

Kevin Morgan, MSEE

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Overview

I am a professional engineer for the web. Demonstrated strengths include strong conceptual thinking and architectural skills, creative skills and aesthetic sensibility, and a focus on the importance of user experience. This is backed by comprehensive product development experience, anticipating likely obstacles and sources of change to ensure successful and timely product delivery. I am dedicated to excellence and getting the job done.

Technologies

- Client-side: Javascript (ES6 & ES5), React, Knockout, web sockets, jQuery, Canvas, CreateJS, WebGL/Three.js, HTML5 media element programming, Video.js, D3.js, SVG, Haml, Bootstrap, CSS/SASS, node/npm, webpack, gulp.
- Server-side: Ruby on Rails with MySQL, Postgres, and various gems (Fog/AWS, Carrierwave, Sidekiq, Apartment, etc.); .NET/C# with Sql Server.
- Architectures: Single Page Applications, MVC, MVVM, object-oriented, functional reactive, REST.

Experience

MSEE, PRINCETON UNIVERSITY (GPA 3.9)
BS, CLARKSON UNIVERSITY (GPA 4.0)

CONSULTING – 2007-PRESENT

Kadenze, Inc.: Designed and developed the lecture video suite (web applications and infrastructure) for Kadenze's learning management platform. The applications used a single page architecture with client-side view templates, data binding, routing, authentication/authorization, internationalization, and promises-based XHR to a backend RESTful api (JSON/Rails). Applications were responsive and mobile-ready. Results: Provided key capabilities that enabled this startup company to secure adoption of their learning management system by Stanford, Cal Arts, and Princeton, among others. Some specifics:

- Designed and implemented the site's core HTML5 video capabilities. This included the core video player and playlist functionality. The video player could fire custom media events (a la timeupdate, paused, ended, etc.) for use by other front-end modules. The UI was skinnable as well as visually extensible – allowing programmatic addition of new controls to progress and transport bars, for example, or content overlays on top of the video. With this capability, other modules could 'decorate' the video player without requiring modifications to the player itself.
(HTML5 media element, Video.js, Javascript, Rails, Carrierwave, Fog/AWS, Sidekiq, Postgres)

- Designed and implemented an extensible framework for authoring and synchronously rendering interactive content for lecture videos. This framework enabled any web-based content – text, graphics, map coordinates, and even interactive web applications – to be authored by an instructor and inserted into an HTML5 video timeline (without requiring modifications to the video itself). On playback, a student could interact with the content at the appropriate time. Included were monitoring and reporting capabilities. I designed the framework around an extensible set of client-side javascript objects that allowed flexibility in extending authoring capabilities for future media types. Objects were loosely coupled using a custom event architecture. I also designed and developed the Rails backend for this, using polymorphism and single table inheritance to allow any item stored in the database to be embeddable in a video timeline. JSON was used to exchange data with the browser.

(HTML5 media element, Knockout, Bootstrap, Haml, Rails, Postgres)

- Using the framework described above, implemented an in-video quiz application allowing instructors to embed questions for testing a student's understanding of the video. The authoring application was capable of creating multiple choice questions accompanied by text and graphics, the correct answer with an explanation (including graphics), and question variants for quiz randomization. It also included a unique 'capture time' feature that allowed instructors to insert questions by pausing the video at the appropriate time and simply entering the question (no manual time code input was necessary, though it was available as an option). Despite the rich capabilities of the authoring application, its interface was clean, responsive, and easy to use. On student playback, questions were displayed over the video at the appropriate time using eased animation, translucent panels, and blurred backgrounds for a cinematic feel. Question markers overlaid on the video progress bar (as well as separate navigation controls) allowed the user to directly navigate to questions for review.

(Knockout, Bootstrap, Haml, Rails, Postgres)

- Implemented support for YouTube and Vimeo video as a complement to instructor-provided video. To ensure feature parity and smooth integration, I encapsulated the native YouTube/Vimeo players and enabled programmatic control of playback and monitoring a la instructor-uploaded video. This, in turn, enabled queueing (playlists) and analytics. I also implemented the capability for instructors to include YouTube and Vimeo videos in assigned coursework, lectures, class surveys, and as general classroom resources.

(Youtube api, Vimeo api, Knockout, Bootstrap, Haml, Rails, Postgres)

- Implemented closed caption/subtitle support for videos in support of industry accessibility requirements.

(WebVTT, HTML5 media element, Knockout, Bootstrap, Haml, Rails, Fog/AWS, Postgres)

- Implemented video analytics for tracking student time spent watching lecture videos.

(keen.io, HTML5 media element, Knockout, Bootstrap, Haml, Rails, Postgres)

- Contributed features and bug fixes for many other web applications throughout the site.

Curriculum Associates: Designed and co-developed a math learning activity for young children to teach counting and addition. This was a single page application created with React and CreateJS (an animation library). Created the concept, storyboard, artwork, animations, and sound design, as well as contributing to the programming of the finished web app.

