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HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Website

Anik, Shahriar Mahmud

Independent University, Bangladesh

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HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Website

By

Shahriar Mahmud Anik
ID: 1830872

Autumn, 2022

Supervisor:

Md. Mahmudul Peyal
R&D Officer
Department of Computer Science & Engineering
Independent University, Bangladesh

Report Chapter on: "Final Report Internship – CSE499"

Attestation

This is to certify that Shahriar Mahmud Anik (1830872) has finished the report HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Website, which was submitted as part of the requirements for the degree of Computer Science and Engineering from Independent University, Bangladesh (IUB). It was finished with Mr. Md. Mahmudul Peyal Sir's guidance and support (Supervisor). I also assure that all of the knowledge I gained during my internship is original. This project's and report's information sources have all been properly acknowledged.

Shahriar Mahmud Anik **20/01/2023**

Signature Date

Shahriar Mahmud Anik

Name

Acknowledgement

First and probably the most important, I want to express my gratitude to Almighty Allah; I have come this far because of His mercy and blessing. It has been an honor to work as an intern for Tritech Building Services Limited. Tritech Building Services Limited employees have been extremely supportive and encouraging. I'd like to thank the Faculty of Computer Science and Engineering for incorporating internship credit into the graduate program's curriculum and allowing me to get a flavor of industry-oriented duties and the field of work that interests me. I'd like to thank my supervisor, Mr. Md. Mahmudul Peyal Sir, R&D Officer in the Department of Computer Science and Engineering at Independent University Bangladesh. He encouraged and directed me throughout this internship and report preparation with his consistent direction, invaluable instructions, intriguing suggestions, and insightful advice. I am grateful to my external supervisor, Md. Shajahan Sharif, Team Leader, Branding and Communication of Tritech Building Services Limited, for his kind support, guidance, constructive supervision, instructions, and advice, as well as for motivating me to successfully complete my internship at Tritech Building Services Limited. My gratitude also extends to all other Tritech Building Services Limited employees who helped me learn so much in my own skill development process and made me feel comfortable in the environment. Finally, I want to thank my family, relatives, and friends for their great sacrifices, good wishes, moral support, helpful advice, inspirations, and encouragements.

Shahriar Mahmud Anik

20 January, 2023

Evaluation Committee

Evaluation Committee

Asif Bin Khaled

Signature

Asif Bin Khaled

Name

Internal Examiner-1 / Panel Member-1

Signature

Mahmudul Islam

Name

External Examiner-2 / Panel Member-2

31.01.2022

Signature

Md. Mahmudul Kabir Peyal

Name

Supervisor of the intern

Signature

Dr. Mahady Hasan

Name

Head, Department of Computer Science & Engineering

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Letter of Transmittal

Mr. Md. Mahmudul Peyal Sir, R&D Officer,
Department of Computer Science and Engineering,
Independent University, Bangladesh.
Subject: Letter of Submission for Internship Report.
Dear Sir,

This is to inform you that I am now submitting my Internship Report as part of my bachelor's degree program in Computer Science and Engineering, with due honor and respect. Working under your active supervision is an impressive accomplishment. This report is based on my internship experience and the work I did at Tritech Building Services Limited. I will be working at Tritech Building Services Limited for four months under the supervision of Md. Shajahan Sharif, Team Leader, Branding and Communication at Tritech Building Services Limited. This internship gave me academic as well as practical experience. The training has enabled me to establish a corporate network. I attempted to make this report as informative as possible using the knowledge I gained during my internship. I followed the instructions and went into enough detail about the relevant fields to write a well-organized internship report. However, I am confident that this report will satisfy the requirements of my internship program. I would appreciate it if you could accept this report and provide feedback. It would make me very happy if you found this report useful and informative in gaining a complete understanding of the situation.

Sincerely Yours,
Shahriar Mahmud Anik
ID- 1830872
Department of Computer Science and Engineering,
Independent University, Bangladesh.

Abstract

The internship is defined as gaining practical experience from various organizations, which aids in the formation of a link between theoretical and practical knowledge. It is critical because this is the first opportunity for a student to gain a thorough practical understanding of various organizations. " HVAC (Heating, Ventilation, Air Conditioning) SYSTEM WEBSITE " project focuses on web development and design for HVAC Products and Client Engagements. I designed two websites for Tritech: one for the CHITTAGONG HVAC system and another for Air Condition BD. The project plan was presented to me by my office supervisor. Then I gathered data, designed the website, and built the project.

In this project, I am attempting to make it user-friendly so that customers can easily gain their specific HVAC product features and solutions. To provide the customer with accurate product information and images. Implementation of a customer support chatbot. Implementing a contact form so that clients can easily contact with company. Furthermore, the website contains a brief introduction to the company as well as a contact us page. There is also a management panel. The website is designed in such a way that the administrator can change almost everything. Almost the entire website is dynamic, allowing the administrator to easily change things. This project has given me some valuable learning opportunities. This initiative has motivated me to do more development-related work. I'm hoping that this experience will help me in my future work.

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Chapter 1

Introduction

Internships are usually connected to a student's academic and professional goals. The internship program helps students figure out exactly their professional preferences and potential. It enables students to apply their theoretical knowledge in difficult real-world scenarios. The Department of Computer Science & Engineering at Independent University, Bangladesh offers an undergraduate program in "Computer Science and Engineering. “The Internship Curriculum is a course in the program. We must complete an internship in a reputed organization where I will be instructed in workplace norms and become acquainted with the industry as part of that course. Currently, I'm working at Tritech Building Service Limited, which is an HVAC Services & Solutions Provider Company. I am working as a WordPress Developer here. In this report, I will discuss the background of my work, a literature review and methodology.

1.1 Overview/Background of the Work

The major problem as an intern was turning academic principles into real-life experiences. Tritech Building Services Limited is where I start my Internship as a WordPress Developer. They give me the opportunity to develop their HVAC services and solutions website.
Without this website, company and customers can face many problems. The company is unable to provide accurate information regarding its product and its features. The consumer, on the other side, did not receive accurate product descriptions and feature information. It is quite difficult for them to communicate with each other.

After completing this HVAC services and solutions website Tritech can generate more business and Solve their issues:

The HVAC industry is highly competitive. Many consumers search for an HVAC company online when they need heating and cooling products, services, and solutions, a well-designed, conversion-driven website with compelling content, attractive images, and good calls to action are important.

1. Serve as a Virtual Salesperson

By offering vital information on your products and services, as well as the features and benefits of doing business with you, your HVAC company's website can act as a virtual salesperson. Much of the information visitors require may be found on the website, allowing you to "close the deal" much more easily and quickly when they contact you.

2. Bring New Customers

When making a shopping choice, 90% of shoppers consult search engines. A user-friendly website that delivers helpful, relevant, and up-to-date material will rank higher in search engines – for your goal keywords in your target market — than those that are not well maintained or haven't been updated in years.

3. Make it simple for existing customers to find you.

Many of your current heating and cooling customers will use search engines to find your contact information. Having a website that is optimized for the name of your HVAC company will ensure that your consumers can find you easily and fast. Including thorough product and service information on your website allows your existing clients to learn about all of your company's possibilities, which increases the possibility of further sales and business.

1.2 Objectives

The project goals are the objectives that we hope to achieve by the end of the project. The following are the primary goals of this Website:

- To make it user-friendly so that the customers can easily get their specific product features and solution.
- To give proper information about the products with pictures to the customer.
- To make the website dynamic so that the admin can update information easily. And post their products-related blogs.
- Implementation of customer Support Chatbot
- Implementing a contact form so that clients can quickly contact.
- To make a cost-efficient system.
- To build a time-saving system.

1.3 Scopes

The website is made for Tritech Building Services Limited. And this website can be accessed by everybody all over the world. But people around the world can get accurate information about HVAC services and solutions through the website.

Customers can see the industrial and commercial HVAC services, products, and applications after visiting the website. They can also compare product brands and features. They will be able to see the recommended product for industrial and commercial areas. If the customer requires further information, they can get some frequently asked questions and answers from a chatbot, as well as a contact form.

Chapter 2

Literature Review

A literature review is an in-depth evaluation of prior research on a certain topic. A literature review examines scholarly articles, books, and other materials on a certain research topic. In other words, a literature review helps the reader comprehend how the current study fits into the larger body of relevant literature. In such cases, the strategy is frequently the first thing to go, followed by work components.

2.1 Relationship with Undergraduate Studies

Knowledge and skills gained from undergraduate courses have helped develop the "HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Website" project. It would have been more challenging if these courses had not been completed before starting this project. Among the courses are:

● **CSE 303- Database Management:** This was the first course in which I learned how to develop and plan a project. It addressed well-known planning and strategy approaches as the System Development Life Cycle, Rich Picture, Requirement Analysis, Entity Relationship Diagram, Business Process Model and Notation Diagram, and so on. These strategies aided in the development of the "HVAC (Heating, Ventilation, and Air Conditioning) SYSTEM Websites" Strategy.

● **CSE 309- Web Applications and Internet:** This is the course where web application development was learned. It explored a variety of significant industry technologies, including HTML, CSS, Bootstrap, JavaScript, jQuery, PHP, API and others. Because it is a web application developed with web technologies and includes a backend server that had to be delivered to the server correctly, the tools and technologies learned in this course greatly helped in the development of "HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Websites."

● **CSE 307 - System Analysis and Design:** This course has taught the tools and techniques for designing and analyzing information systems. Systems and models Project management, data flow diagrams, decision tables, and decision trees are all approaches for identifying system requirements. Systems analysis, system development life cycle models, application architecture,

user interface design, front-end and back-end design, database design, software administration, hardware selection, and case studies in information systems All of these skills help me to work on these projects.

2.2 Related works

There are some similar web applications or websites on the internet. The
following are a few of them:

LG HVAC [1] : LG HVAC responds to the needs of companies searching for digitalized and environmentally friendly HVAC solutions by utilizing specialist knowledge. LG are the business partner any organization expects, incorporating smart technology into their daily operations and assisting organization at every turn.

Samsung HVAC [2] : Samsung is bringing forward-thinking to Residential, Light Commercial, and Commercial HVAC to assist people in finding the best HVAC system for their needs. Samsung distributes heating and cooling products as part of its commitment to providing HVAC solutions to customers. They also provide training to distributors, spec reps, and contractors to ensure the highest quality service at all stages of our distribution process.

Tritech HVAC [3] : The main objective of the company is to provide engineering solutions in the field of HVAC (Heating, Ventilation and Air-conditioning). Tritech provides all types of HVAC consultancy, design, supply, and installation supports to the customers. High-quality products are imported from renowned manufacturers to fulfil the need for project owners and technical people like architects, developers, builders, and consultants. A group of experienced engineers and skilled technicians are at the service disposal of the clients all the time.

Earnest [4] : Earnest is a Bangladeshi company that develops technology, manufactures, and installs high-quality, energy-efficient Industrial & Commercial Chilling Plants, HVAC, and low-temperature refrigeration plants of all types. By selecting world-class, energy-saving, environmentally friendly cooling solutions.

Chapter 3

Project Management & Financing

3.1 Structure of Work Breakdown

The Work Breakdown Structure is a diagram that shows how a project is broken down into smaller components. To guarantee that our activities were coordinated, we created a work breakdown structure (WBS) for our project. The work breakdown structure (WBS) depicts all scopes, risks, communication points, responsibilities, and costs, ensuring that key deliverables are not overlooked. It is the most effective team brainstorming and collaboration tool. We employed a top-down strategy in our job breakdown structure.

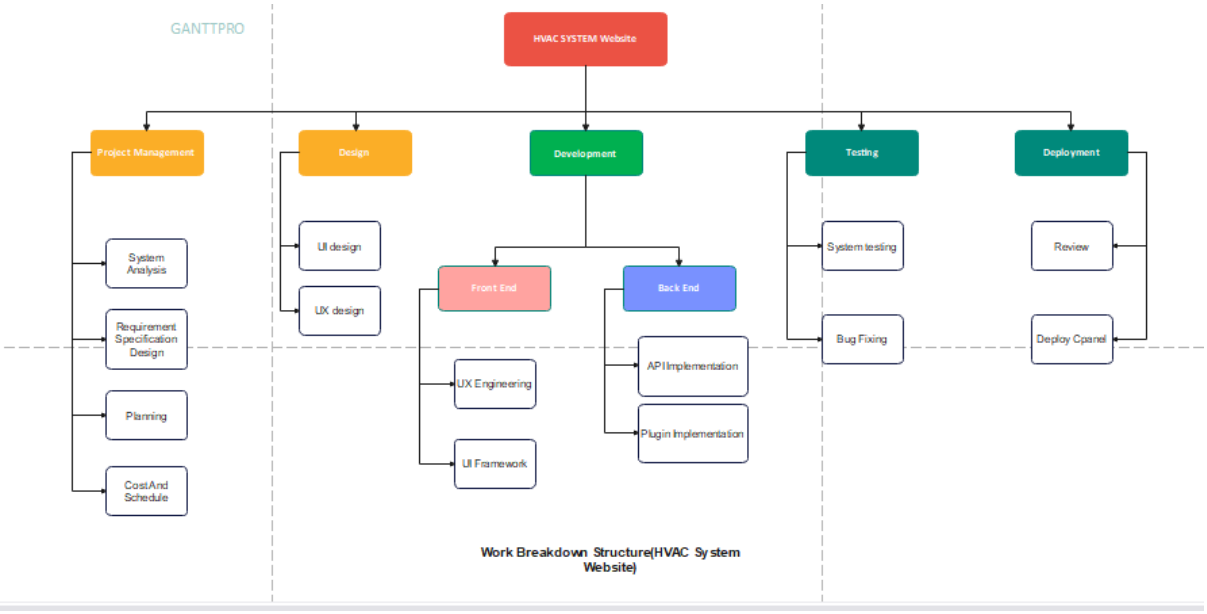


Figure 3.1: Work Breakdown Structure.

3.2 Process/Activity wise Time Distribution

The process-wise time distribution is specified by the projected time required to complete a project. It helps developers in visualizing how efficiently they must work in order to meet deadlines. Time management is the most challenging part of developing a website. As a result, first and foremost, the content must be fixed, and development must take place inside this framework. Time management is the process of planning and managing how much time is spent on certain tasks. Effective time management enables a person to do more tasks in less time, decreases stress, and promotes professional success. Time management is necessary to complete any project. Initially,

the first two weeks are dedicated to learning (16.1% of the work). The core functioning then begins. Five days are required for project planning, five days for data collection, five days for risk analysis, and three days for cost and schedule.

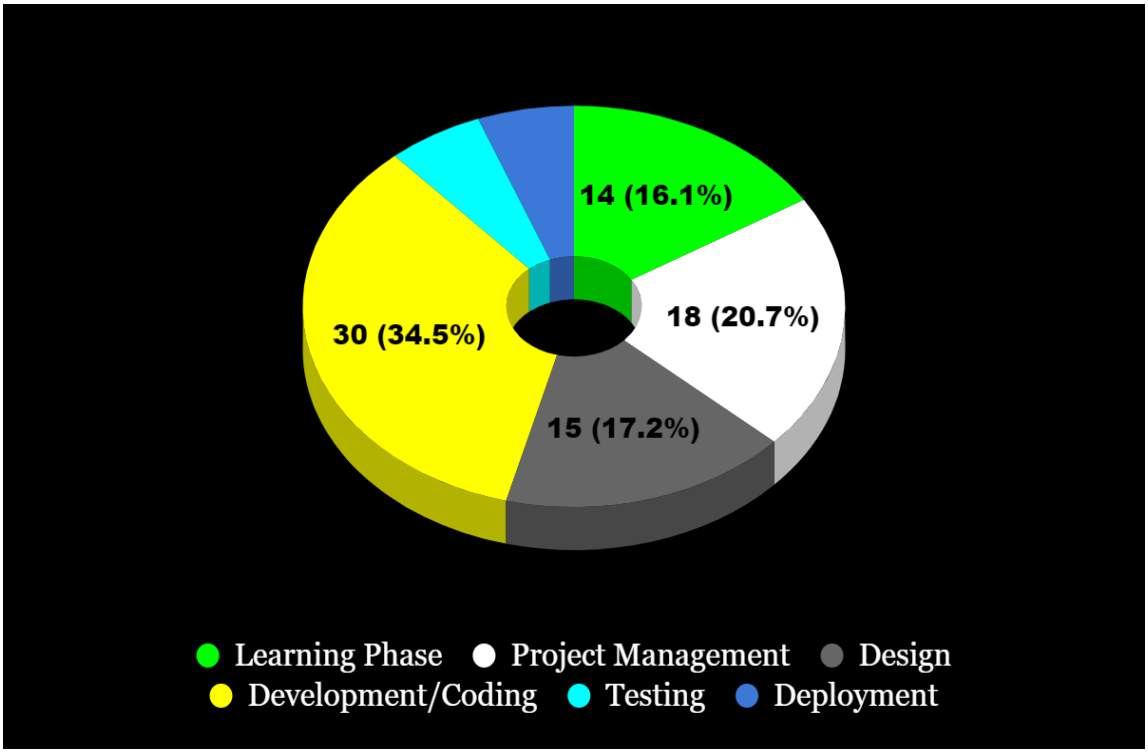


Figure 3.2: Process wise time distribution.

3.3 Gantt Chart

A Gantt chart is a project management tool that can be used for a variety of project planning and scheduling tasks. Nonetheless, it is especially useful for simplifying complex processes. Project management timelines and tasks are translated into a horizontal bar chart that displays start and end dates, dependencies, scheduling, and so on deadlines, how much of each step has been completed, and who is responsible for the work. This is useful when working with a large team and multiple stakeholders. Keep the work on track when the scope changes. The following activities are carried out using a Gantt chart-

- Set up the initial project schedule, which includes who will do what, when and for how long.
- Allocate resources - Make sure everyone understands who is in charge of what.

- Make project changes - Significant changes will be made to the original concept.

I've included a Gantt chart to show the timeline of my project, which is divided into different aspects of the work over the course of our 17-week project. The majority of the time was spent on the design and development process of development. The figure is given below:

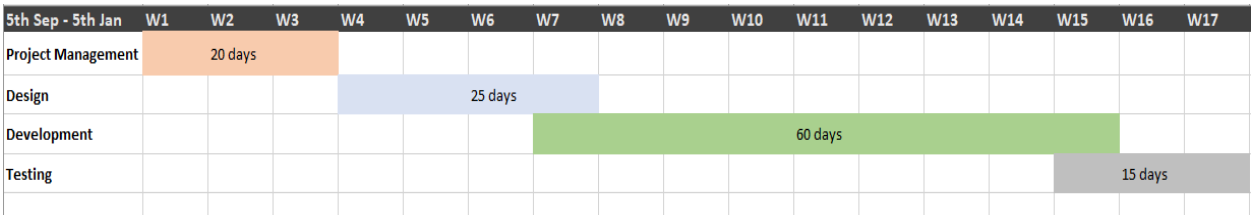


Figure 3.3: Gantt Chart.

