MecMovies 3.0

Developer Technical Guide

This document serves as a guideline to the development of MecMovies for the Mechanical Engineering Department at the University of Cape Town. The intention of this paper is to provide a descriptive walkthrough on how the software was developed such that future development can be carried on with ease.

Overview

The application is developed as a web application, such that it can be integrated online with learning management systems (LMS), due to the scale and comprehensiveness of the existing content the software is built on top of the existing infrastructure that is MecMovies 2.0 and thus built with flash while the navigation around the flash player is in HTML, CSS, and JavaScript. The application is built within the Tsugi framework which provides easy integration with other LMS systems. The system is designed to best display the existing MecMovies content to be compliant with the needs for first year engineering students. Additionally, the lecturer is able to track student completion of sections.

Languages

The following languages are used in development

* HTML – This is used to develop the web portal that the content is displayed in.
* CSS – This is used to style the appearance of the content, specifically the portal and not the actual flash content.
* JavaScript – This is used to change the interaction in the front end, such as movement between sections and build dynamic navigation.
* JSON – this is used to configure the content for the course.
* PHP – Tsugi is written in PHP and so interaction with Tsugi’s framework and the lecture tracking database is done in PHP.
* ActionScript 1 – This is used to code and alter the flash content files.
* MySQL – This is the relational database structure in which the data is stored to track course and section completion for each student.

Tools and Frameworks

Tools

* Git – Version Control
* GitKraken – GUI for Git
* Brackets – Web development focussed text editor
* XAMP – Web server software
* PhpMyAdmin – Database interaction
* JPEX’s Free Flash Decompiler – Flash file decompiling and editing software

Frameworks

* Tsugi – Interoperable learning management system framework
* Bootstrap – Tsugi’s styling framework
* Materialize – MecMovies 3.0 styling framework
* Toastr – JavaScript notifications library

Features

* Student Tracking

The lecturer is able to view the progress of each individual student, this is done by allocating a minimum time with each section of the course based on its length. This time in seconds is then used as a benchmark to determine whether a student has spent the minimum amount of time to complete a section. To support the applications dynamic course content creation the data is stored in a SQL database which tracks when a user has completed that specific section. Only the lecturer has access to view this student progress.

* Time Suggestion

Based on the minimum allocated time associated with each slide this is summed up for each chapter and multiplied by an offset of 1.75. This is a realistic interpretation of how long the chapter should take to complete. The idea of this is to support the students prior understanding of the magnitude of the course. The length of a text book is intuitive to a student and thus this concept stems from improving the students user experience in a technical online learning sphere.

* Dynamic Content Creation

The application is designed such that it can be used as a low level content management system, by this I mean with a basic understanding of JavaScript and file directories it is conducive to creating variations or new courses. This is done by dynamically pulling content from a central point which is a configuration file.

To simplify the understanding of this application there are a series of short accompanying video tutorials to accompany this document. The Videos cover the following content:

General Overview - <https://www.useloom.com/share/cabfec3d3414434d8ec840907fdf5035>

Dynamic Content Creation – Config file - <https://www.useloom.com/share/bc13361da4864f4f9c22785f8d1bb14b>

Scripts and Time Tracking - <https://www.useloom.com/share/4d7a970efa85435cb9228b17b4e6aa78>

Slide Editing - <https://www.useloom.com/share/60d6946decd34ed5ba5468991008029b>

The links are active at the time of writing to stream the content online, otherwise the videos will be stored within the same folder as this technical guide.

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