(HTML5/Canvas, Javascript/ES6, React, CreateJS, TexturePacker, Sketch, Logic Pro X)

The Response Network: Principal designer/developer for a web-based multimedia law enforcement training system. My work was instrumental in bringing this startup's product successfully to market, increasing its customer base from zero to 18,000. Also cut operating costs by 85% while expanding and improving the capabilities of the product. Delivered on over five dozen projects, including:

- Designed and implemented web applications for students (course taking), agency administrators (monitoring student progress and generating reports), course authors, and site administrators. Users found the applications useful, clear, and pleasing to work with.
(Rails, Javascript, jQuery, CSS, MySQL, Photoshop)
- Designed and implemented an e-commerce subscription system, including advertising, subscriber acquisition, payment, and provisioning for course-taking. It replaced a manual payment and provisioning system that took days to complete with an automated process taking minutes. It also eliminated 90% of acquisition and provisioning errors.
(Rails, Javascript, jQuery, CSS, MySQL, Photoshop)
- Established flexible course provisioning to allow law enforcement agencies to customize courses offered to their officers. This included allowing selection of a subset of courses from the full course catalog, customization of existing courses, and introducing new courses specific to the agency.
(Rails, PHP)
- Developed a web api to allow third parties to sign up students, take courses, and generate progress reports directly from their web sites, without needing to access TRN's front-end.
(Rails, XML)
- Established a web-based digital workflow/asset management system for course production and archiving. This significantly improved the course-development process for collaborating course authors across the world, replacing a frustrating and error-prone email and ftp process with a centralized asset pipeline and repository.
(PHP, Apache/Linux)
- Established a streaming video server to improve the course playback experience for end users.
(Adobe Media Server, Apache/Linux, ActionScript/Flash)
- Replaced an aging learning management system with a more suitable one, a separately-hosted solution that I fully and seamlessly integrated with the main web site.
(PHP, Rails, Javascript, jQuery, CSS, MySQL, XML, Apache/Linux)
- Designed and produced 3D models, animations, motion graphics, and videos for the training courses.
(Cinema 4D, modo, After Effects, Photoshop, Illustrator, Premiere Pro)

Valco Data Systems: Design and development of web-based healthcare applications.
(C#, .NET, JavaScript, SQL)

PRINCIPAL ENGINEER, LEWTAN TECHNOLOGIES – 2 YEARS

Design and development of web-based financial applications.
(C#, .NET, ASP, Javascript, XML, SQL Server)

CHIEF ARCHITECT AND CTO, MUSICPLAYGROUND, INC. – 4 YEARS

Designed and co-developed interactive software for live music performance, used in music education and entertainment. This groundbreaking advancement of interactive music inspired the Rock Band and Guitar Hero line of products. It earned endorsements and praise from Roger Daltrey of The Who, Steven Tyler and Joe Perry of Aerosmith, and Paul McCartney (among other artists). Investors in the company saw a six-fold return. Accomplishments:

- Published seven interactive music products, including a web-based interactive music subscription service, as well as cd-extra projects with Brian May (of Queen) and other artists, and a project for the movie "Rock Star" (Mark Wahlberg/Jennifer Aniston).
- Designed and co-developed the core audio/video engine providing a multithreaded object architecture that rendered fully synchronized and seek-able streams of audio, video, midi, graphics; a performance engine that triggered audio and graphics via custom USB device input; and significant enhancements to audio and visual fidelity over previous industry technologies.
(C++, DirectX, COM, and Win32)
- Designed the security system for the protected delivery and use of the company's media assets, including a seek-able, streaming encryption system.
(C++, DirectX, COM, and Win32)
- Specified a complete e-commerce website, which permitted purchase and fulfillment of hard goods and real-time, secure fulfillment of software and media.
(ASP.NET, SQL Server)
- Improved the efficiency and reliability of the company's software development and media production processes, resulting in a complete product development cycle of two weeks (including QA), and a scalable media production system that produced over 1000 interactive songs and videos.
- Troubleshoot and solved many problems company-wide, including significantly improving input latency, increasing reliability of the master clock, USB driver issues, synchronization issues among media streams, and website implementation issues.

SENIOR PROGRAMMER, THE INTERACTIVE MEDIA LAB, DARTMOUTH COLLEGE – 1 YEAR

Designed and developed the interactive multimedia framework for IML's healthcare education programs. Based on this work, Simon and Schuster published several titles, including HIV&AIDS, a training program for medical professionals. These programs were praised by the US Director of the CDC for their educational and emotional impact.

(C++, Win32, QuickTime)

MEMBER OF TECHNICAL STAFF, BELL COMMUNICATIONS RESEARCH (BELLCORE/BELL LABORATORIES) – 9 YEARS

Designed and co-developed a software simulation of the public telephone network for a real-time telephony network test system. This was early in the history of object-oriented design and was the largest working OO system at the time. It received international attention and influenced the evolution of the C++ language and modern object-oriented development principles and practices. I spoke at national and international conferences with the designers of the C++ language and published several papers on this work.

(C++, Unix)