

CS486C – Senior Capstone Design in Computer Science

Project Description

Project Title: Integrated Automated Testing for Enterprise Websites

Sponsor Information:

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Project Overview:

Like most modern enterprises, Choice Hotels maintains a strong web presence, based on a sophisticated and complex web infrastructure. One critical element in the web development process used by the IT Build Group at Choice Hotels International is a well-structured testing process to ensure that all web pages developed for the Choice Hotels International site are tested for functionality and errors before deployment. Unfortunately, managing this testing process is quite manual and effort-intensive; the IT Build Group would like a testing management software application that will assist in creating automated test suites for websites.

Currently, the process for preparing a web page for test automation is laborious: A software tester must examine and account for each page element, text box, button, etc., on every page, and manually assemble objects that can be used in automated UI testing. The goal of this project is to improve the efficiency and robustness of this process tremendously, by creating an application that will read a given webpage, recognize each and every component that comprises it (at least at the UI level), and sort these components into objects. These compiled web pages would then be fed into our web page testing infrastructure for detailed testing. A few of the desirable features of the system would include:

Level 0, minimal viable functionalities:

- An elegant graphical interface for running the system on individual web pages, whole directories of pages, or entire (sub)sites derived from scanning all pages linked from some site root.
- Strong integration with our existing testing tools and process, e.g., the Selenium HQ browser automation software that drives testing.
- Potential meta-level revision our existing toolset, i.e., explore use of this product to serve as an elegant graphical front end for our entire webpage testing chain: point it at pages to test and it scans the pages, extracts object, runs the pages through our testing process, and displays results in a useful format.

Level 1, what we really think is the future. An above average project:

- An ultimate goal we'd like explored is of this lightweight webpage testing tool as a Web2.0 software-for-service architecture, driven by a Web2.0 front-end to this tool chain. Users would visit the site and create an account, and then could enter a series of web pages that they are responsible for maintaining/testing. They could then initiate testing on these web pages/sites at any time, with results view/printed/downloaded as appropriate.
- Other features, as developed through requirements analysis and discussions during the first project phase.

To our knowledge, there is no extant technology that does this. We strongly believe this would be a valuable tool for any company that already uses test automation on its website, and would be especially useful for start-ups and other low-budget application, by providing a free and robust website testing infrastructure. Theoretically, a new company would only require SeleniumHQ (a free web-browser automation application), Eclipse IDE (also free), and this page object builder to fully automate its browser.

Knowledge, skills, and expertise that will need to be learned for this project:

The proficiencies that will need to be developed to tackle this project are not too complicated, and will include:

- Java programming expertise.
- A comprehensive understanding of how websites are constructed
- Knowledge of Web2.0 architectures: frameworks, cloud services, etc.
- Knowledge of selected webapp implementation language(s), e.g., python, javascript
- The ability to construct an elegant web-based graphical user interface (GUI); ability to thoroughly test with potential end-users.

Choice is committed to the educational mission of the NAU Capstone class and will provide technical advice and support in developing or attaining certain proficiencies. At the same time, we are eager to see your creativity and own ideas, so we will expect for you to explore designs and technologies, and present them to us with your rationale over the course of the collaboration. We welcome your ideas concerning how this application might be built (and what it will look like), and promise to participate in frequent design sessions, both on Skype and in person.

Equipment Requirements:

- There should be no equipment or software required other than a development platform and software/tools freely available online.

- We will supply whatever technological and intellectual resources you require. For both semesters, you will have regular access to members of our development, architectural, and test automation teams, as well as a dedicated contact person at Choice who will help to ensure that you have everything you need to make an outstanding product.

Software and other Deliverables:

- The minimal outcome (Level 0) should be a functional page object builder, integrated with our on-site testing. A strong outcome will include a Web2.0 implementation of the testing suite.
- A GUI that adheres to good design principles, along with a viable end-user manual.
- A strong as-built report detailing the design and implementation of the product in a complete, clear and professional matter. This document should provide a strong basis for future development of the product.
- Choice International is an agile software development company. Our build teams are committed to delivering software every two weeks. Preferably, the NAU project team would work on a similar schedule, delivering a minimal viable product on a regular, twice-a-month basis once the implementation phase of this process begins in Spring semester. You will have learned Agile development, but we are also happy to refresh the team on the process, and educate on how it is deployed in our environment, e.g., cadences, tools, and methods.
- If possible, we would like the team to present its finished work for IT leadership at the Choice offices in Phoenix. We will help with travel arrangements.