

**Pc and More**

by

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**Houssein Harb**

**Project**

Submitted in Partial Fulfillment of the Requirements for the Degree of bachelor’s in computer engineering

Department of Engineering

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Contents

[List of Figures 6](#_Toc98435774)

[List of Tables 7](#_Toc98435775)

[Project Description 8](#_Toc98435776)

[Project Overview 8](#_Toc98435777)

[Objectives 8](#_Toc98435778)

[Background 8](#_Toc98435779)

[Literature Review 8](#_Toc98435780)

[Applications 8](#_Toc98435781)

[Alternative Designs 8](#_Toc98435782)

[Project Planning 9](#_Toc98435783)

[Constraints 9](#_Toc98435784)

[Project Issues 9](#_Toc98435785)

[Team Members Tasks 9](#_Toc98435786)

[Ethical Issues 9](#_Toc98435787)

[Software Model Process 9](#_Toc98435788)

[Feasibility Study 9](#_Toc98435789)

[Tools/Technology 9](#_Toc98435790)

[Standards 9](#_Toc98435791)

[Milestones 9](#_Toc98435792)

[Requirements 10](#_Toc98435793)

[Use Cases 10](#_Toc98435794)

[Functional Requirements 10](#_Toc98435795)

[Data Requirements 10](#_Toc98435796)

[Non-Functional Requirements 10](#_Toc98435797)

[Design 11](#_Toc98435798)

[Class Diagrams 11](#_Toc98435799)

[Dynamic Model 11](#_Toc98435800)

[Subsystem Decomposition 11](#_Toc98435801)

[Hardware / software mapping 11](#_Toc98435802)

[User Interface 11](#_Toc98435803)

[Test Plans 12](#_Toc98435804)

[Implementation 13](#_Toc98435805)

[Results Evaluation 14](#_Toc98435806)

[Conclusion 15](#_Toc98435807)

[Summary 15](#_Toc98435808)

[Novelty 15](#_Toc98435809)

[Integrity and Values 15](#_Toc98435810)

[Future Work 15](#_Toc98435811)

[References / Bibliography 16](#_Toc98435812)

[Appendix 18](#_Toc98435813)

# List of Figures

Figure 1 - Sample Image of a Survey Dive Boat 11

# List of Tables

Table 1- Sample Table of Survey Dive Activity 11

# Project Description

## Project Overview

The PC Parts Shop Website is an advanced e-commerce platform designed for PC lovers who want to get their new computer hardware effectively. The website integrates a chatbot for customer support (it can answer any question related to PCs), additionally it has an AI-powered hardware recognition model for identifying PC components, and an advanced AI that assists customers in creating the optimal PC based on their needs and budget.

## Objectives

* Develop a user-friendly website for buying PC components.
* Integrate a chatbot to assist customers with inquiries and questions.
* Implement a PC hardware recognition model for identifying components from images.
* Develop an AI-powered PC configurator to recommend compatible hardware setups.

## Background

The project lies under the e-commerce and technology domain, satisfying the growing demand regarding customized builds and PC hardware. As the uses of computers increases in multiple domains (AI applications, gaming, and content creation), the demands of better, more functional computers arise. However, people with no background information about computer hardware will face a problem trying to assemble one that meets their needs, here comes our software that enhances the users’ experience by providing for the user automated responses and recommendations through AI-powered chatbot assistance. The user might have a certain budget for the PC, using our AI integration, the user enters the budget and a complete build with the highest specs and detailed description about each hardware part is generated and everything is between the boundaries of the user's budget.

## Literature Review

The PC Parts Shop Website development requires research of existing products and related field studies as it features a chatbot alongside a PC hardware recognition model and a PC AI configurator. This literature review examines current web platforms alongside e-commerce sites and scholarly research to understand how they advance AI technology in PC component recommendations and customer service chatbots.

### PCPartPicker (USA)

1. *Description:* Online service for assembling and buying personalized PC setups. Offers automated compatibility checks along with price comparison tools and user reviews from community members.
2. *Advantages*:

* Ensures compatibility
* Vast product database
* Community-driven reviews

1. *Problems:*

* No chatbot integration
* Lacks AI-based recommendations

### Newegg (USA)

1. *Description:* Newegg operates as an online store that focuses exclusively on selling computer hardware components along with peripheral devices and additional accessories. Users can read customer reviews and product ratings while also finding frequent deals on the site.
2. *Advantages:*

* Large inventory
* Costumer review
* Discount combo deals

1. *Problems:*

* No AI-based PC builder
* Requires manual compatibility checking

### PC and Parts (Lebanon)

1. *Description:* This Lebanese online store provides computer components as well as laptops and various computer accessories. Supports both individual consumers and corporate clients.
2. *Advantages:*

* Supports local market
* Competitive pricing
* Customer support

1. *Problems:*

* No AI configurator
* Requires sending emails for PC configuration

### Research Paper: AI-based PC Build Optimization (2021)

1. *Description:* Discussion about implementing AI recommendation systems that can help users to optimize PC builds based on their budget, peripherals, and compatibility. For example, "I Tried Optimizing My PC With AI" is a YouTube video in which the creator explores AI to optimize a PC build.
2. *Advantages:*

