find many freeware System Utility, but they don't support completely. Somehow, we have tried fulfilling all basic requirements and features that are provided by other Commercial System Utility and USB antivirus Software.

4.2 Limitation

Last but not the least, "***To err is human***" We do bear some limitations, this software is totally developed on Windows built-in system tools and API, in case any component of OS fails, the software can't provide that service. We have used Windows system tools because these tools are easy to make use of and are familiar to general users. System programing is a challenging task, it is quite impossible to build a complete System Utility and USB antivirus software through it by one or two people. All professional System Utility software are developed by an organization or Community based process where many people work together.

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