

University of Arkansas – CSCE Department

Capstone II – Final Proposal – Fall 2022

NWA School For Dogs Project

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Abstract

Our project for capstone is updating the business, NWA School For Dogs Project's website. The problem that we are faced with is that the website is created inefficiently. This leads to problems such as confusing user experience and loss of potential customers. The main objective of this project is to update the website to where it is fully functional with some additional features that will help the business expand to new clients. Our approach to this will be using the MERN stack architecture. This is a variation of the MEAN architecture, which is commonly used to create webpage applications. Using this method will allow us to handle everything needed for the website. (frontend and backend) The significance of doing this project is helping a local business in our community potentially gain new customers, which will allow for growth in their business.

1.0 Problem

The business's website is a bit outdated. They also seem to want to add updated information for their new location up in Rogers. Their older version of the website also wanted to have an online store that allows customers to purchase items they recommend in helping with dog training/pet care in general. However, it seems the updated version removed the tab for that most likely due to that page being designed (frontend and backend) inefficiently. The importance of this problem is the revenue and foot traffic the business can generate from the webpage. Being able to update the webpage can help make a good impression on newer customers and provide a good user experience for all customers visiting the site. The impact of not solving this problem can be loss of potential customers, revenue, and user accessibility. We want this website to be easily understood/navigatable no matter the user's experience with technology.

2.0 Objective

The objective of this project is to create a fully functional website for NWA School For Dogs in order to do this, we will separate this section into chunks we want to really focus on:

- UI Cleanup - Update the entire website's UI to give it a more modern feel. (Especially focus on text alignment)
- Database - While implementing this part, ensure that older users in the database don't get lost and allow for new users to be added. (Enrollment for classes)
- Online transactions - Implement a way to allow users to purchase items efficiently and securely.

3.0 Background

3.1 Key Concepts

In order to do this project, we should familiarize ourselves with a frontend and backend framework for a web application. Our pick for this is the MERN Stack which consists of React.js, (frontend framework) Express.js and Node.js, (backend framework), and lastly MongoDB. (database) The other main concept to focus on is including the business owner in the development process to ensure that the business agrees with our design choices.

3.2 Related Work

For our project, not much needs to be researched or developed. Instead, most of our references will come from documentation of the used languages. As well as good industry practices for webpage development.

What other researchers or developers have accomplished in this project area, including references in [ref number] format, e.g., [1]. What are the problems with those implementations that yours will solve, or why will yours be better or different?

4.0 Design

4.1 Requirements and/or Use Cases and/or Design Goals

- Must allow for users to enroll in appointments, and likewise a database that allows the client to keep track of upcoming appointments.
- The website does not currently have any form of payment processing, but to be a successfully business now that ability is a must. So, we need to implement an api for processing payments.
- Easy to navigate website with minimal clutter.

4.2 [High Level / Detailed] Architecture

Full-Stack Choices:

MERN (MongoDB, Express.js, React.js, Node.js). We chose the MERN tech stack since it is good for Multi-Page Application(MPA) development. A MPA was chosen since it is better for

search engine optimization. Since we are building a website for a business with ecommerce capabilities, it is very important that search engines can reliably parse information to help boost the ranking of their site.

- **React.js Frontend:**

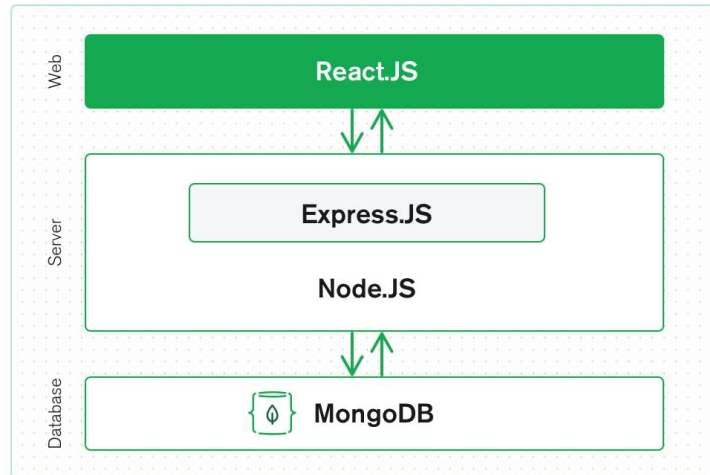
React.js is a javascript framework that allows complex interfaces to be built through components, and then these components can be connected to your back-end server and rendered as HTML. (this is important for SEO since if the actual information is hidden behind javascript on a page then search engine crawlers will not be able to correctly gain all the process all the information)

