COMP 3059 – Capstone Project I

Software Requirements Analysis and Design Assignment

This assignment is an overview to gather the software needs with requirements analysis and help to proceed with the design.

The requirements analysis helps to break down functional and non-functional requirements to a basic design view to provide a clear system development process framework. It involves various entities, including business, stakeholders and technology requirements.

The design is the activity following requirements specification and before programming. Software design usually involves problem solving and planning a software solution.

To work on this assignment you could use the references and a sample template given below. The sample template can be customised to suit the nature of your project.

Reference Readings/Example:
http://www.uacg.bg/filebank/acadstaff/userfiles/publ_bg_397_SDP_activities_and_steps.pdf

www.cse.msu.edu/~chengb/RE-491/Papers/SRSExample-webapp.doc

Reference template:
www.tricity.wsu.edu/~mckinnon/cpts322/cpts322-srs-v1.doc

1.0 Introduction

The Introduction section provides an overview of the system using software requirements analysis and design for the scope of the system.

1.1 Purpose

This document describes the high level software requirements for the system. It describes the what, not how, of the capabilities of the system for the intended audiences.

The purpose of this document is to describe the software requirements analysis and design for IT Clan's AI Chatbot web application. It will discuss the scope of the project and provide an overview of the system including: constraints, assumptions and dependencies. It will also go over the project's functional requirements and provide descriptive data and process modelling diagrams. It will then discuss the non-functional requirements of the project and describe logical database requirements. This document is intended for the stakeholders and developers of the project to provide them with a detailed software requirements analysis and design.

1.2 Scope

This explains what the proposed system will and will not do. Describe relevant benefits, objectives and goals. The description of scope should be consistent with the Project Plan.

In-Scope:
In terms of our scope, we limit it to the front and back-end implementation of our AI Chatbot in the IT Clan website. This means creating a template and configuring our aesthetic implementation of what we want the AI chatbot to look like. For example, perhaps an AI chatbot mascot to compliment the overall design of the chatbot. We will find proper color schemes and fonts that will fit the pre-existing look and feel of the IT clan website so they are integrated with each other. Lastly, our AI chatbot back-end will incorporate the necessary algorithms needed for the chatbot to not only communicate efficiently but also learn as it grows.
Out of Scope:
Out of scope would entail creating a communicative platform for all involved members of IT Clan and Lezrey can discuss any issues or concerns regarding the chat bot for the IT Clan.

2.0 System Overview - just a caption/does not need to be assigned

The System Overview section introduces the system context and design.

2.1 Project Perspective

The Project Perspective describes the context and origin of the system by defining whether the system is:

- a follow-on member of a system family
- a replacement for existing systems, or
- a new self-contained system.

To put IT Clan's AI Chatbot web application into perspective, this section will describe other related products, provide a description of their functionalities and compare them. There are several AI Chatbots on the market that aim to assist in business or ecommerce. These chatbots promise many functionalities, including but not limited to: delivering faster chat support, easy set up, proactive customer service, cutting down support costs and optimizing performance. The IT Clan AI Chatbot web application aims to fulfill all functionalities of existing related AI Chatbots, with a specialization and/or personalization towards IT Clan's and their clients' specific needs. For example, the IT Clan AI Chatbot web application will be able to answer questions pertaining to IT Clan's business processes, contact information, registration and any other common questions that IT Clan clients may have. It's interface will also be built in a way that is accessible and tailored to the IT Clan audience. Furthermore, the AI Chatbot will also aim to solve problems specific to IT Clan such as need for more accessible client support, increasing availability of client support and lessening the workload of IT Clan employees.

2.2 System Context

The System Context describes the resulting software within the business case, including strategic issues in which the system is involved or which it specifically addresses.

- Our project will be hosted on the web as the plan is to develop a functional website where the chatbot is integrated.
- Our chatbot targets the issue of not having available assistance for clients at all times, the chatbot would be able to provide assistance at any time hence taking care of the root problem.
- The chatbot would also be able to assist clients with disabilities as in many cases it would be easier for them to interact with a chatbot than with a representative on the phone.