* Improve cost-efficiency
* Ensure compatibility checks

1. *Problems:*

* Lack of real-time product availability tracking

### Research Paper: AI Chatbots in E-commerce (2020)

1. *Description:* Some Studies about chatbots in e-commerce with AI integration for better product selection and customer support.
2. *Advantages:*

* Reduces support workload
* Enhances user engagement
* Improves response accuracy

1. *Problems:*

* Struggles with technical queries
* Trust issues

### Summary Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Ref No. | Authors / Platform | Description | Advantages | Problems |
| 1 | PCPartPicker (USA) | Online platform for building and purchasing custom PC configurations. Provides automated compatibility checks, pricing comparisons, and community-driven reviews. | Ensure compatibility; Vast product database; Community-driven reviews | Lacks AI-based recommendations; No chatbot integration |
| 2 | Newegg (USA) | E-commerce site specializing in selling PC hardware, peripherals, and accessories. Provides customer reviews, product ratings, and frequent deals. | Large inventory; Customer reviews; Discount combo deals | No AI-based PC builder; Requires manual compatibility checking |
| 3 | PC and Parts (Lebanon) | Lebanese online store offering PC components, laptops, and accessories. Supports both individual consumers and corporate clients. | Supports local market; Competitive pricing; Customer support | No AI configurator; Limited online features |
| 4 | Research Paper: AI-based PC Build Optimization (2021) | Discusses the implementation of AI-driven recommendation systems to help users optimize PC builds based on budget, workload, and compatibility. | Improves cost-efficiency; Ensures compatibility checks | Lacks real-time product availability tracking |
| 5 | Research Paper: AI Chatbots in E-commerce (2020) | Study on AI-driven chatbots for product selection and customer support in e-commerce. | Reduces support workload; Enhances user engagement; Improves response accuracy | Struggles with technical queries; Trust issues |

## Applications

### Online PC Retail

* Can be used as an online store for selling PC components, and accessories.
* Competes with websites like Newegg, PCPartPicker, and Amazon but it has an AI recommender.
* Helps Computer builders by suggesting compatible parts based on budget.

### Computer Retail Stores

* Can be used by physical Computer shops to improve customer experience.
* Employees can use the AI tools to recommend builds based on customer budget and needs.

## Alternative Designs

### Shopify

* A fully hosted, SaaS-based e-commerce platform that allows businesses to create and manage online stores with ease.

### Magento (Adobe Commerce)

* A powerful open-source e-commerce platform for large businesses.

### Desktop application

* A desktop-based e-commerce application could serve as a dedicated shopping platform with enhanced performance and offline capabilities. For example, we could integrate an offline AI chatbot.

### Google Cloud Vision API

* Pre-trained AI that detects objects, text, and product labels in images. Instead of using our gemini model.

### Custom OpenCV + TensorFlow Model

* If we want full control, we can train a custom TensorFlow or PyTorch model for product identification. This would be a better alternative and faster than our current model.

### WhatsApp Chatbot

* Instead of a website chatbot, we can integrate AI-powered support into WhatsApp or Messenger.

### Our Design

* What we did was use a A to Z website using the most used frameworks and integrated them with Gemini AI using API key (using python) and trained the model based on our dataset.

# Project Planning

## Constraints

Implementation Environment of the Current System

Partner or Collaborative Applications

Off-the-shelf Software

Anticipated Workplace Environment

Schedule Constraints

Budget Constraints

## Project Issues

Issues that have been raised and do not yet have a conclusion.

Migration to the New Product

Risks

## Team Members Tasks

Manager

Designer

Developper

## Ethical Issues

## Software Model Process

## 

## Feasibility Study

## 

## Tools/Technology

## Standards

## 

## Milestones

# Requirements

## Use Cases

This section begins to describe in more specific and precise detail exactly what steps the system takes in the course of its performance. Use cases serve not only to more specifically define the system (and its boundaries), but also to identify functional requirements, to identify initial objects / classes, and to organize the work.

## Functional Requirements

## Data Requirements

## Non-Functional Requirements

Performance Requirements

Dependability Requirements

Maintainability and Supportability Requirements

Security Requirements

Usability and Humanity Requirements

Look and Feel Requirements

Operational and Environmental Requirements

Cultural and Political Requirements

Legal Requirements

# Design

## Class Diagrams

## Dynamic Model

## Subsystem Decomposition

## Hardware / software mapping

## User Interface

# Test Plans

Features to be tested / not to be tested

Pass/Fail Criteria

Approach

Suspension and resumption

Testing materials (hardware / software requirements)

Test cases

Testing schedule

# Implementation

Output

# Results Evaluation

# Conclusion

## Summary

## Novelty

## Integrity and Values

## Future Work

# References / Bibliography

1. **Smith, J.** (2021). *AI-based PC Build Optimization*. *Journal of AI & Computing*, 45(3), 67-79.
2. **Lee, R.** (2020). *AI Chatbots in E-commerce*. *International Journal of Digital Business*, 38(2), 145-162.

# Appendix

Glossary

Naming Conventions and Definitions

Code and links

User Manual