3.4 Process/Activity wise Resource Allocation

Allocating assets in a way that supports your team's/company's goals are what resource allocation is all about. The primary resource in this project is the developers, followed by the computers used in the office and the servers required to deploy the project. I think it may take 75 days to complete this project. The entire timeline is approximately a system the following are the specifics of each project step:

- **Project Management:** This is the initial stage of a project. Developers and others spend the first 18 days of the development process defining how to build this project from top to bottom, what approach to take, smaller goals and deadlines, and the overall requirements for completing the project. Computer specifications, software/technologies used to build applications, features, and required developers are examples. This section accounts for 20.7% of all work.
- **Design:** We design the user interface during this phase. We spent nearly three weeks (15 days) designing the application's web page, and management set out to create high-level and low-level project diagrams. This section was responsible for 17.2% of the total workload.
- **Development:** The website is ready for design, and the developer has begun working on the application's front-end and back-end. The whole thing around takes four weeks. It will represent 34.5% of the total work.

- **Test:** The test started as soon as the feature was added to the site. As a result, the developers reviewed everything at once. The application's unit testing began at the conclusion of the implementation phase. It will take five days to complete this procedure. It represents 5.7% of the total effort.

Activity-wise Resource Allocation (Approximately)

Table 3.4: Activity wise Resource Allocation.

Activity	**Days**	**Percentage**
Learning Phase	14	16.10%
Project Management	18	20.80%
Design	15	17.20%
Development	25	34.50%
Testing	3	5.70%
Deployment	3	5.70%

3.5 Estimated Costing

The cost was determined by the functionality requested by the customer for the website. It is determined by the size, requirements, features, and design of your website. It includes pre-made themes, logo design fees, homepage slider fees, and search engine optimization fees. This website was built using SEO, social media connections, and a variety of other techniques. There are tools included. The developer's costs and resources were also taken into account. If additional service support is required within one year of provisioning, additional hosting and domain fees will apply. This Cost will vary in different situation:

Table 3.5: Estimated Cost.

Features	**Cost**
Internet Bill	6000
Domain Bill	5000
Hosting Bill	3000
Developer / Project Manager	50000

Chapter 4

Methodology:

Software Development Methodology is a process or series of processes organized in an organized manner or an arrangement of procedures used in the software development field to develop software by dividing the development work into smaller, parallel, or sequential steps to reduce time and follow a discipline to the development process. It is a broad and vast issue that includes steps such as planning, defining requirements, designing, developing, testing and maintenance. It describes how software should be produced and what discipline should be followed to achieve a successful outcome in a specific time frame. There are different types of software development methodologies and practices, that include:

- Agile
- Waterfall
- Spiral
- Prototype
- Iterative
- Incremental
- Scrum
- Rapid Application Development

For this project, we have decided to choose the Agile methodology. It may sometimes take iterative development too. Agile is one of the most common and popular software development methodologies. It mainly focuses on how to rapidly satisfy the users and their requirements. In Agile methodology, all the tasks are broken down into smaller phases, and requirements and frequent improvements and iteration at all phases.

4.1 Why Agile

The project is created using the agile software development life cycle technique. The agile software development process is one of the simplest and most successful ways to convert a concept for a company's demand into software solutions. Continuous planning, learning, improvement and evolutionary development are components of agile software development methodologies. It enhances one's ability to adapt to change. Agile Development Ensures Success:

Figure 4.1: Agile Method.

The reason we choose this methodology are:

1. Faster development time: Agile follows an iterative discipline. Staying one step ahead of the competition and quickly getting its benefits. Agile methods reduce the development cost and time to release.

2. Flexible Control: Because the Agile approach is based on incremental development, tasks and phases can be broken down into smaller pieces and completed in rapid and iterative cycles. This lets Project supervisors exchange progress, solve concerns, and generate solutions through daily meetings, creating transparency throughout the process.

3. Productivity and Quality: Because the Agile technique is incremental, projects are completed in short periods, making them more manageable. It enables the project to be launched quickly, and development adjustments can be made at any time. It can also discover problems and produce solutions quickly and efficiently, allowing us to gather user input and continuously improve the projects.

And It has more advantages also such as -

- A face-to-face conversation is the best form of communication.
- It continuously gave attention to technical excellence and good design.

- Daily and close cooperation between business people and developers.
- Regular adaptation to changing circumstances.
- Even late changes in requirements are welcomed.

Agile means adapting work methods to meet user needs.

Chapter 5

Body of the Project

For those readers who want to know all that was done in-depth, the report's body provides an in-depth overview of the work. The basic structure of the project outlines what was done, how it was done, the result, and what conclusions and recommendations can be made.

5.1 Work Description

An HVAC is a system that can quickly manage the interaction between clients and the company. In this system, we will develop simpler, faster, and smooth Websites between customers and the company. Clients can instantly obtain product specifications and information from the HVAC website by using this website.

This website overcomes the issue of HVAC product features, information, instant support, services, Supplies and contacts according to users' choices and demands. This system is made up of two parts. These are as follows-

● User Module: Users can see the details of the products and information and call a meeting and discuss their HVAC requirements also users can get detailed
information about HVAC technologies from the website.

● Admin Module: Admin can create new categories of products and blogs. Also, the
admin can update the company's various information.

5.2 Requirement Analysis

Rich Picture:

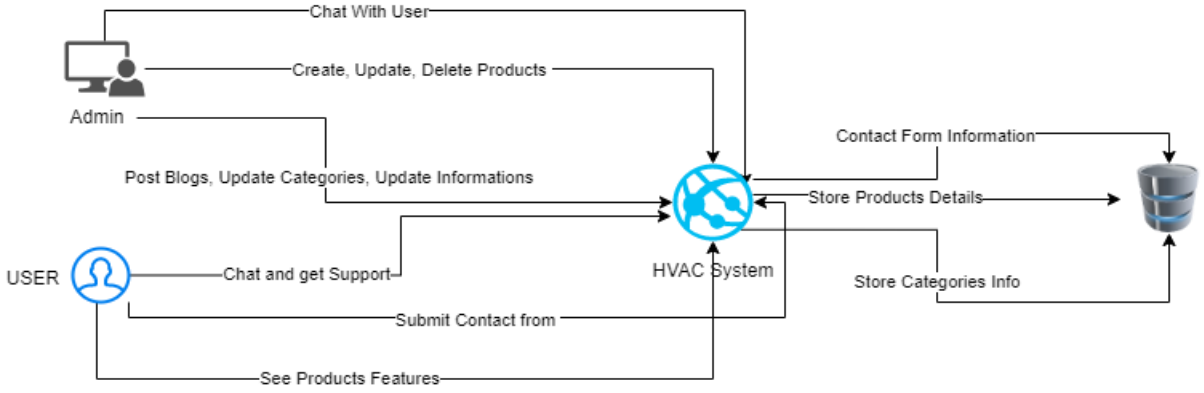


Figure 5.1: Rich picture

Admin can create, update, and delete the Products, categories, and their details. All the things will be stored in the database automatically. Users can see details of the products, can see information about the company, and get support and solutions from the website.

Functional Requirements:

Admin Requirements:

- The admin can add new Product categories.
- The admin can update any Product and blog category.
- The admin can delete any categories.
- The admin can add new Products.
- The admin can update any Products Details and features
- The admin can delete Products Details and features.
- The admin can give HVAC support and solutions with the chatbot.

User Requirements:

- Users can chat with the admin and get support from the website.
- Users can see detailed information about the HVAC Products.
- Users can see detailed information about the Company.
- Users can submit the contact form to schedule a meeting.

Non-Functional Requirements: Nonfunctional Requirements (NFRs) are properties of a system that define things like security, stability, performance, maintainability, scalability, and usability. They work as limitations or restrictions on the system's development across the different backlogs.
Database Security: Unauthorized access to the c-panel and database is prohibited, as is reading, and writing information. It must ensure that the client's information is secure.
Reliability Requirement: The HVAC system website should provide a reliable environment for both Clients and Company. Admin should be able to upload, delete, and update new items of HVAC products and categories without any error. And give services and solutions.

Usability Requirement: The system is designed for a user-friendly environment and is easy to use.

Availability: The system should be operational 24 hours a day, seven days a week.

Efficiency Requirement: When all the functionalities are implemented, customers can see their exact information and requirements efficiently.

5.3 System Analysis

System analysis is a problem-solving technique that involves looking at a total system, breaking it into its individual elements, and analyzing how it functions to achieve a specific goal. It is employed in information technology when computer-based systems necessitate detailed examination due to their structure and design.

5.3.1 Six-Element Analysis

Table 5.3.1 : Six-Element Analysis

Process						
	Human	Non-Computing Hardware	Computing Hardware	Software	Database	Communication & Network
Homepage	User	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN
Chatbot	User, Admin	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN
About us	User	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN

Contact Form	User	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN
Admin Dashboard	Admin	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN
Blog posts	Admin	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN
Info update, Delete	Admin	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN
Category Update, Listing	Admin	N/A	Computer/Smart Phone	Chrome, Edge, Firefox and any other browser	SQL Server	WAN/LAN

5.3.2 Feasibility Analysis

The analysis of a proposed project to determine whether it is feasible and should proceed is known as feasibility analysis. The major goal of this analysis is to confirm the design, plan, and strategy. This method can validate assumptions, constraints, decisions, and methodologies. The feasibility analysis has several key components.

They are -

Technical Feasibility: The proposed system's software, hardware, and other technical requirements are assessed in terms of technical feasibility. This evaluates how we intend to give a

product Supplies, services and solutions to clients. Employees analyze supplies, transportation, our company's location, and the technology required to bring it all together. WordPress was used to develop the system. It contributed to the building of a lot more efficient and faster website. Furthermore, these technologies are vital in modern industry and are widely used by a growing community.

Operational Feasibility: The system proposed solves problems and meets system requirements set during the project scope and problem analysis phases, therefore determining its operational feasibility. It is dependent on the project's human resources and necessitates anticipating whether or not the system will be used once it has been developed and implemented. The HVAC System has been developed to be quick and easy to use. Clients and company management will undoubtedly accept it. It is a well-thought-out system. It will be open to individuals of all ages. It helps reduce physical and technological difficulties. This HVAC system does not require extensive technical understanding from users. We hope that this system will be able to fulfil the requirements of the users.

Economic Feasibility: Costs and benefits are identified in economic feasibility. It calculates cash flow and provides monetary values to expenses and benefits. Economic feasibility takes into account development and production expenses. If this system reaches the users, it will be beneficial. On the one hand, it will save time and schedule meetings anytime without any hassle However, depending on the uses, assistance will be provided.

5.3.3 Problem Solution Analysis

The main problem that a web developer must deal with during the web development process is that the requirements are always changing. According to a Stack Overflow Developer poll, 33% of respondents are thinking about creating a website with no specific needs. Before beginning to develop any product, it is important to gather requirements.

The following is a solution to this problem:

- Describe the scope of the project.
- Make no assumptions about the requirements.
- Communication between teams is necessary.
- Make a list of all the prerequisites.
- From the beginning, management or the supervisor should be involved.

Project Management: Multitasking can cause temporary more issues than it is worth. As a result, a good planner must ensure the project is smooth and organized. Keeping up with current market trends: The number of users increases as technology advances; nowadays, everyone is attached to their smartphone, thus being mobile-first or mobile-only is challenging. The solution is to keep updated on market developments.

5.3.4 Effect and Constraints Analysis

Effect: Previously, when the software was not present, the company was unable to provide the clients with online HVAC Services, Solutions, and Support. The old system worked well, but people nowadays are more accustomed to the internet system. Furthermore, people are busy with their many tasks and prefer the online system these days. As a result, the program is developed to solve this problem. We hope that after developing the system, the company will be able to attract more clients and meet their requirements. Customers can also discover which products and solutions the company provides, as well as different information. We hope that the system will be useful to the company.

Constraint: There are some challenges in finding a solution for this system. The company does not provide a clear description of the website interface. Furthermore, they do not provide detailed information on the functionalities. As a result, determining the correct measures for that is a challenge for me. The software's budget is one challenge, however, later improvements that reduced a few functionalities. This system served the company well. It saves both time and money.

5.4 System Design

Based on the criteria stated, systems design provides components such as modules, architecture, components, interfaces, and data. It is the process of finding, developing, and designing techniques to satisfy the specific aims and requirements of a company or organization.

5.4.1 UML Diagrams

A UML diagram and its primary actors, roles, actions, objects, or classes based on the UML (Unified Modeling Language) to better understand, update, manage, or keep system

documentation. UML diagrams can represent a project before it begins or after it is completed. UML diagrams can represent a project before it begins or after it is completed. However, the overall goal of UML diagrams is to help teams visualize how a project is or will work.

Use case:

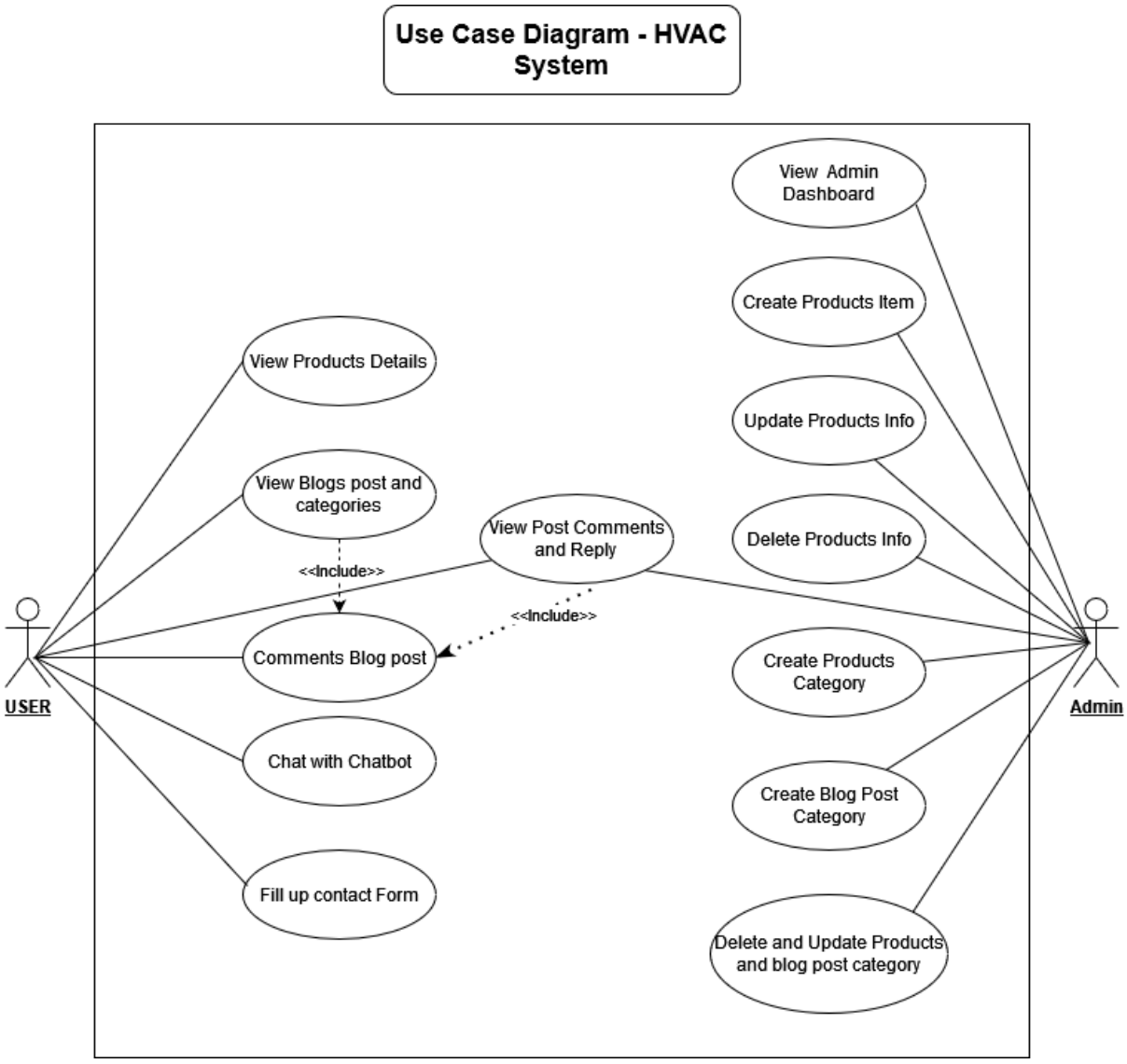


Figure 5.4.1: Use case diagram.

Activity diagram:

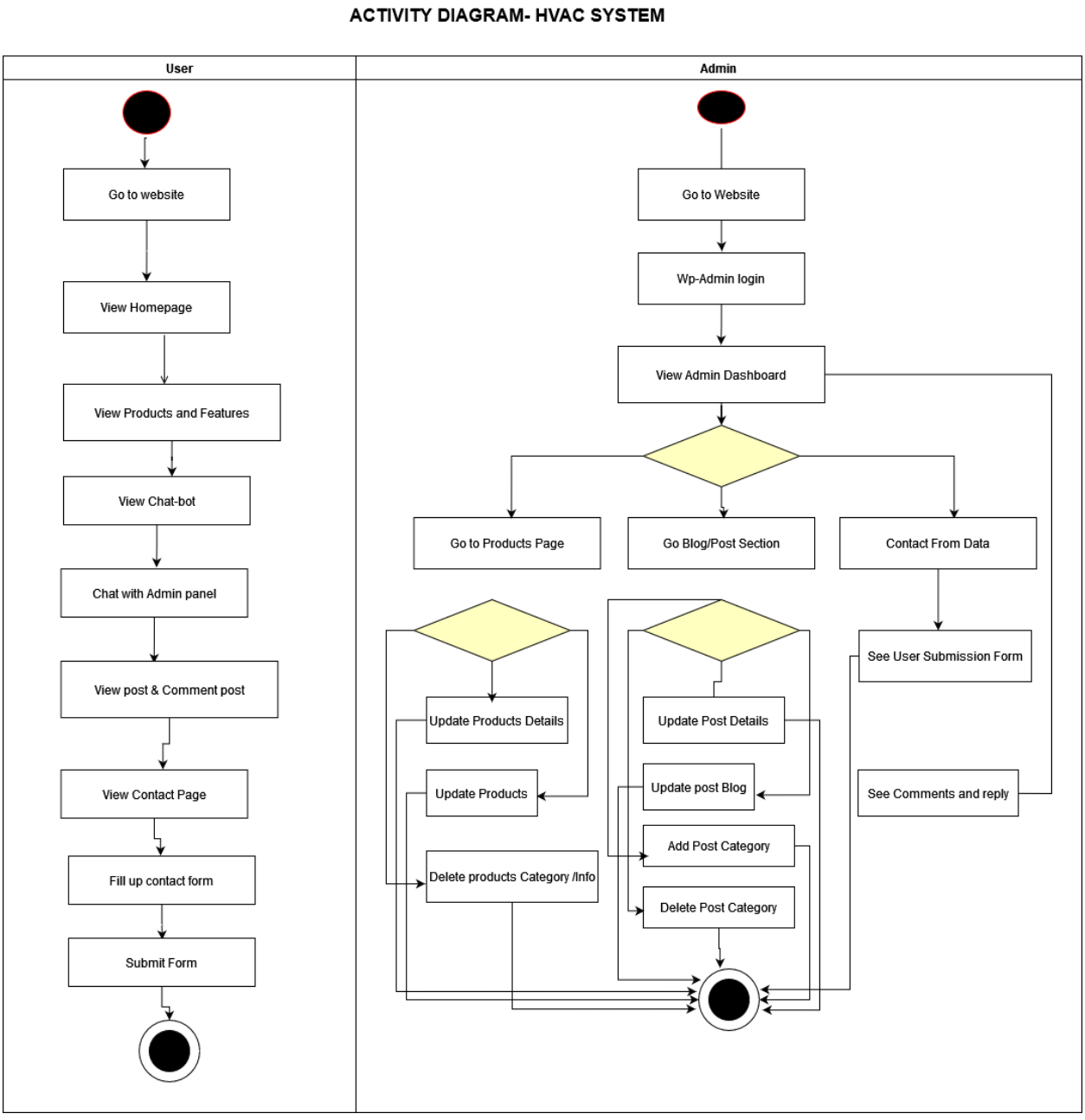


Figure 5.4.2 : Activity diagram.