2.3 General Constraints

- Data gathering: This is the most crucial step as we cannot train a fully functional model without data.
- Training Time: The time required for the model to complete training and achieve an over 90% accuracy.
- Testing data: Finding more data to test the model with, different than the data required to train the model.
- Hardware Resources: Deep Learning and its implementations is computationally demanding. Strong graphics and processors are required to train the amount of data we hope to gather.

2.4 Assumptions and Dependencies

List any assumptions that have been made during the initiation of the project. In addition, list any dependencies that may impact its success or the desired result.

- **Assumptions**
    - Data required to implement a Natural Language Algorithm is available.
    - Stakeholders will provide resources that would allow us to use Google based technologies.
    - Mentoring available for team members who may run into problems.
    - Time required to train the AI Model is reasonable.
    - Computers available can handle training the expected amount of data.
    - Accuracy of the project schedule dates.
    - Stakeholder delivery times.
- **Dependencies**
    - Project planning must be completed before and coding can begin, this includes deadlines, sprint and product backlogs, wireframes, requirements gathering and prototyping. This is to ensure that everything needed is prepared and reduce problems when creating the product.
    - Training and resource review must be completed by all team members. This is to ensure everyone has completed all the knowledge requirements for the project and has a good understanding of it.
    - Developers require communication from the stakeholder in order to complete project deliverables accurately and on time.

3.0 Functional Requirements

This section describes specific features of the software project. If desired, some requirements may be specified in the use-case format and listed in the Use Cases Section.

3.1 <Functional Requirement or Feature #1>

- Introduction
- Inputs
- Processing
- Outputs

Our functional requirements consist of introducing our AI chatbot in an integrated and harmonious way so it fits the aesthetic front-end and logical back-end requirements. The inputs would include interactions and messages from the user directed towards the chat-bot. The processing would be the integrated AI learning pattern back-end algorithm that enables the bot to not only interact but also learn as it grows. The output would be the message the chatbot responds back with as well as resources or links that the chatbot provides to the user.

3.2 Use Cases

3.2.1

Use Case #1 : Customer

- Customers will go onto the web application and open the chatbot when they require any customer support. They type the inquiry in the chat and receive support from AI chatbot. If they require further assistance, the AI chatbot will connect the customer to the support team.