- **Express.js and Node.js server tier:**

Express.js is server side framework running in a Node.js server. Express.js has powerful models for URL routing and handling HTTP requests.

- **MongoDB database tier:**

JSON documents created by React.js can be sent to the Express.js server where they can be processed and stored in MongoDB.



4.3 Risks

Risk	Risk Reduction
Processing payments	Using an api like stripe for security and

Long development process	The schedule below is meant to keep us on track and to finish ahead of time to account for possible slowdowns that might occur during the dev process.
Slow speed and performance	Keep track of the speed of the web pages and if performance is not up to standards start implementing some processes to help page loading speed. (i.e. image compression, caching, etc.)

4.4 Tasks –

1. Gain full knowledge of MERN tech stack so that the team can work together to develop specific parts.
2. Set up access to devops platform (e.g. Gitlab, Bitbucket, etc.) so that the team can share up to date versions of the application.
3. Set up application and node server
4. Set up database schema.
5. Connect to MongoDB
6. Test DB
7. Start design process for frontend with sketches.
8. Implement frontend.
9. Start developing the website to meet the needs of the client.
 - Implement some form of payment processing.
 - Use MongoDB to help track users and upcoming appointments.
10. Test full application functionality.
11. Launch

4.5 Schedule –

Tasks	Dates
1. MERN tech stack research	9/8 - 9/20
2. Connect with Devops platform	9/21 - 9/24
3. Set up app/node server	9/25 - 9/30
4. Declare database schema	10/1 - 10/5
5. Implement MongoDB	10/6 - 10/10
6. Test DB	10/11 - 10/17
7. Start design process with sketches	10/18 - 10/23
8. Implement frontend	
9. Implement client's needs	10/24- 10/31
10. Test full application	11/1 - 11/10
11. Perform any updates if necessary	11/11 - 11/18
	11/19 - 11/20

12. Launch	11/21 - 11/24
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4.6 Deliverables – Give a thorough listing and description of each item which will be submitted with your final, working project. Each major component should be described. The below is just an example list which should be replaced with your own.

- Design Document: Document containing the general outline for the project.
- Database schema: Schema that the database was initialized with
- Web site code: All code for the web site
- Final Report: Final report document updated with accurate schedule and any new risks or updates we would make to the project.

[The final deliverable to the instructor is a zip file containing all reports and code. Also, all results from the project are posted on your website (except, optionally, any proprietary code).]

5.0 Key Personnel

Khoi Hoang – Hoang is a senior Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. He has completed Database and Software Engineering. Knowledgeable on frontend topics like html/javascript and backend like sql. I will be responsible for _____

Colton McCrea - Colton is a senior Computer Science major in the Computer Science and Computer Engineering Department at the University of Arkansas. They have completed Software Engineering, Networks, and Database Management. They will be responsible for .

Sebastian Vivo – Lastname is a junior/senior Computer Science/Computer Engineering major in the Computer Science and Computer Engineering Department at the University of Arkansas. S/he has completed relevant courses. List any relevant experience and internships. List what tasks this student will be or was responsible for.

Other students, same format

Champion/Advisor name, Industry champion/professor – *short* bio listing interests – 3-4 lines

7.0 References

[1] Web page, URL

[2] Authors, "Article in Title Case," Conference or Journal, Publisher, Year