5.4.2 Architecture

Architecture is the foundation of any structure. It is used to indicate how a system will perform. A website architecture describes the design of a website, including how the website will work, how data will be transferred, and where it will be stored. To go through specifics, we can look at the

architecture we developed for our project. Users in our project can only see and interact with the website's front end. Users' requests or commands are received by the front end. Information sends it to the web server, which fetches and stores data from the database before returning it to the frontend as a response to the users.

5.5 Implementation

Software testing is an important part of system quality assurance since it is the last specification, design, and code assessment. Testing is the only part of the software development process that could be viewed as destructive rather than beneficial. A software testing strategy includes software test case creation methodologies into a well-planned series of activities that result in practical software development. Testing is a series of tasks that can be arranged and carried out in an orderly fashion. Program testing strives to ensure software quality by employing methodologies that may be applied to both strategic and small-scale systems inexpensively and effectively.

5.6 Testing

We developing and testing this website parallelly.

Chapter 6

Results & Analysis

6.1 Overview

In this section results or outcomes are shown. This is the final result of my efforts. In this section, I like to show the screenshot of the websites so it can be seen how the actual websites look like:

Two websites I worked –

1. **HVAC CTG (https://hvacchittagong.com/)**
2. **Air Condition BD (https://aircondition.com.bd/)**

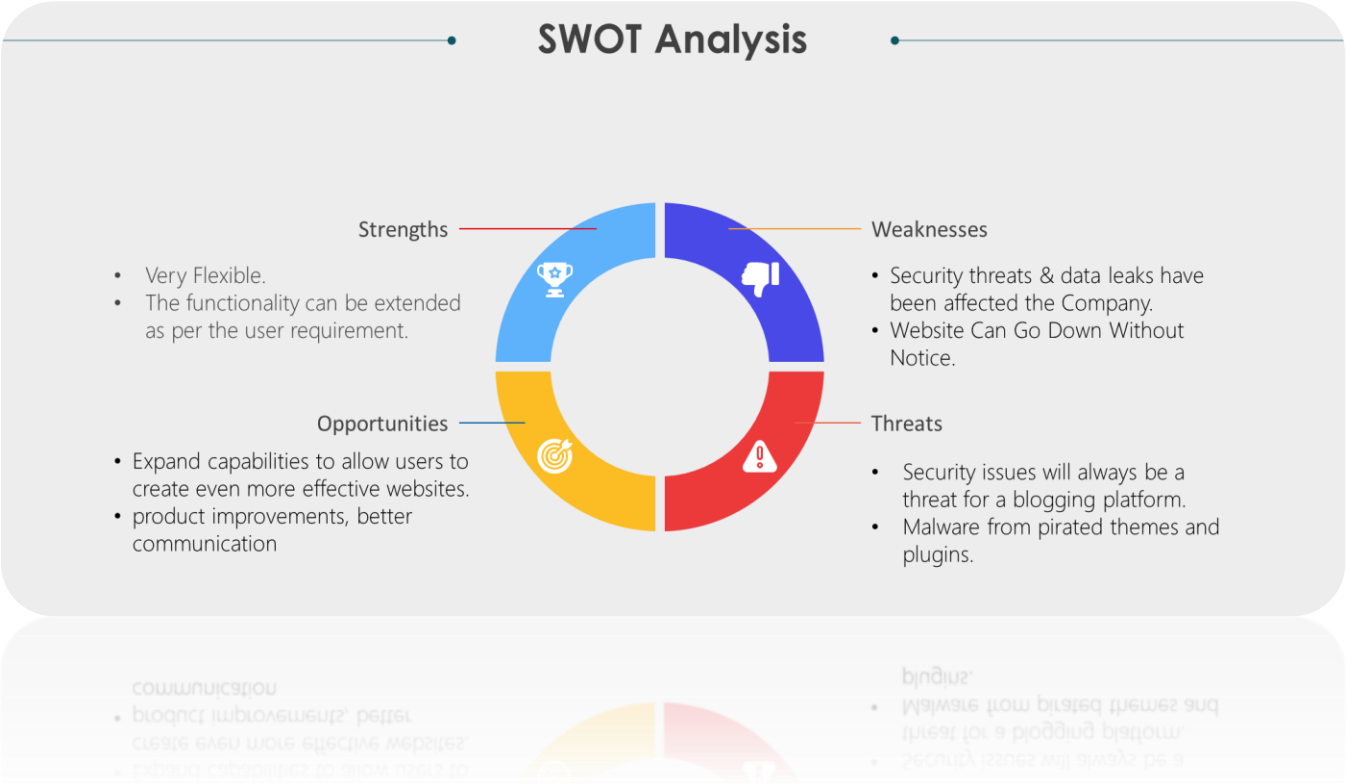
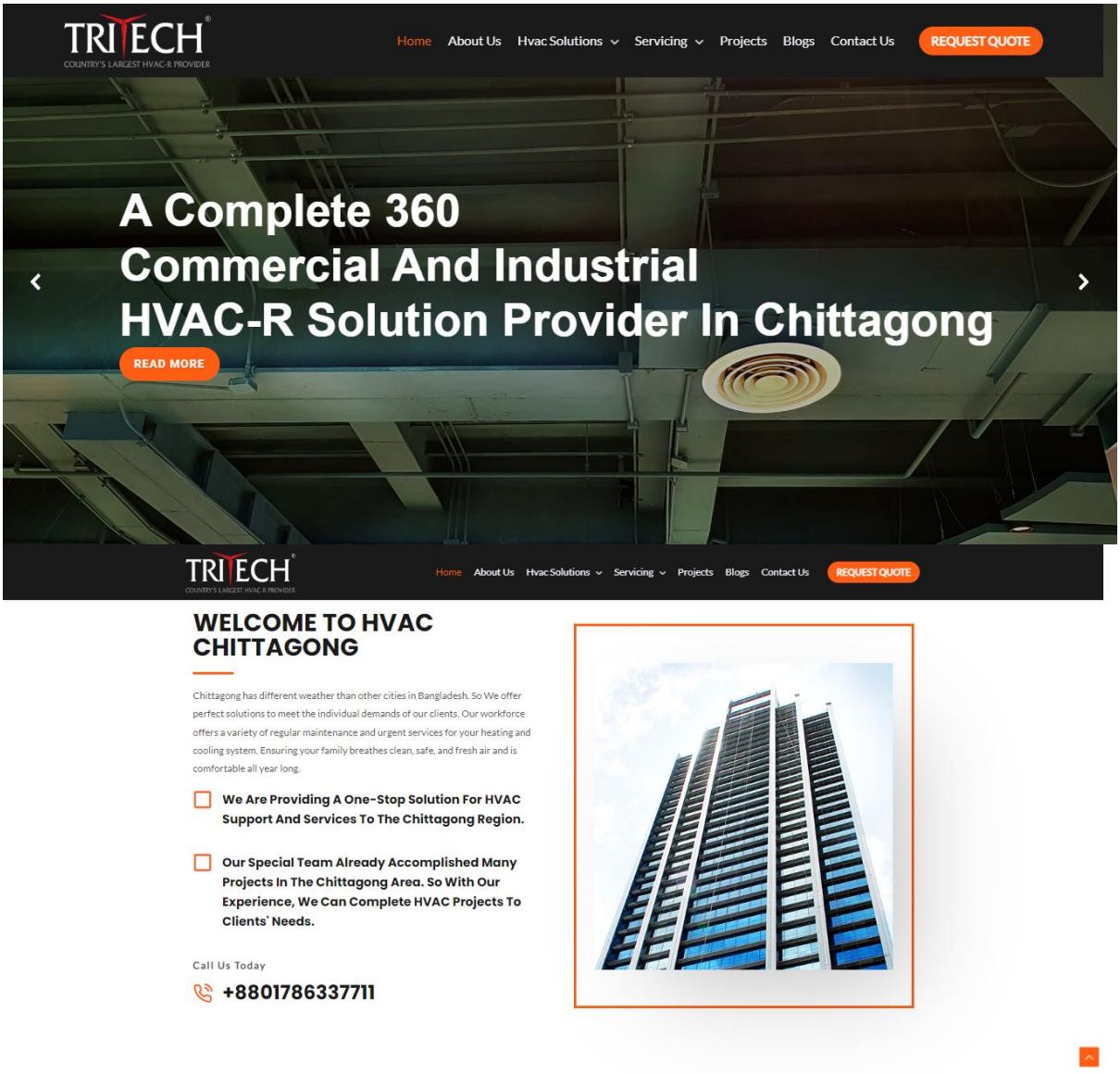
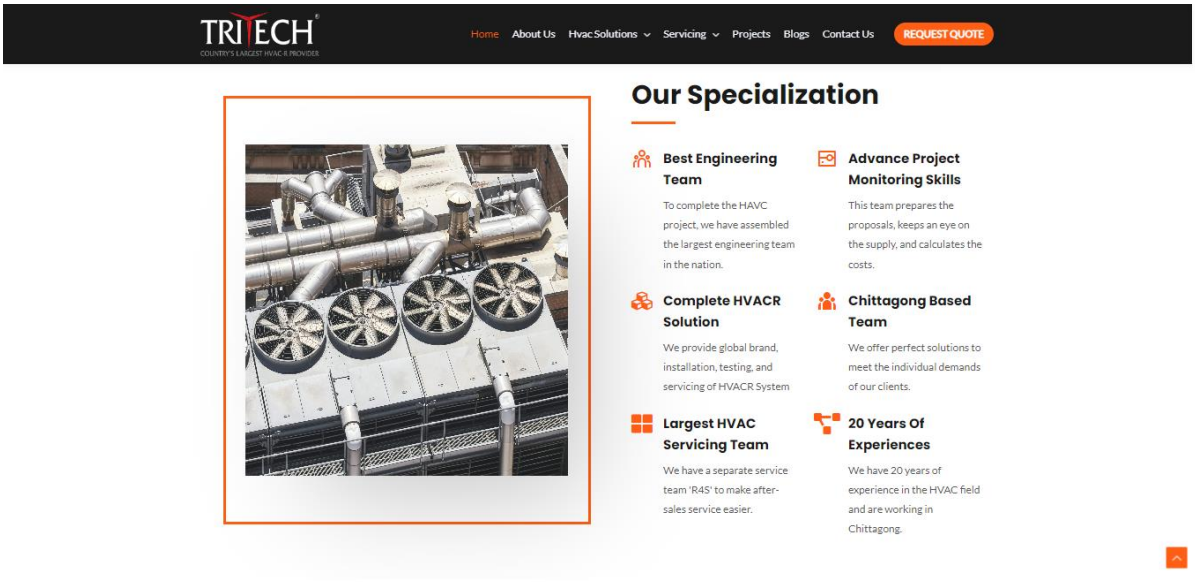
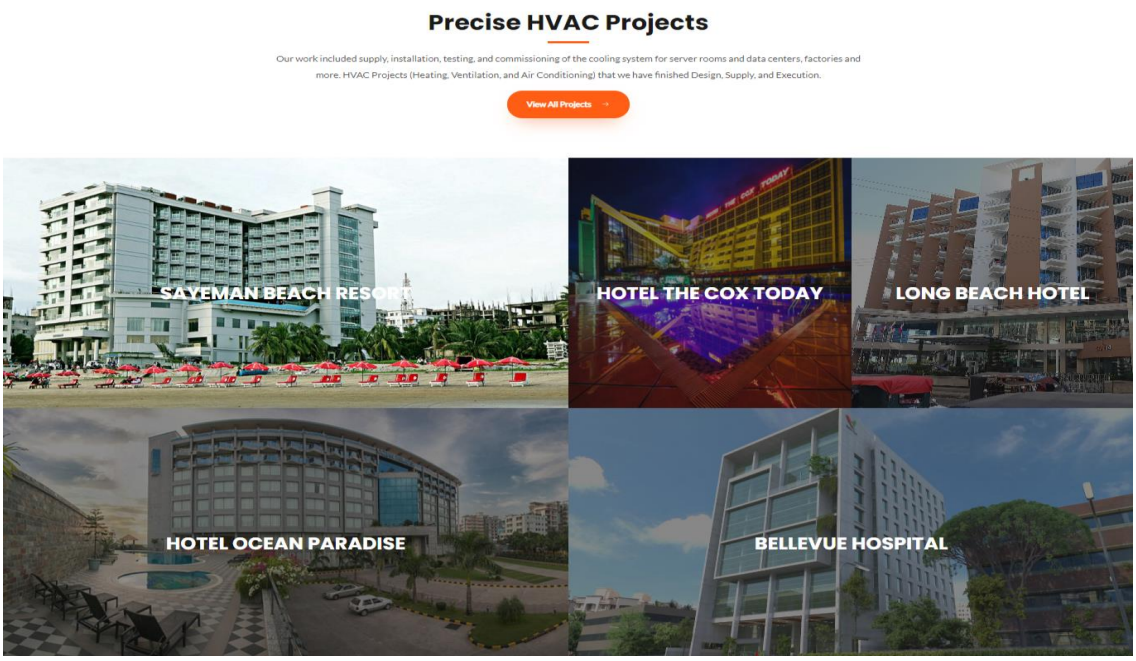


Figure: SWOT Analysis.

Home Page:


TRITECH
COUNTRY'S LARGEST HVAC-R PROVIDER
Home
About Us
Hvac Solutions
Servicing
Projects
Blogs
Contact Us
REQUEST QUOTE
A Complete 360
Commercial And Industrial
HVAC-R Solution Provider In Chittagong
READ MORE
TRITECH
COUNTRY'S LARGEST HVAC-R PROVIDER
Home
About Us
Hvac Solutions
Servicing
Projects
Blogs
Contact Us
REQUEST QUOTE
WELCOME TO HVAC CHITTAGONG
Chittagong has different weather than other cities in Bangladesh. So We offer perfect solutions to meet the individual demands of our clients. Our workforce offers a variety of regular maintenance and urgent services for your heating and cooling system. Ensuring your family breathes clean, safe, and fresh air and is comfortable all year long.
We Are Providing A One-Stop Solution For HVAC Support And Services To The Chittagong Region.
Our Special Team Already Accomplished Many Projects In The Chittagong Area. So With Our Experience, We Can Complete HVAC Projects To Clients' Needs.
Call Us Today
+8801786337711


TRITECH
COUNTRY'S LARGEST HVAC-R PROVIDER
Home
About Us
Hvac Solutions
Servicing
Projects
Blogs
Contact Us
REQUEST QUOTE
Our Specialization
Best Engineering Team
To complete the HAVC project, we have assembled the largest engineering team in the nation.
Advance Project Monitoring Skills
This team prepares the proposals, keeps an eye on the supply, and calculates the costs.
Complete HVACR Solution
We provide global brand, installation, testing, and servicing of HVACR System
Chittagong Based Team
We offer perfect solutions to meet the individual demands of our clients.
Largest HVAC Servicing Team
We have a separate service team 'R4S' to make after-sales service easier.
20 Years Of Experiences
We have 20 years of experience in the HVAC field and are working in Chittagong.


Precise HVAC Projects
Our work included supply, installation, testing, and commissioning of the cooling system for server rooms and data centers, factories and more. HVAC Projects (Heating, Ventilation, and Air Conditioning) that we have finished Design, Supply, and Execution.
View All Projects
SAYEMAN BEACH RESORT
HOTEL THE COX TODAY
LONG BEACH HOTEL
HOTEL OCEAN PARADISE
BELLEVUE HOSPITAL

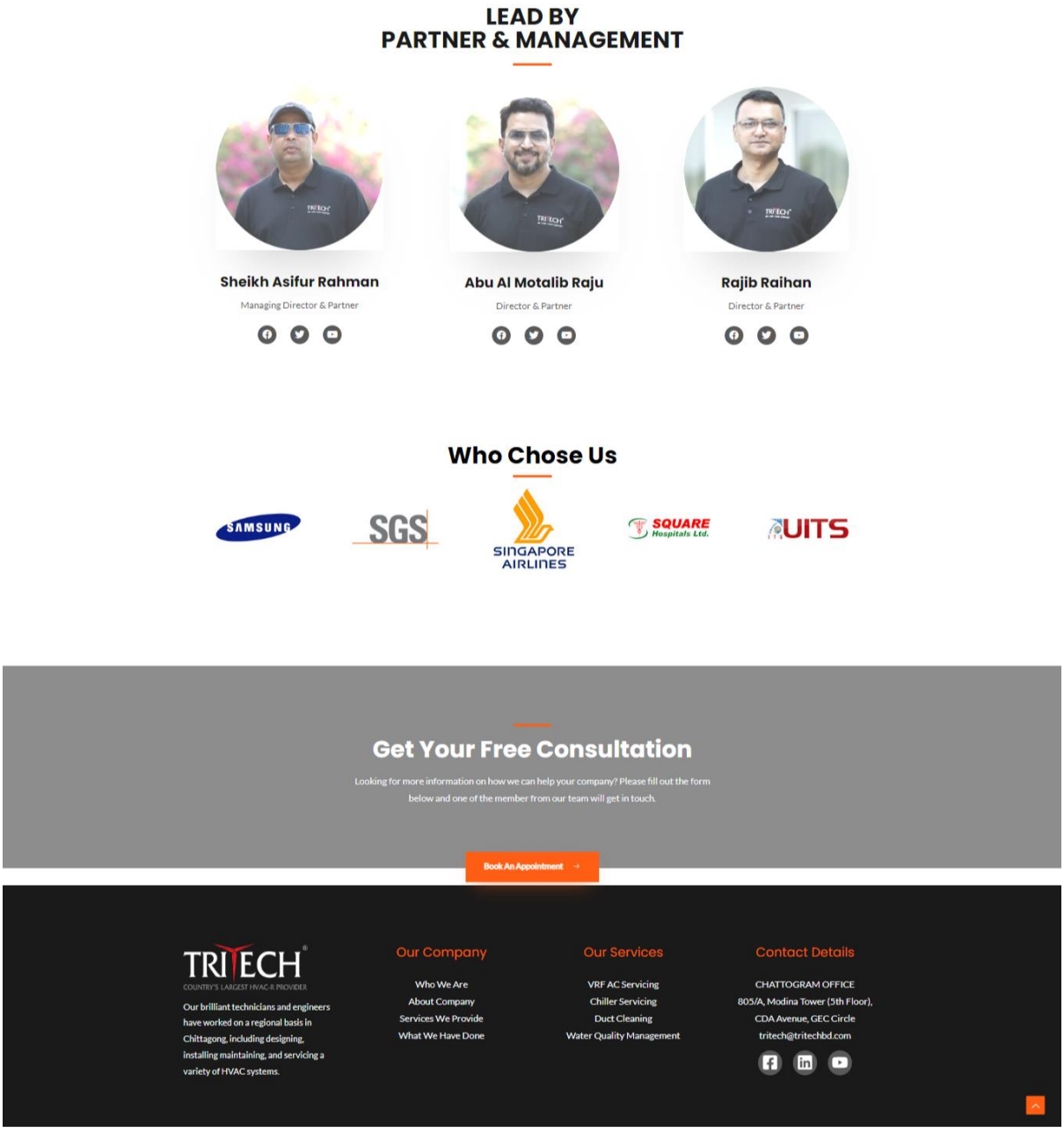


Figure 6.1: Homepage.