Use Case #2 : Support Team Member

- Support team members will receive notification when customers need further assistance or support that can not be handled by AI chatbot. Log in to the system and start conversation with customers in the chat manually.
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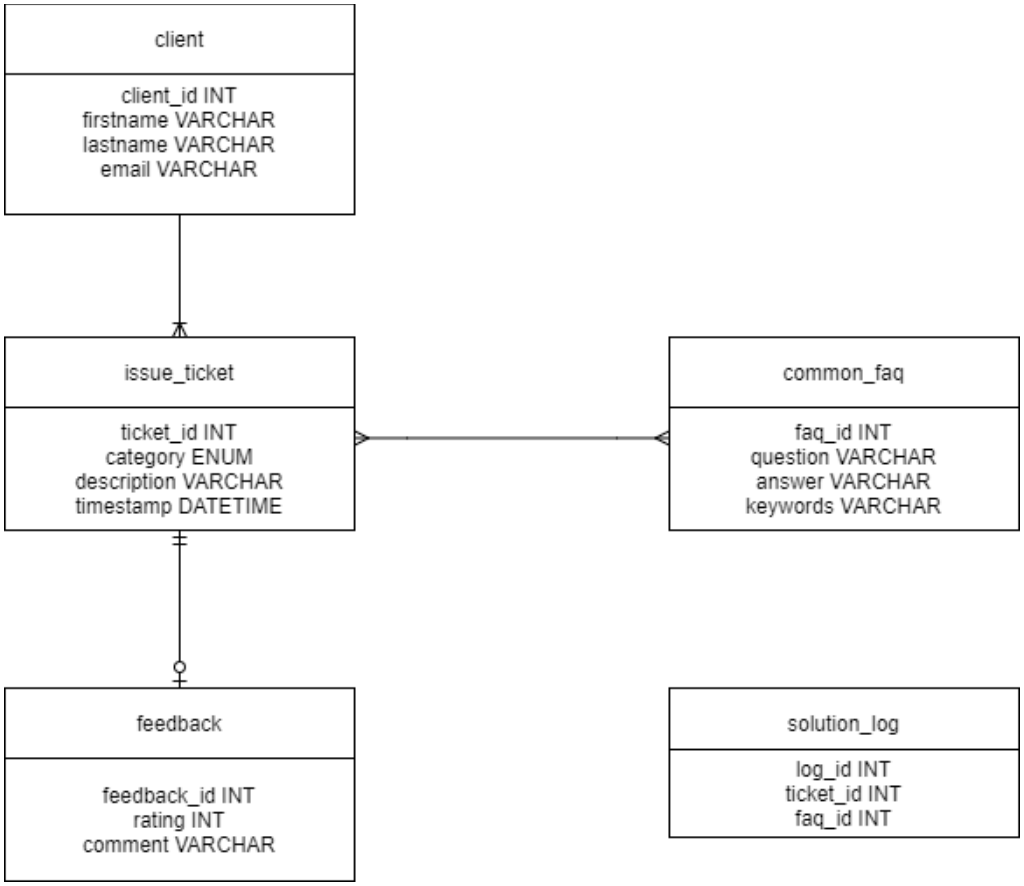
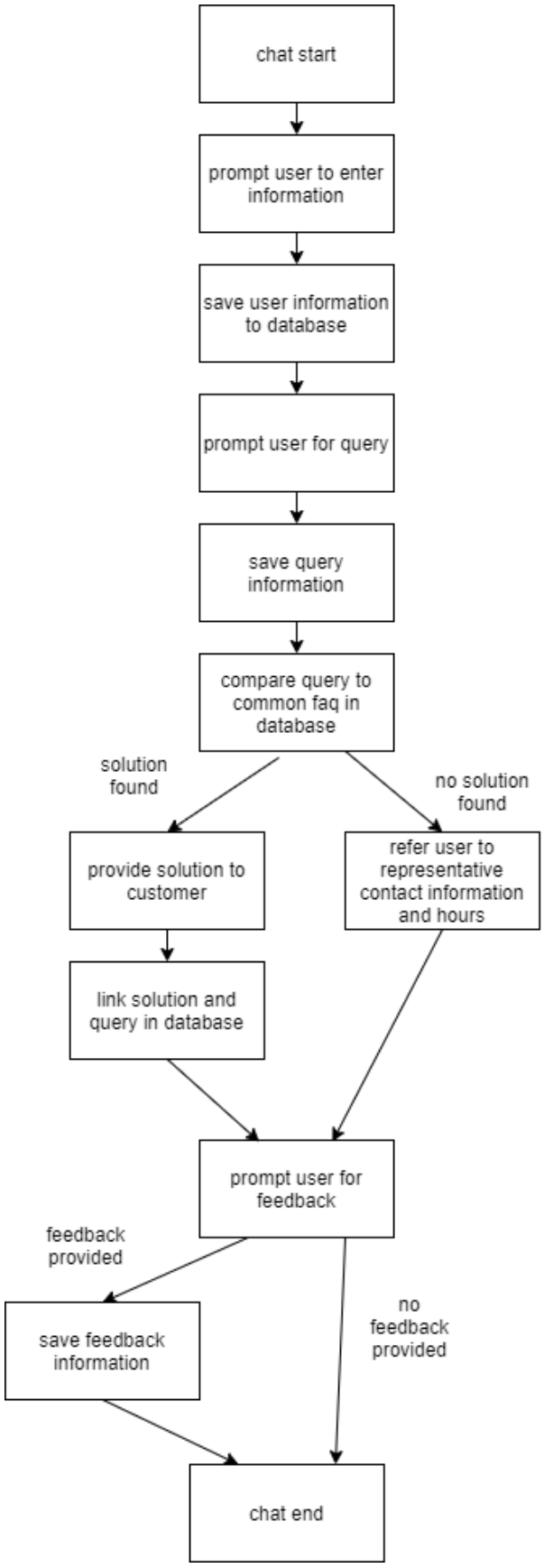
3.3 Data Modelling and Analysis

The following section provides generalized Data Modelling diagrams pertaining to the IT Clan AI Chatbot web application.