These are the screenshots of the homepage. Anyone who goes to the website first sees this homepage. On this page, from the navigation bar, anyone can go to any specific page.

In the next portion, the admin can give any title or information to the users. And the next portion is for the Company Specializations. Here, users can see the categories of products and which one is best for their industrial and commercial uses. When users click the card, a new page will load

with product items under the selected category. And the last part is the footer. In the footer, there is some information about the company. Here also attached some links by which users can go to any other page such as the About us page and so on. The header and Footer are the same on every page for the users.

About Us:

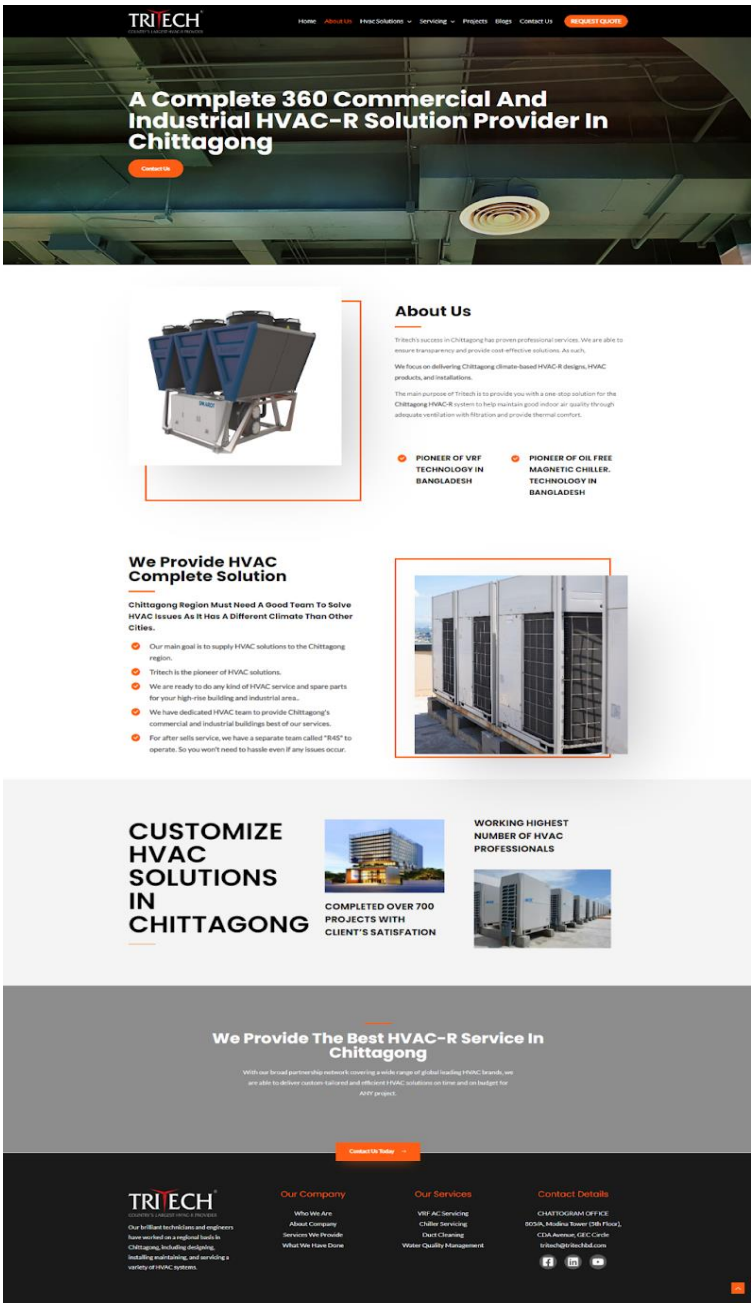


Figure 6.2: About us page

This section users can see the company details and which services the company will provide. Users will get a proper idea of the company.

HVAC Solutions:

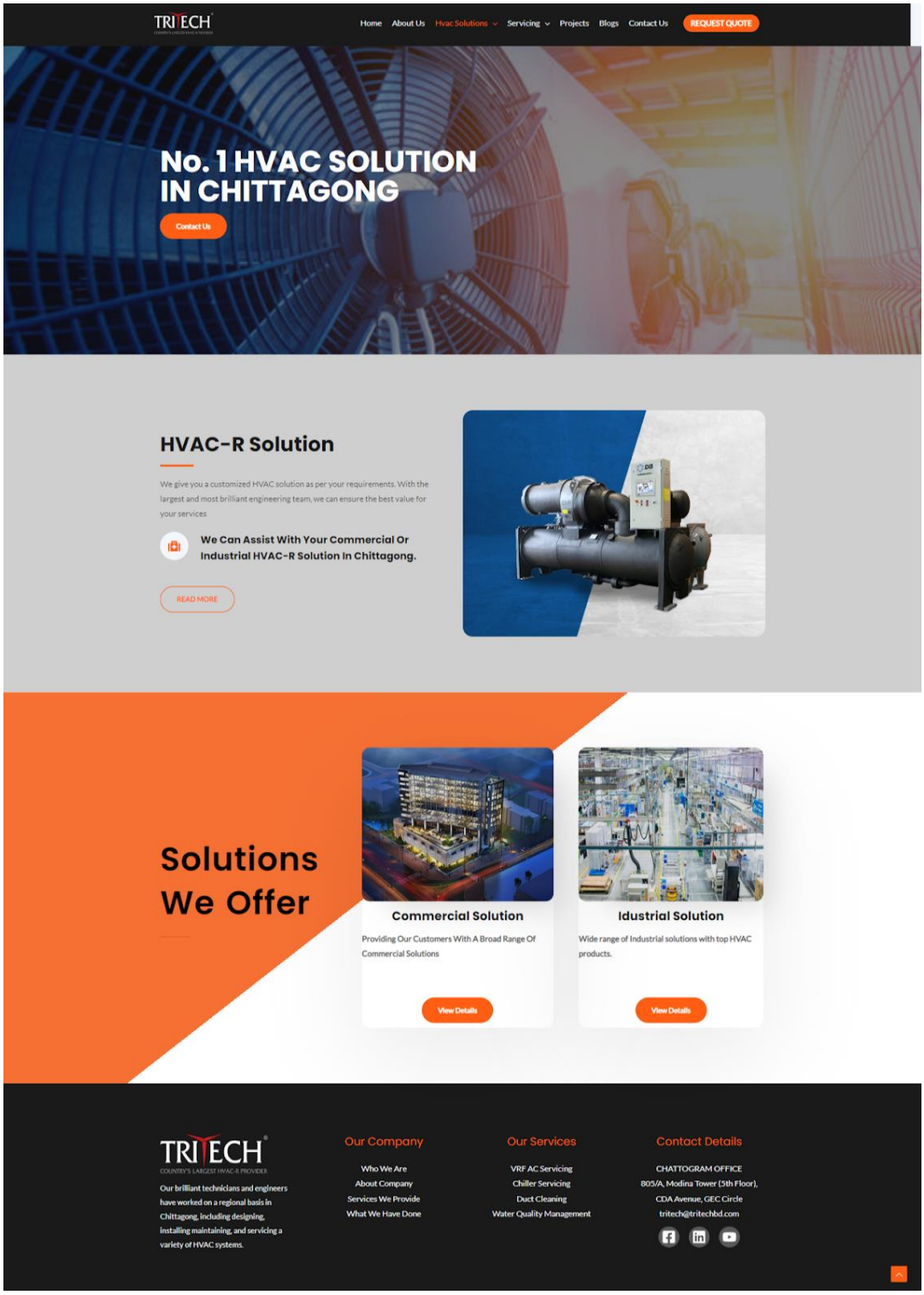


Figure 6.3: HVAC solutions Page

User can see the HVAC solution for industrial and commercial after clicking view details button user will see details HVAC solution for industrial and commercial.

Commercial Page:

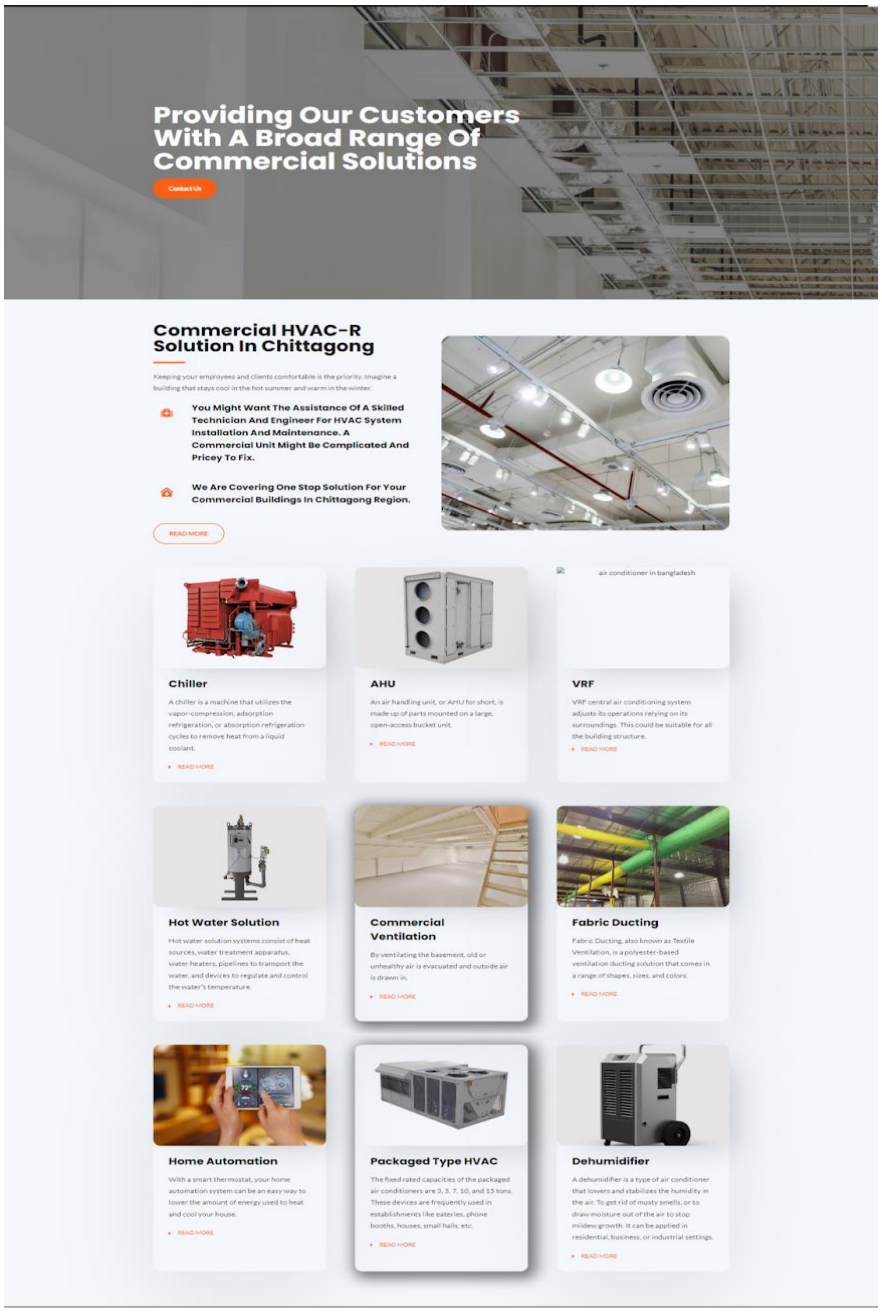


Figure 6.3: Commercial solutions Page

User can see the commercial use products and their features after clicking the products card. And get accurate knowledge of which one is best for user commercial uses.

Industrial Page:

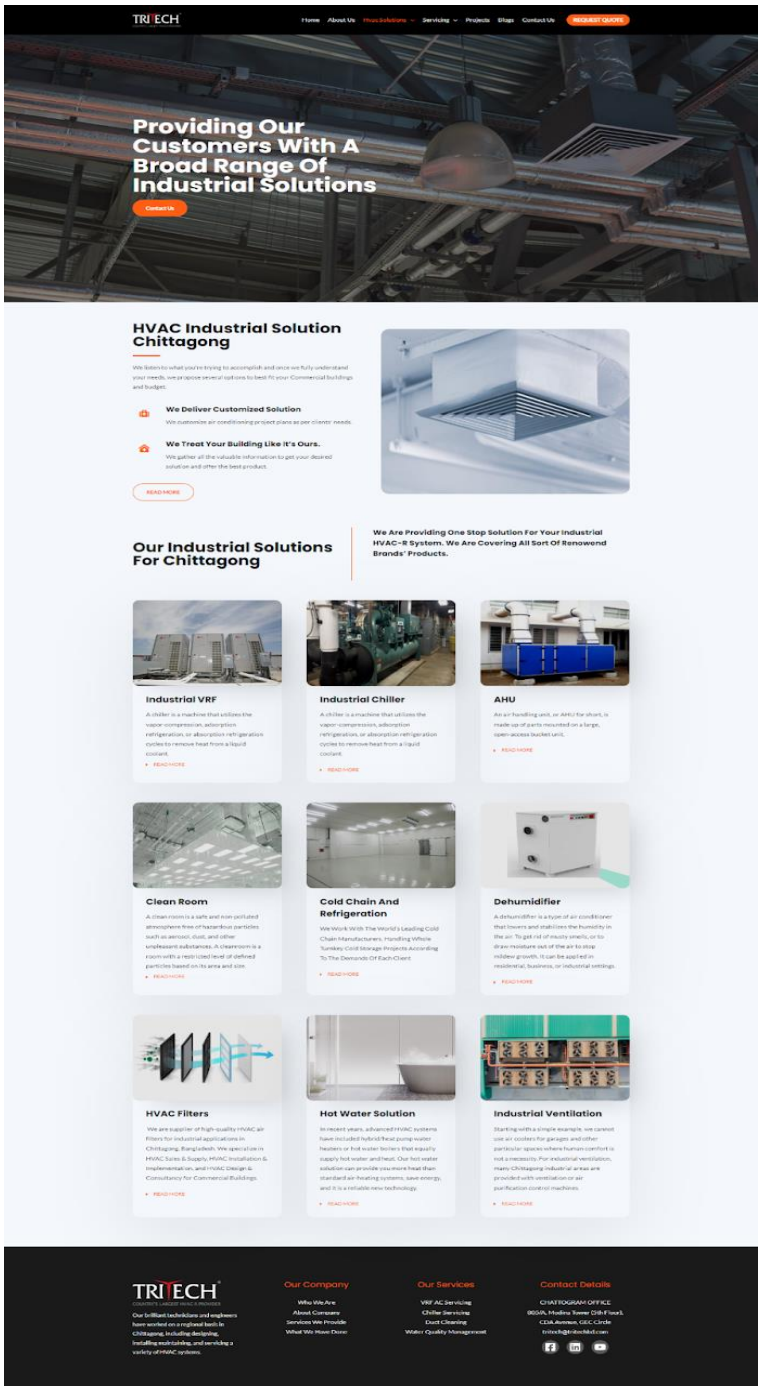


Figure 6.3: Industrial solutions Page

Users can see the commercial use products and their features after clicking the products card. And get accurate knowledge of which one is best for user commercial uses.

Services:

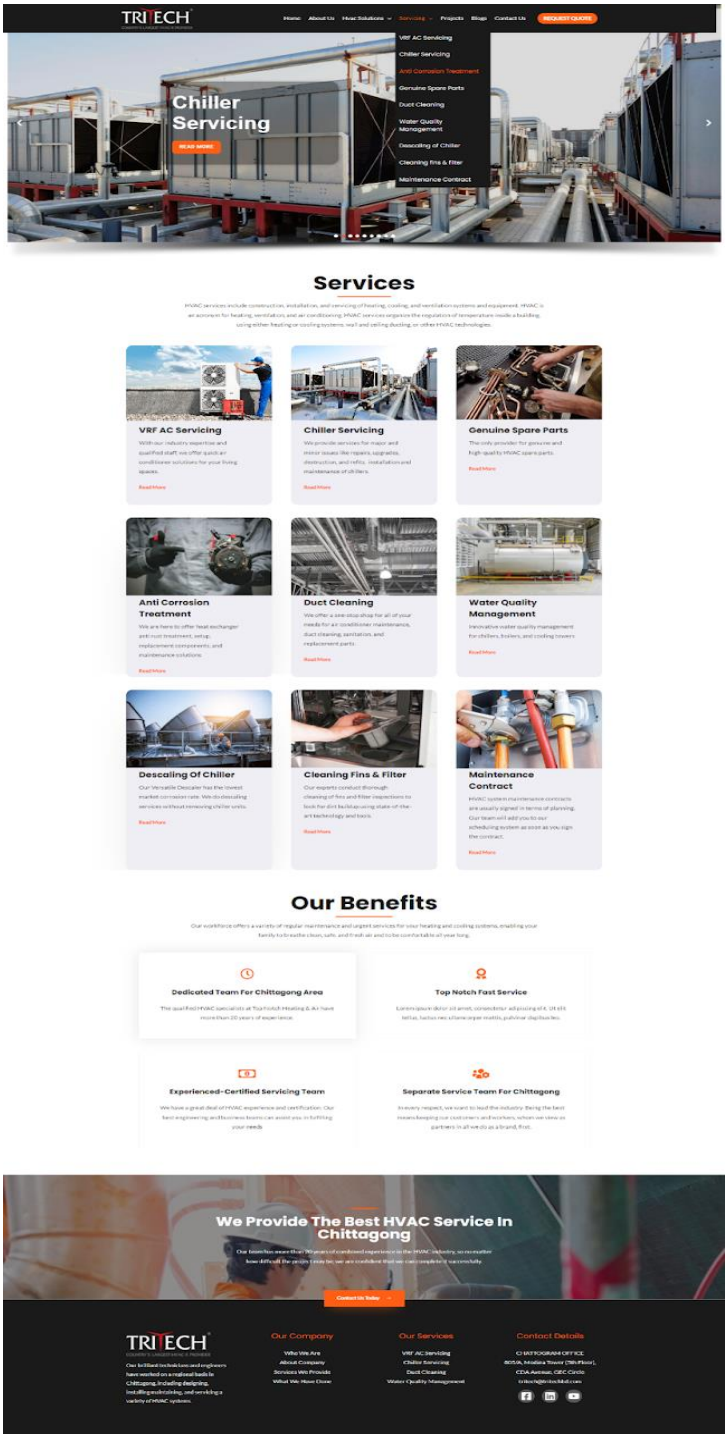


Figure 6.3: Services Page

When the user visits this section and then sees the services after that user will understand which services the company will provide. When the user clicks card user will see more details about services.

VRF Service page:

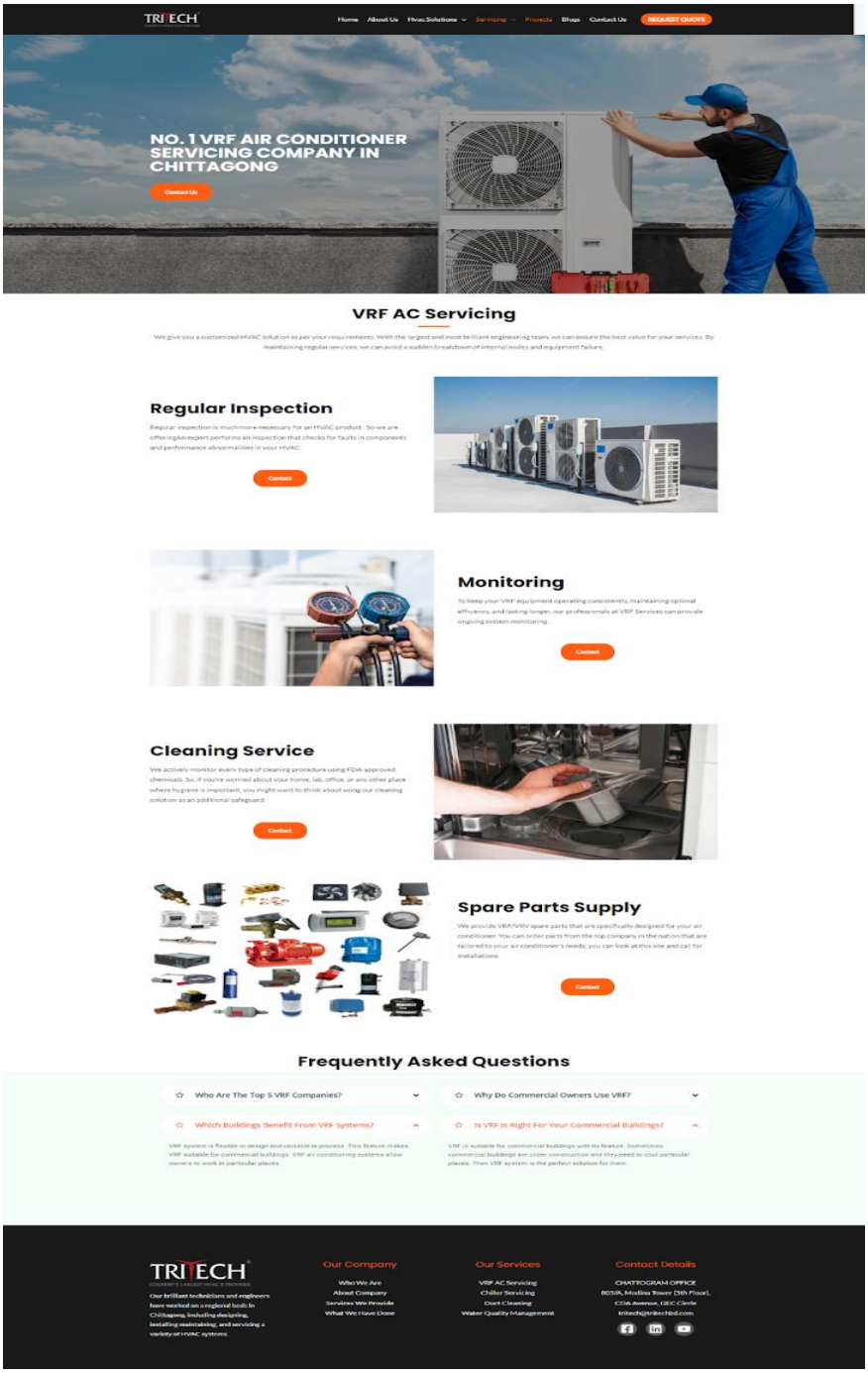


Figure 6.4: VRF Services Page

This page is basically specifically product services. How to product maintain, clean services the user will get this information.

Chiller page:

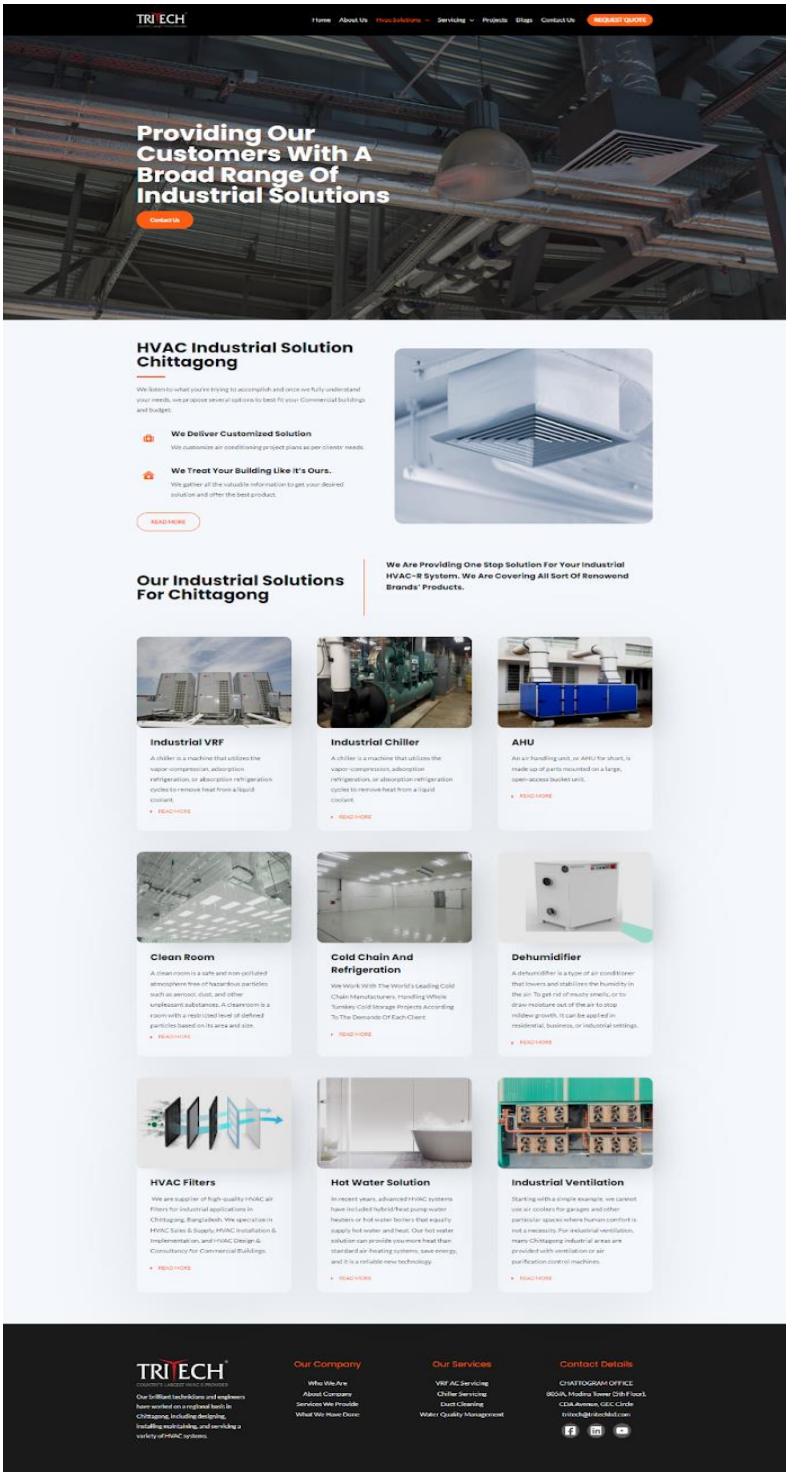


Figure 6.5: Chiller Services Page

Projects Page

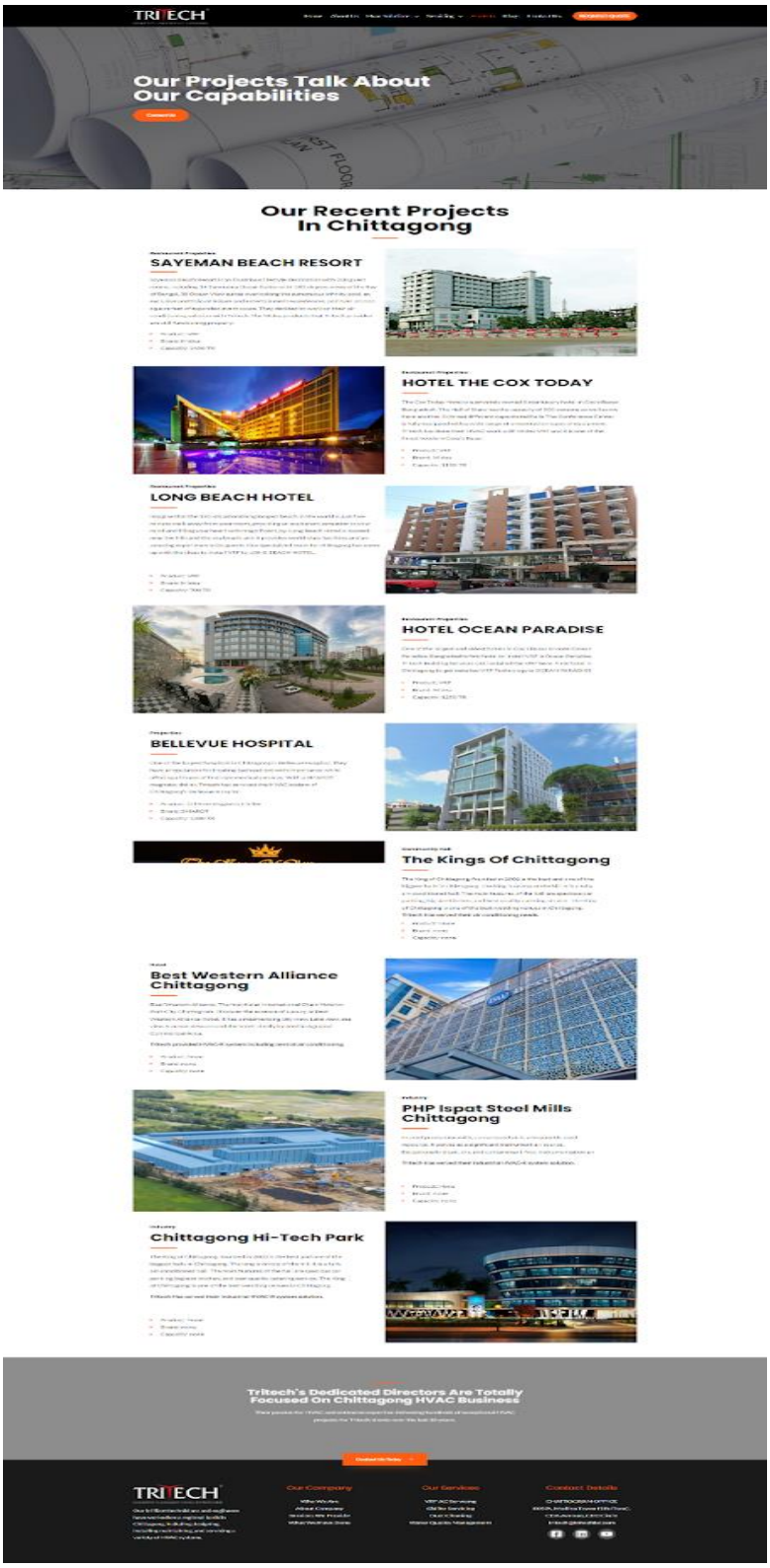


Figure 6.7: Projects Page

The company has already done some projects. So, users can see those project details and get some idea about projects and products.

Blog Page:

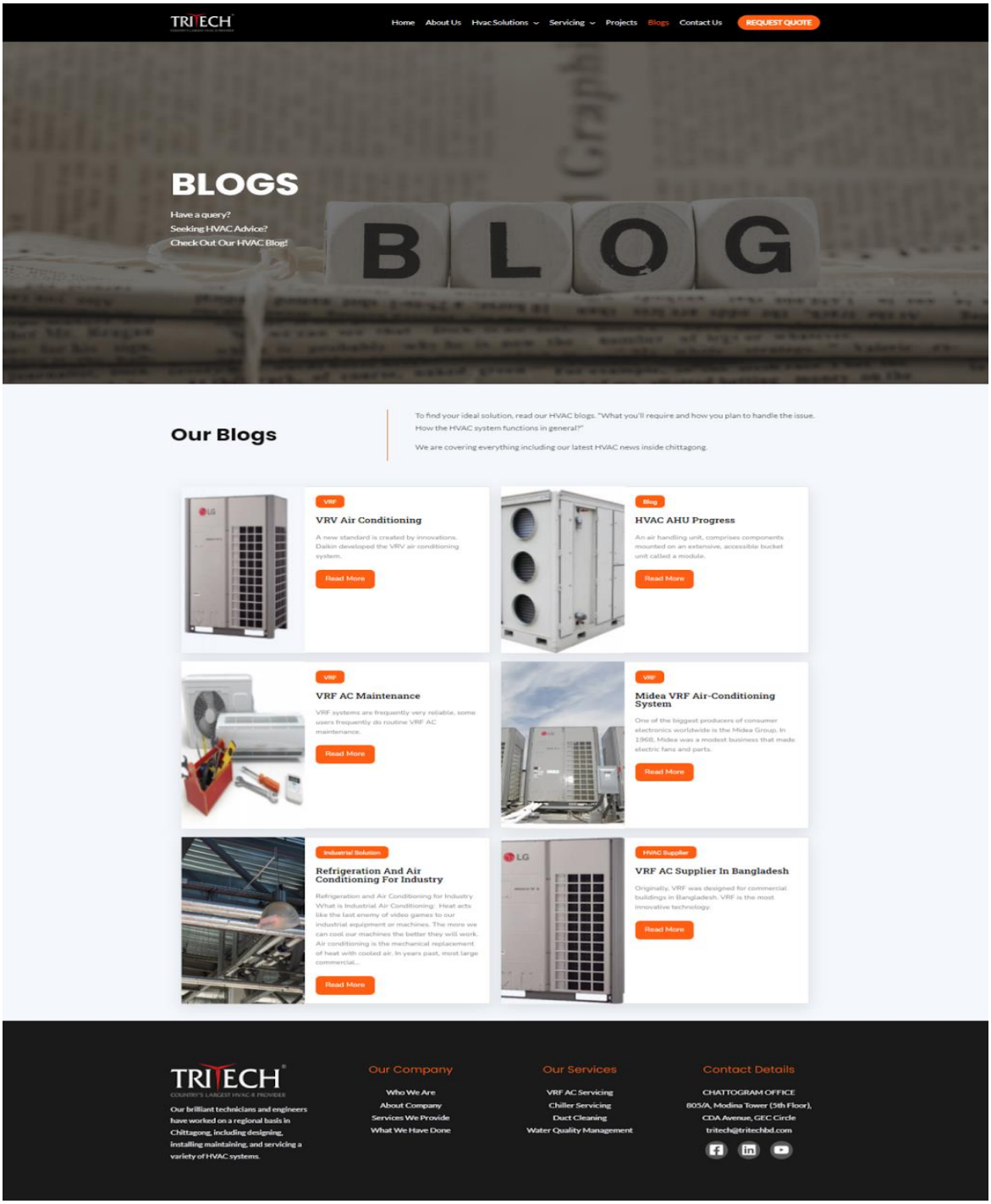


Figure 6.8: Blogs Page

When the users visit the blog section user can see random blogs for products, services, uses of products and maintaining knowledge and information.

Contact page:

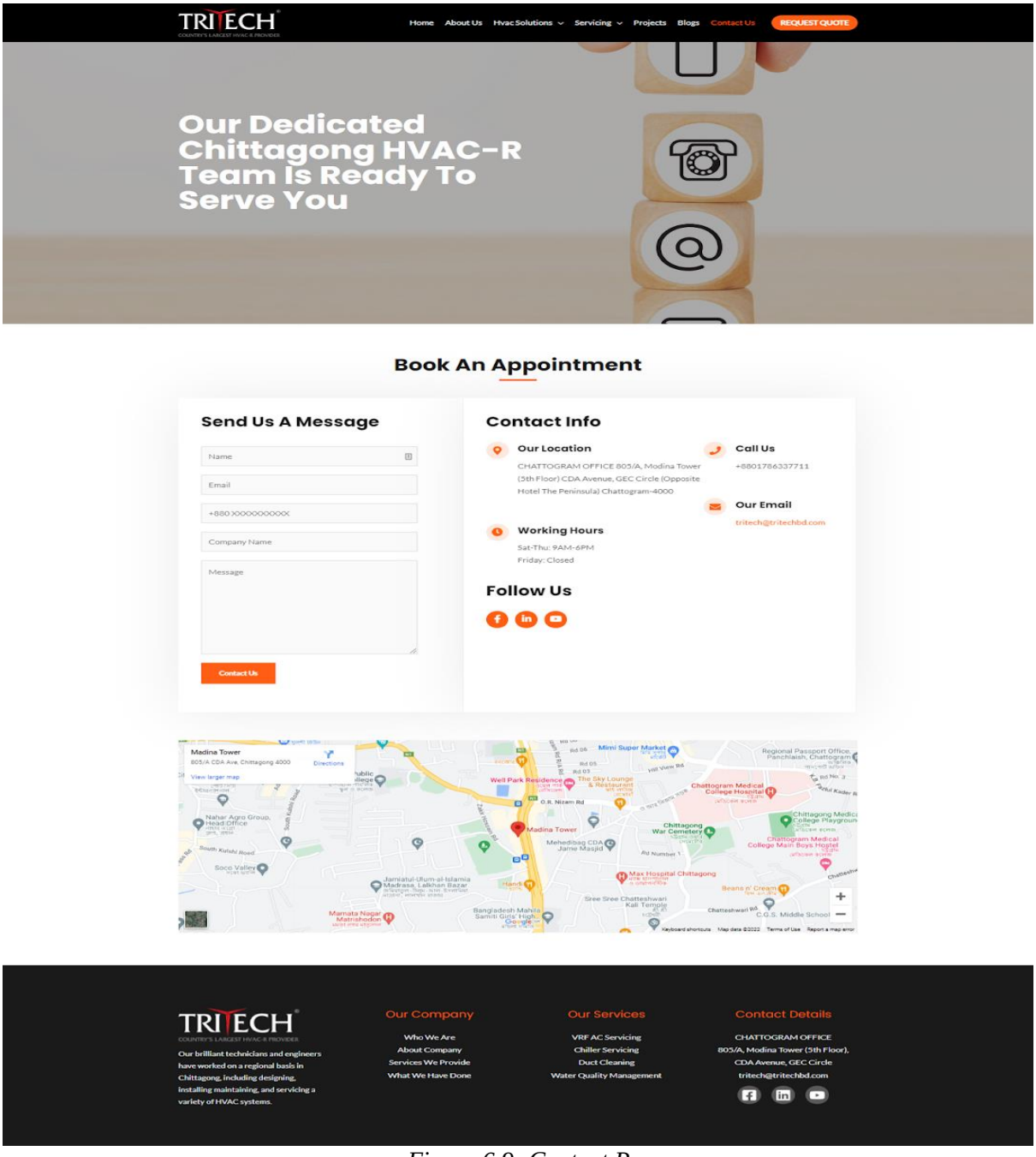


Figure 6.9: Contact Page

Users can easily contact with Company with this form. And admin can see this message and reply with an email or contact number.

Request Quote:

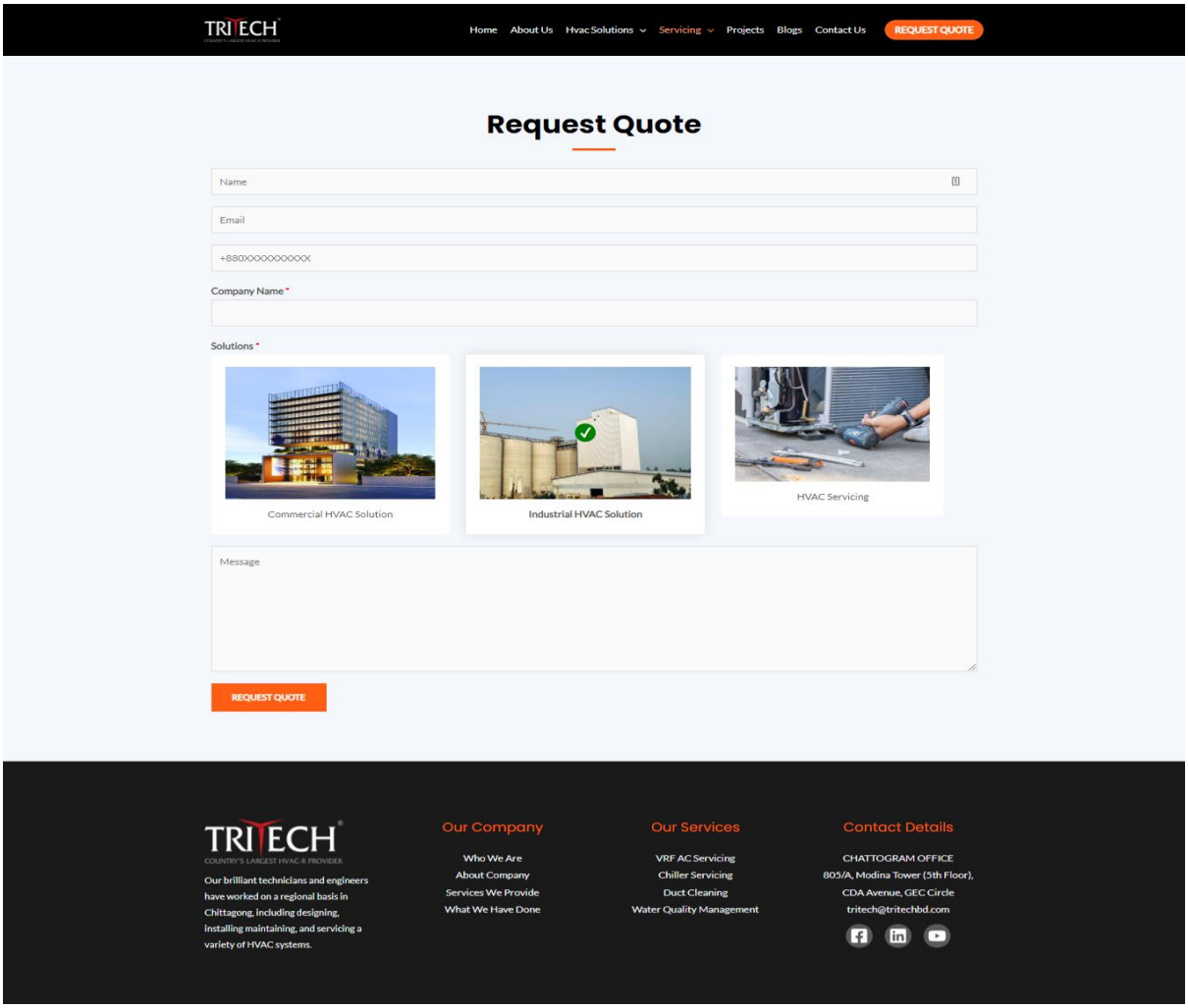
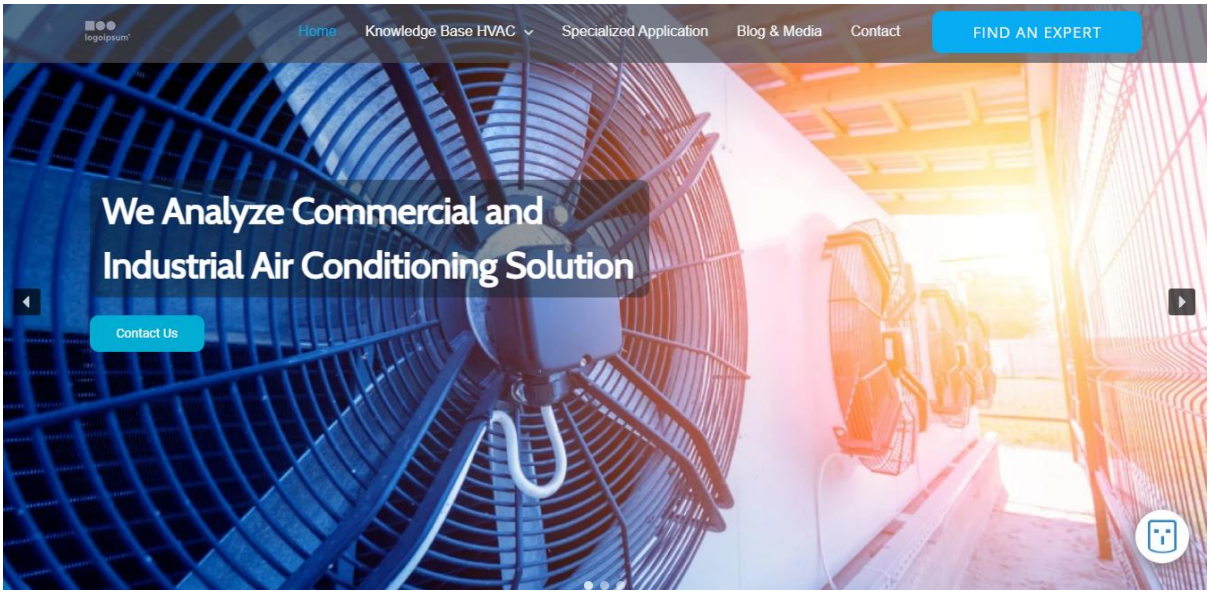


Figure 6.10: Request Quote Page

Users can easily contact and tell their requirements with this form. If the user wants to know about product features, services and maintenance, the user can fill up this form and And admin can see this message and reply with an email or contact number.

Air Condition BD: (https://aircondition.com.bd/)

Homepage

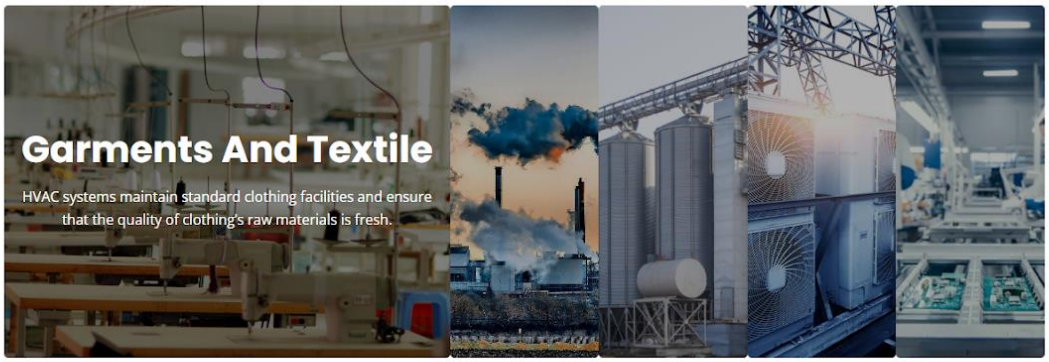


Commercial HVAC

Commercial HVAC covers large commercial structures such as hospitals, shopping centers, government buildings, and hotels with controlled air conditioning, ventilation, and heating systems.

Industrial HVAC

Industrial HVAC systems protect factories from accidents and products. Most importantly Industrial HVAC systems meet Textile, Seed Industry, Steel manufacturers, and Pharmaceutical Industry's demandable environment for production.



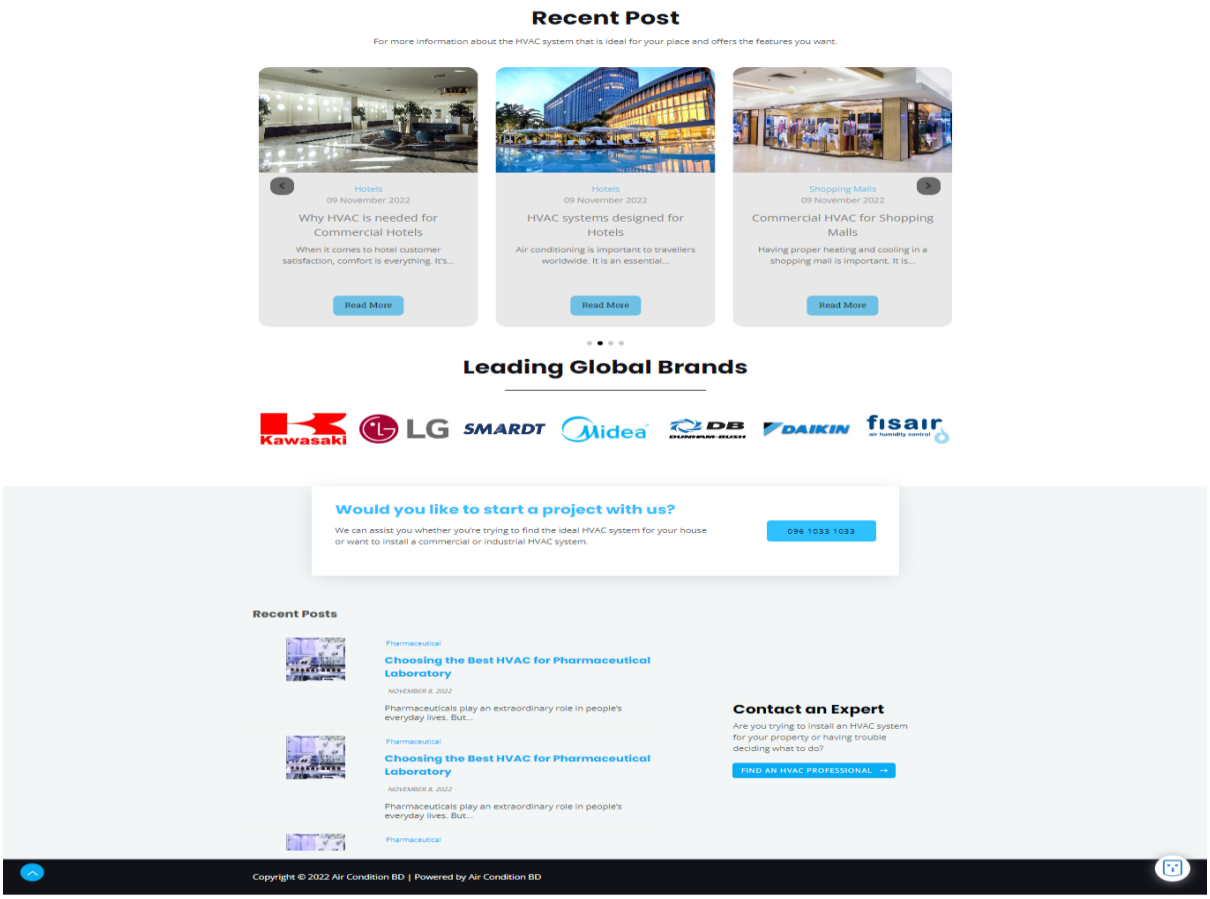
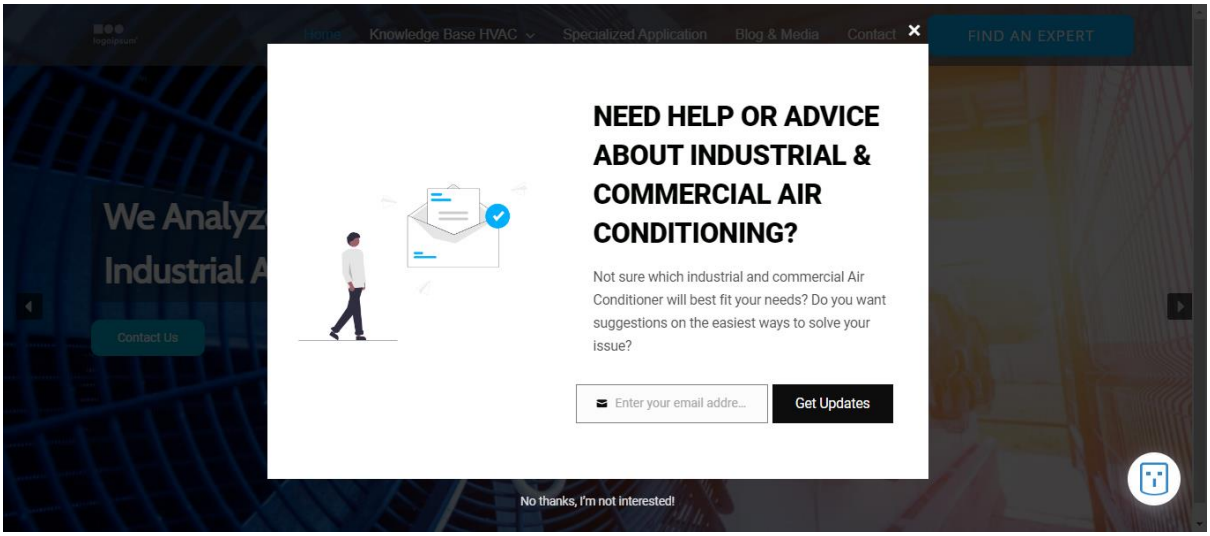


Figure 6.11: Homepage

These are the screenshots of the homepage for Air Condition BD. Anyone who goes to the website first sees this homepage. On this page, from the navigation bar, anyone can go to any specific page. In the next portion, the admin can give any title or information to the users. And the next portion is Industrial HVAC and Commercial HVAC uses. Here, users can see the categories of Industrial and commercial and which one is best for their industrial and commercial uses. When users hover the card and click it, a new page will load with specific details part under the selected category. The next part is a recent blog or post Carousel user read and gets information about the product, services and maintenance. And the other part is the Global Brand which brand is working with the company. And the last part is the footer. In the footer, there is a recent post section. Here also attached some links. The header and Footer are the same on every page for the users.



This is a pop-up banner. When the user visits the homepage and wait 50 or 60 seconds. A popup message will show and the user will get an update if the user provides email.

Knowledge Base HVAC:

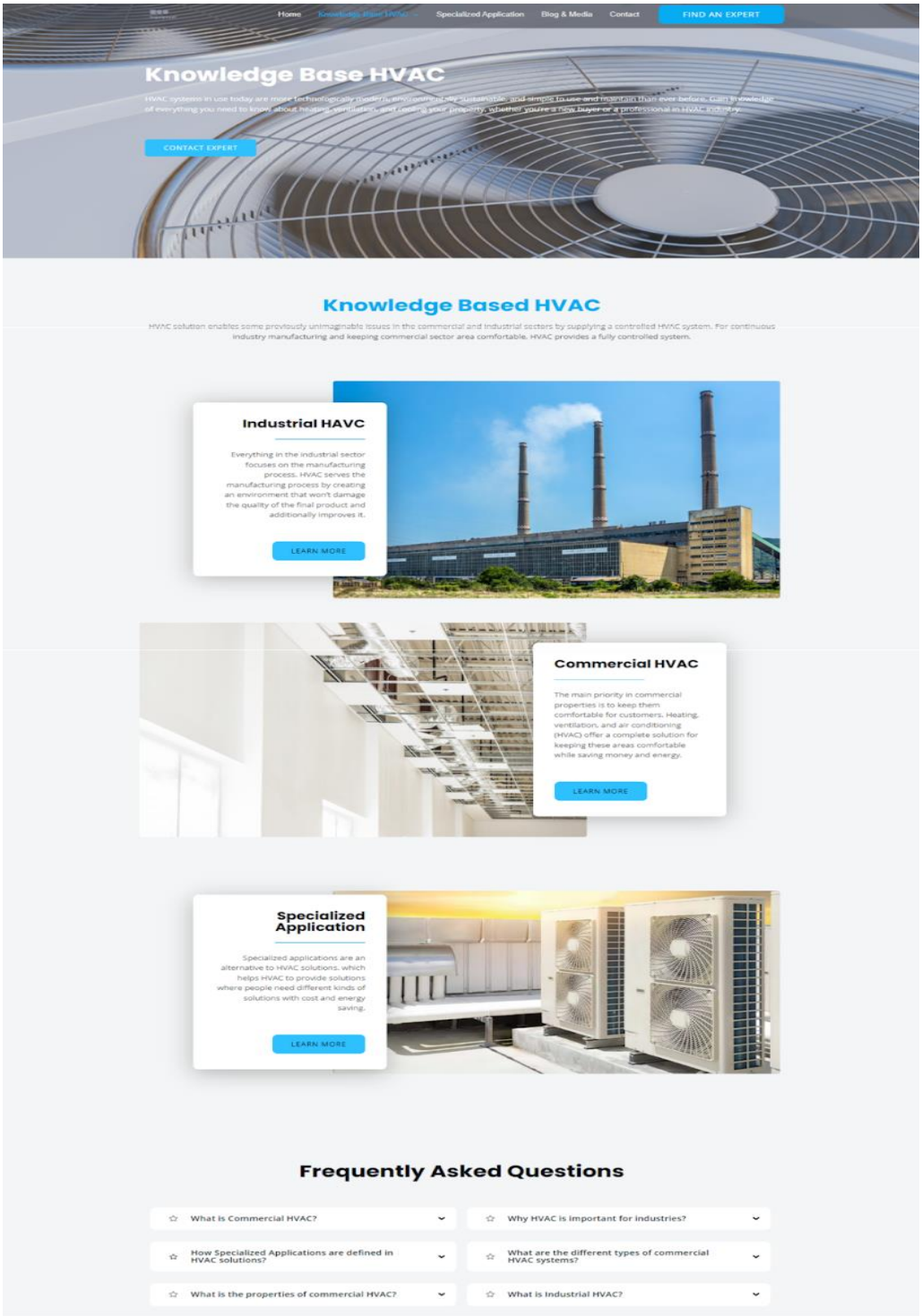


Figure 6.12: Knowledge-Based HVAC page

When users visit this section user will get knowledge about industrial and commercial HVAC and see the FAQ section with answers. When the user click learn more button a new page will load.

Industrial HVAC:

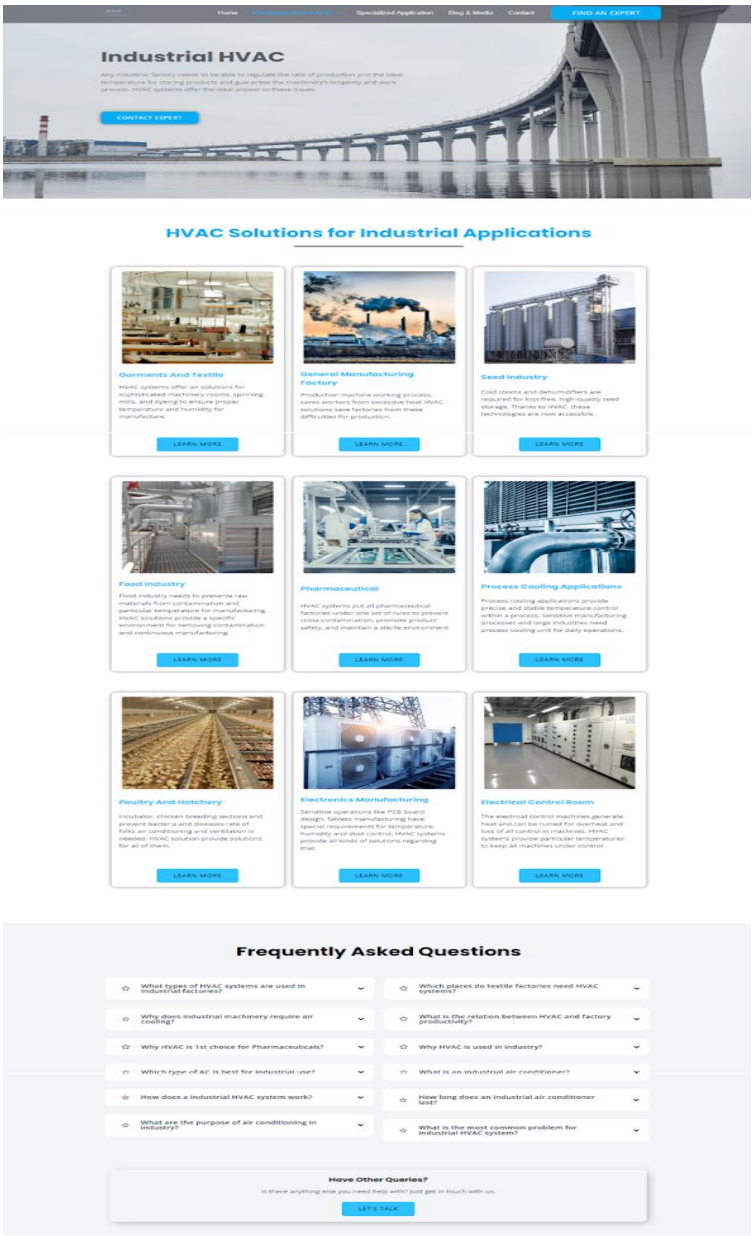


Figure 6.13: Industrial HVAC page

When user visit the industrial HVAC page users can see this interface. All the industrial HVAC categories are here. Users will see more details after clicking ‘learn more’ button. If users have any questions user can go to the FAQ section and get the industrial HVAC-related questions answered.

Commercial HVAC:

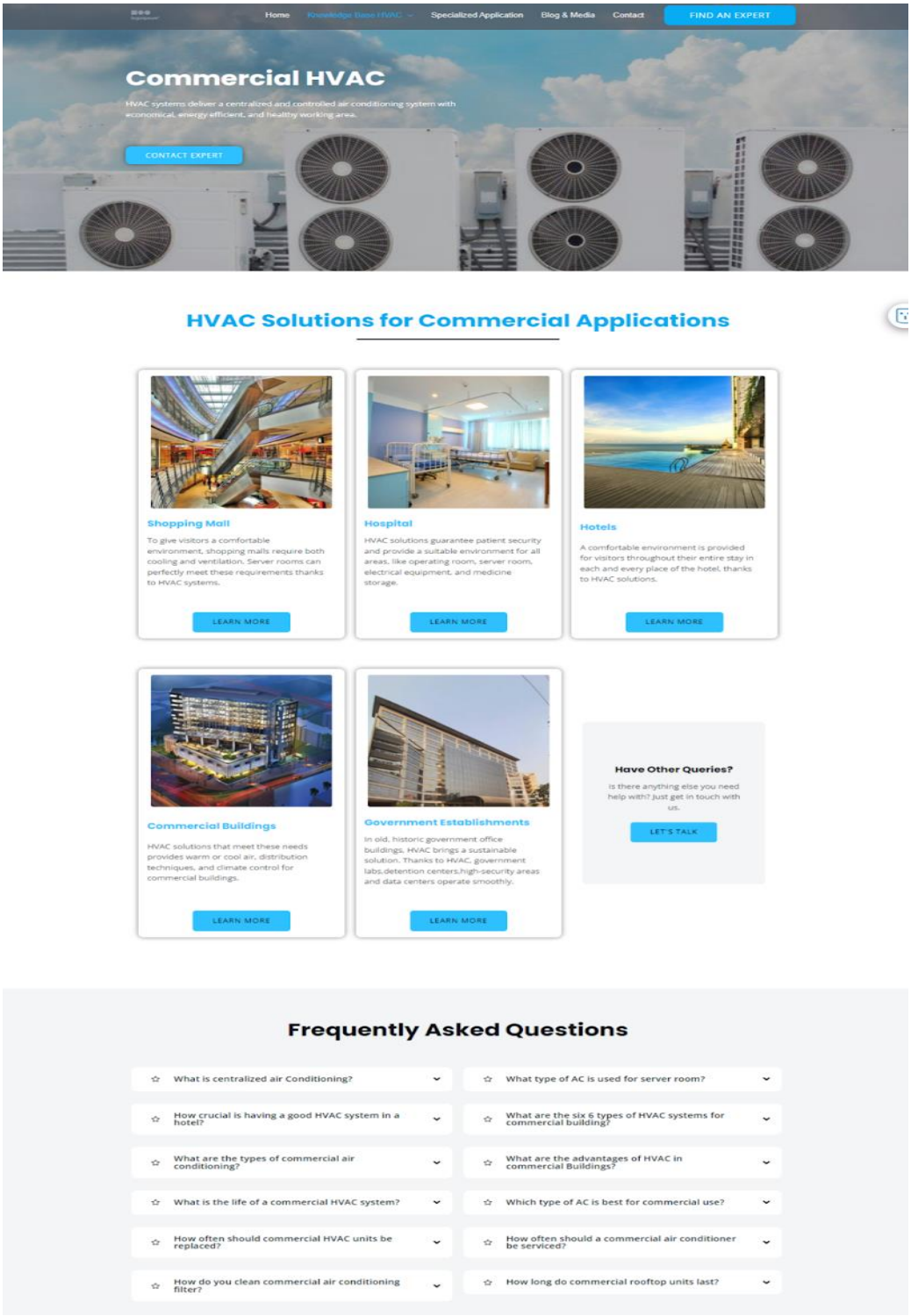
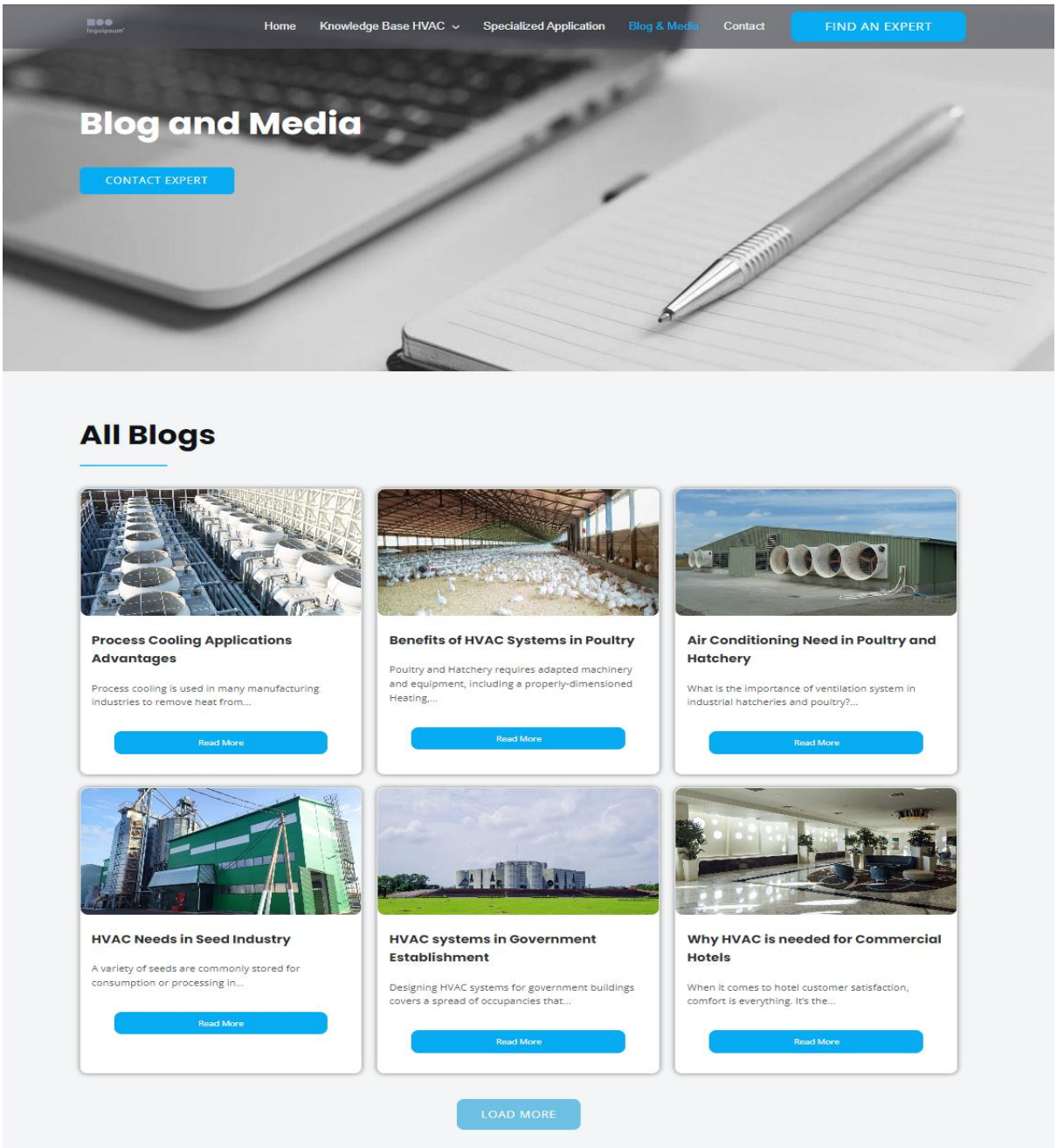


Figure 6.13: Commercial HVAC page

Same goes for Commercial Section, when users visit the Commercial HVAC page users can see this interface. All the Commercial HVAC categories are here. Users will see more details after

clicking the ‘learn more’ button. If users have any questions user can go to the FAQ section and get the Commercial HVAC-related questions answered.

Blogs and Media:



Commercial HVAC Blogs

HVAC systems in Government Establishment

Designing HVAC systems for government buildings covers a spread of...

Read More

Why HVAC is needed for Commercial Hotels

When it comes to hotel customer satisfaction, comfort is everything....

Read More

HVAC systems designed for Hotels

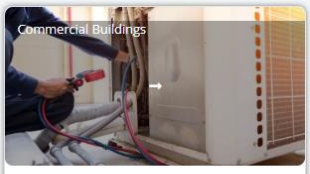
Air conditioning is important to travellers worldwide. It is an...

Read More

Commercial HVAC for Shopping Malls

Having proper heating and cooling in a shopping mall is...

Read More



Maintenance Recommendations for Commercial HVAC

Commercial heating and cooling requirements vary from location to location...

Read More

3 Ways to Improve Energy Efficiency of Commercial HVAC

As a business owner or manager of a commercial establishment...

Read More

LOAD MORE

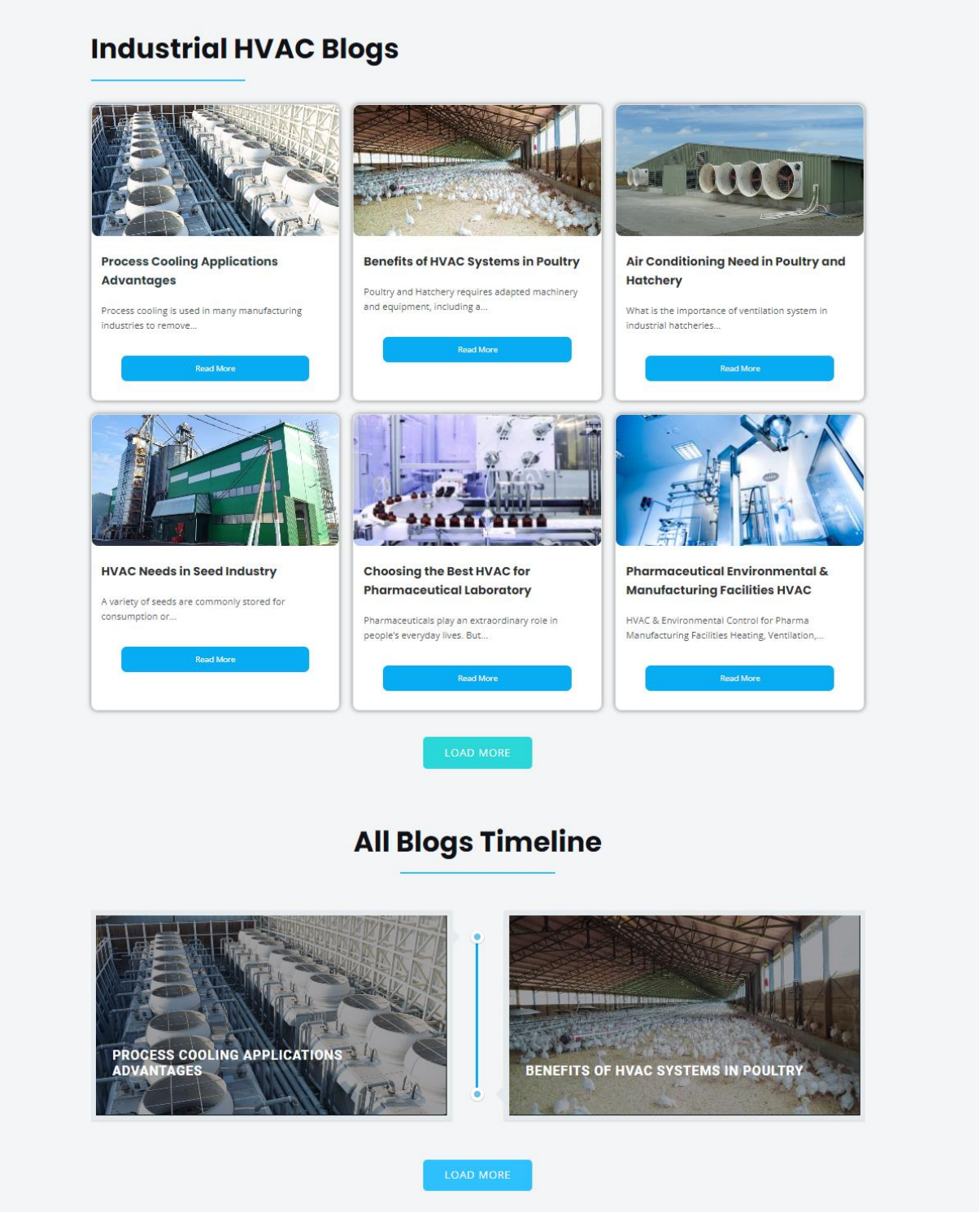


Figure 6.14: Blog and Media page

Users can see random blogs from all blog sections and the next part will be shown only Industrial and Commercial blogs individually.

Contact:

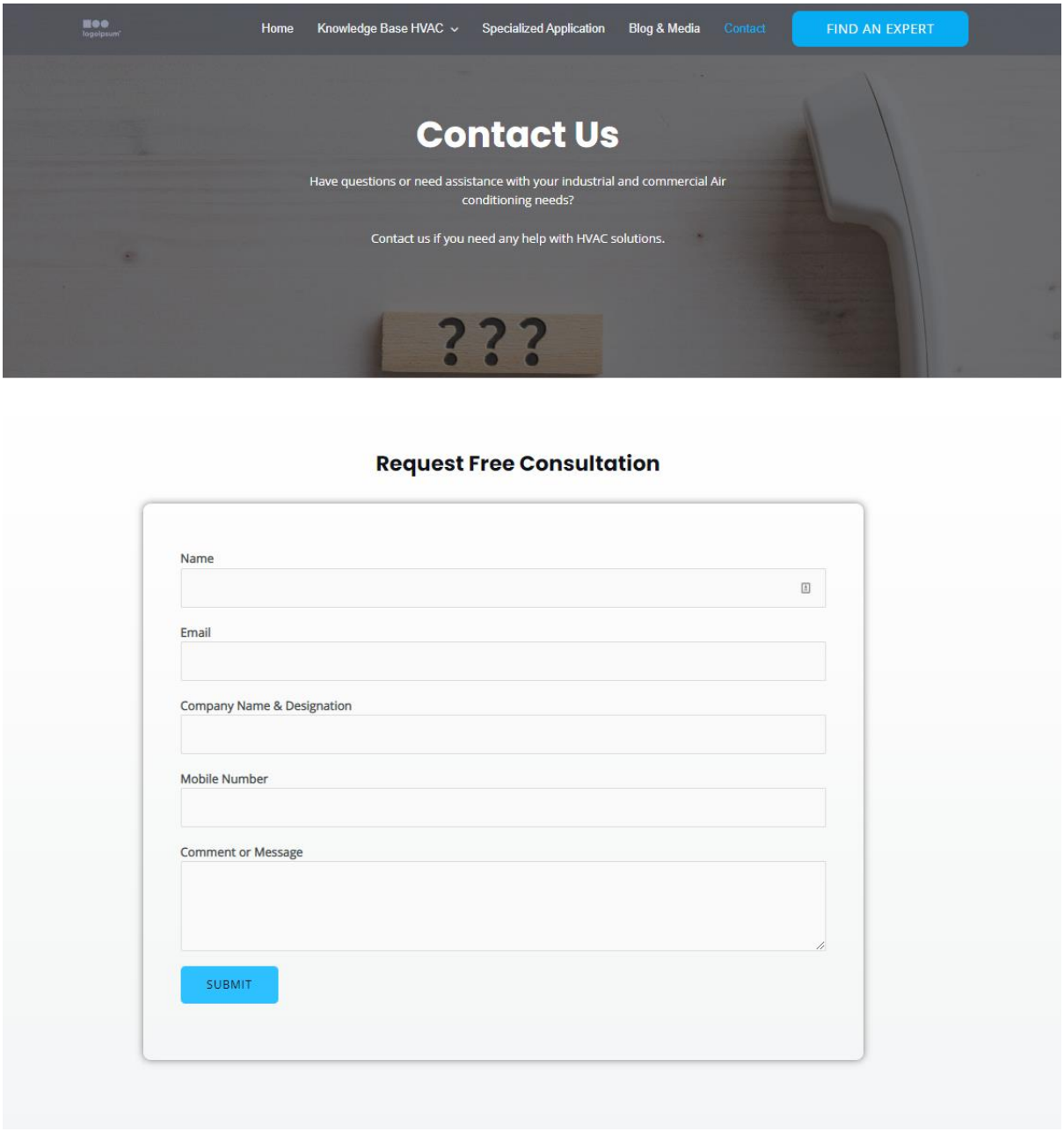


Figure 6.15: Contact page

Users can easily contact with Company with this form. And admin can see this message and reply with an email or contact number.

Find an Expert:

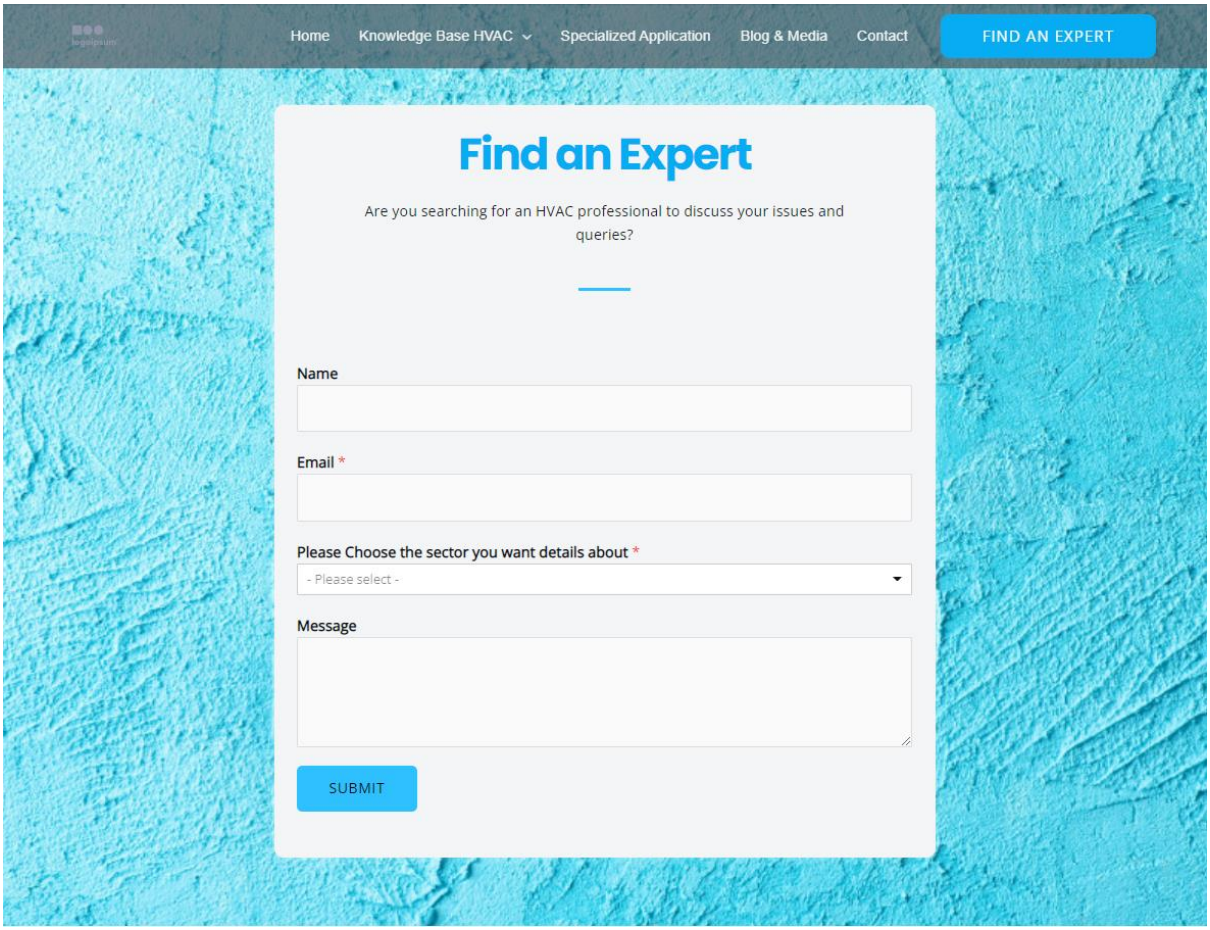
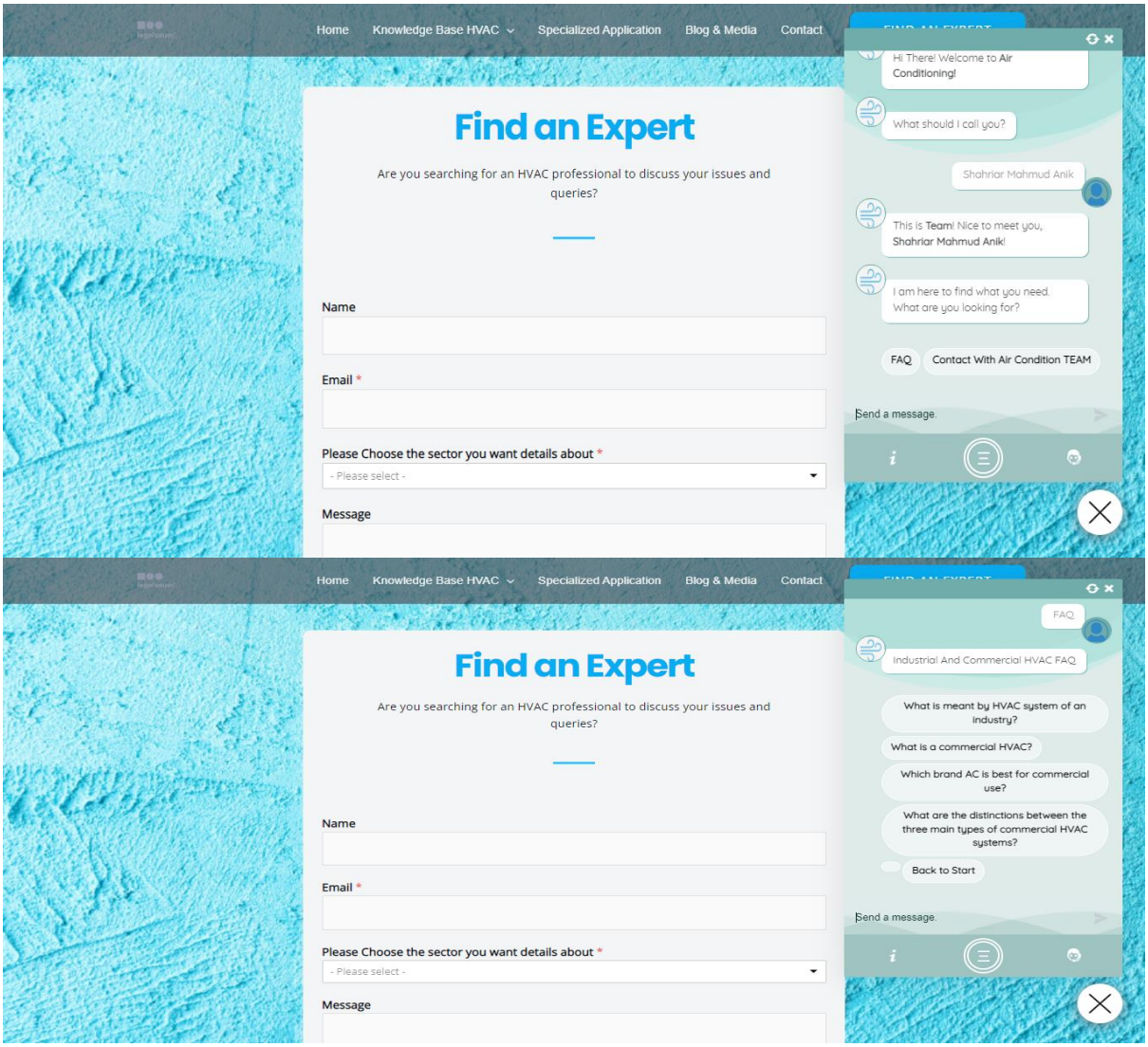


Figure 6.16: Find an Expert page

Users can easily contact and tell their requirements with this form. If the user wants to know about product features, services and maintenance, the user can fill up this form and admin can see this message and reply with an email or contact number.

Chatbot:


Home
Knowledge Base HVAC
Specialized Application
Blog & Media
Contact
Find an Expert
Are you searching for an HVAC professional to discuss your issues and queries?
Name
Email *
Please Choose the sector you want details about *
- Please select -
Message
Hi There! Welcome to Air Conditioning!
What should I call you?
Shahriar Mahmud Anik
This is Team! Nice to meet you, Shahriar Mahmud Anik!
I am here to find what you need. What are you looking for?
FAQ
Contact With Air Condition TEAM
Send a message.
Home
Knowledge Base HVAC
Specialized Application
Blog & Media
Contact
Find an Expert
Are you searching for an HVAC professional to discuss your issues and queries?
Name
Email *
Please Choose the sector you want details about *
- Please select -
Message
FAQ
Industrial And Commercial HVAC FAQ
What is meant by HVAC system of an industry?
What is a commercial HVAC?
Which brand AC is best for commercial use?
What are the distinctions between the three main types of commercial HVAC systems?
Back to Start
Send a message.

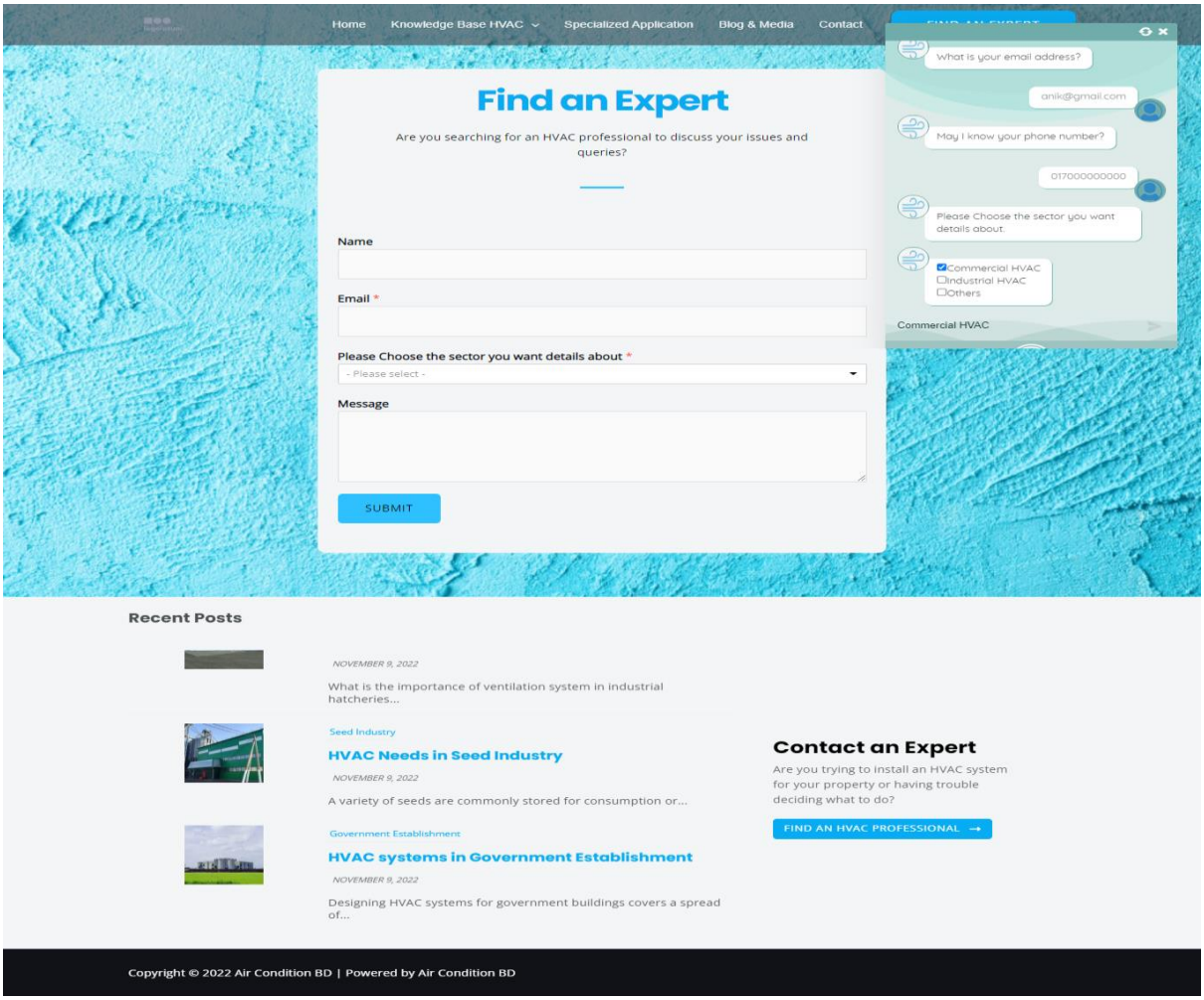


Figure 6.17: Chatbot

This is a unique feature for the website. Users can chat with the bot and get their desired answers from the chatbot with random questions.

Chapter 7

Project as Engineering Problem Analysis

7.1 Sustainability of the Project/Work

Long-term software development has been one of the most significant issues in web application software development. Sustainable development goals are to meet current demands while protecting the viability of shared systems and the environment, so that future generations' ability to meet their own needs is not compromised. System maintenance is performed on a regular basis to ensure the program's longevity. Everything's method has become more digital. Considering people's current risky situation and online dependency, it is understandable that the "HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Website" is highly sustainable.

7.2 Social and Environmental Effects and Analysis

Despite the fact that the HVAC system is only used for HVAC product features, information, where to use, why to use, and how to use for industrial and commercial purposes, it may have some social effects. Some user and company activity is recorded using this system.

The admin can easily add, update, and delete product and blog categories. Users can also easily obtain specific information about HVAC products. The database contains all of the information. Users or the company do not need to be concerned about data loss because the database will be backed up. In terms of the environment, we no longer need to use as much paper as we did previously. As a result, it is a significant document save, as we know that seventeen billion cubic feet of trees are destroyed each year, with paper accounting for 60% of this total. As a result, using this system has a positive environmental impact.

7.3 Addressing Ethics and Ethical Issues

The system will be fully secured for all users. No personal information will be leaked from the database. We will try to give the maximum level of security.

No Discrimination: There is no discrimination of any kind based on a person's race, sexual orientation, gender, religious convictions, color of their skin, language, political opinions, or other opinions, country of origin, place of birth, or any other status.

Chapter 8

Lesson Learned

I learned a lot during my internship program. I joined as a WordPress developer and SEQ manager. As a beginner, it is difficult for me to complete all of the tasks. For the project, I need to learn HTML, CSS, JavaScript, Bootstrap, and PHP. This is my first job in any company. From the company, I learned a lot of things. I learned how to communicate with others in a company. And I'm hoping that this knowledge will be very useful to me in the future.

8.1 Problems Faced During this Period

Time management, work schedules, and meeting deadlines have been some of the challenges I've encountered during my internship program. It wasn't simple to simultaneously understand and adapt to the new technology while also developing the software. In addition to system planning, project management, system analysis, and system design, it also took a lot of careful consideration, analysis, and the use of one's best judgment to meet deadlines, balance tasks, and develop an all-around effective and solid system plan.

8.2 Solution of those Problems

To overcome the difficulties, I will need to put in a lot of effort. Since I do not have so much idea about PHP or WordPress, I need to learn that within a short time. So, In my office time as well as when my off time, I need to learn this. And I do have a lot of work to do in terms of system planning, project management, system analysis, and system design. Although I learned these things in lesson, trying to put them into practice is a difficult task.

As a result, I needed to study more to get a clear understanding on these concepts. In addition, my supervisor assisted me with my work. If anything, I don't understand properly, then my supervisor explains this thing. Despite these ups and downs, finally, I completed my internship at Tritech Building Services Limited and made the project which is the HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Websites for Tritech Building Services Ltd.

Chapter 9

Future Work & Conclusion

9.1 Future Works

The work does not stop here. In the future, we will add more features to this application like-

- More admin monitor: The ability to track many factors, such as which product data are accurate, how many blogs and items are posted and updated, and so forth, is very beneficial to the admin. The management of the HVAC Company will benefit from it.
- New feature for the users: We may provide our clients additional services like categorizing HVAC items, commenting on blogs, and so on. Other individuals may gain more information through this process.
- Information archiving: A system that stores all of a user's data should include an archiving system so that users who have been dismissed, suspended, or retired are archived rather than completely erased.

9.2 Conclusion

During my internship, I worked on a web application for Tritech Building Services Ltd called HVAC (Heating, Ventilation, Air Conditioning) SYSTEM Website. This HVAC (Heating, Ventilation, Air Conditioning) SYSTEM WEBSITE is intended to save users time and perform well. This system is being implemented to improve the user and company experience. Working as a WordPress developer for their company has been a fantastic opportunity for me. The internship program here was Four months, and the guidance here has been my first step in information technology. My experience provided me with a wealth of information about the development process. I've learned how to manage various software requirements and the best approach to developing it. This program provided me with a complete representation of my professional life as a WordPress developer and web developer, what I would face, and how to handle those situations. During the internship, I worked to improve my web development skills and become a better WordPress developer and web developer.

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Consent Form

An Undergraduate Internship/Project on

HVAC (Heating,Ventilation, Air Conditioning) System Website

By

SHAHRIAR MAHMUD ANIK

Student ID: **1830872**

Autumn, 2022

Consent from Supervisor

The student modified the internship final report as per the recommendations made by his/her academic supervisor and/or panel members during and/or before final viva, and the department can use this version for archiving as well as the OBE course material for CSE499.

Peyal 31.01.2022

(Signature of the Supervisor)

Mr. Md. Mahmudul Peyal

Department of Computer Science & Engineering

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