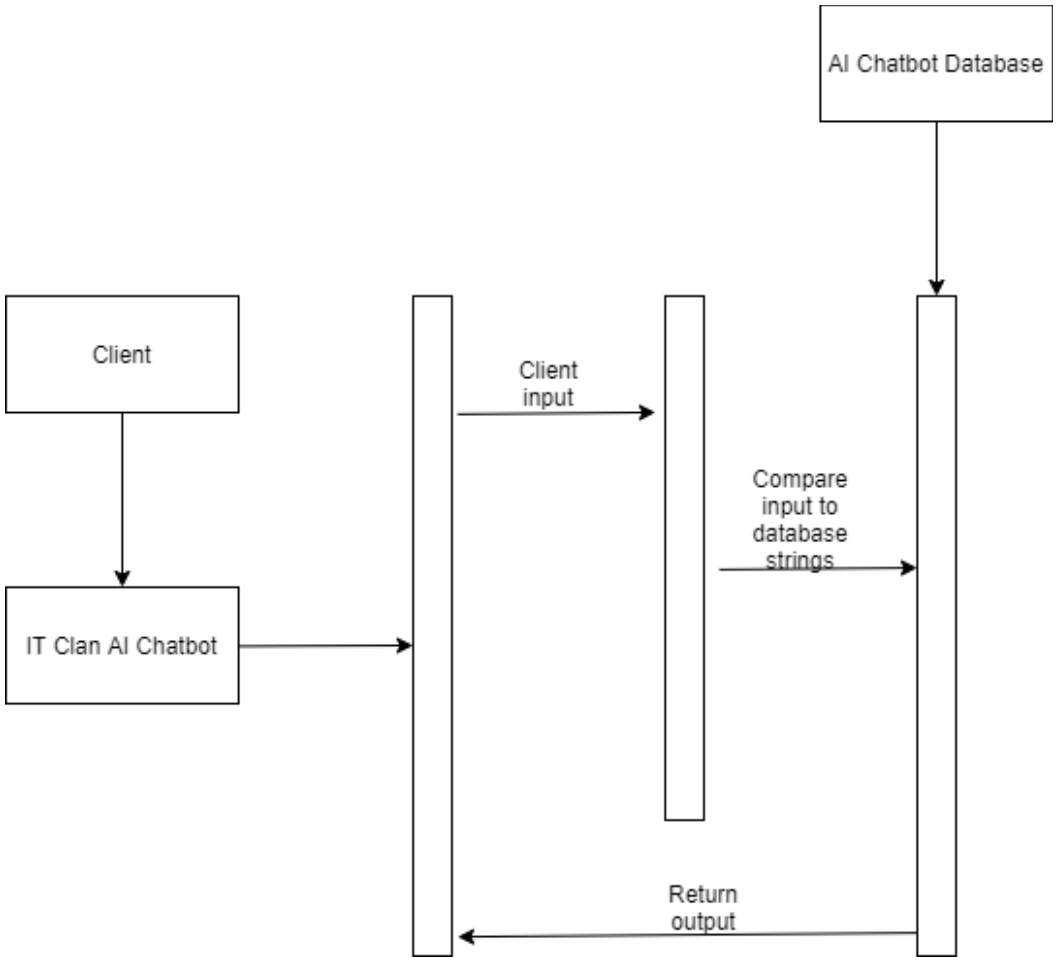
- Normalized Data Model Diagram



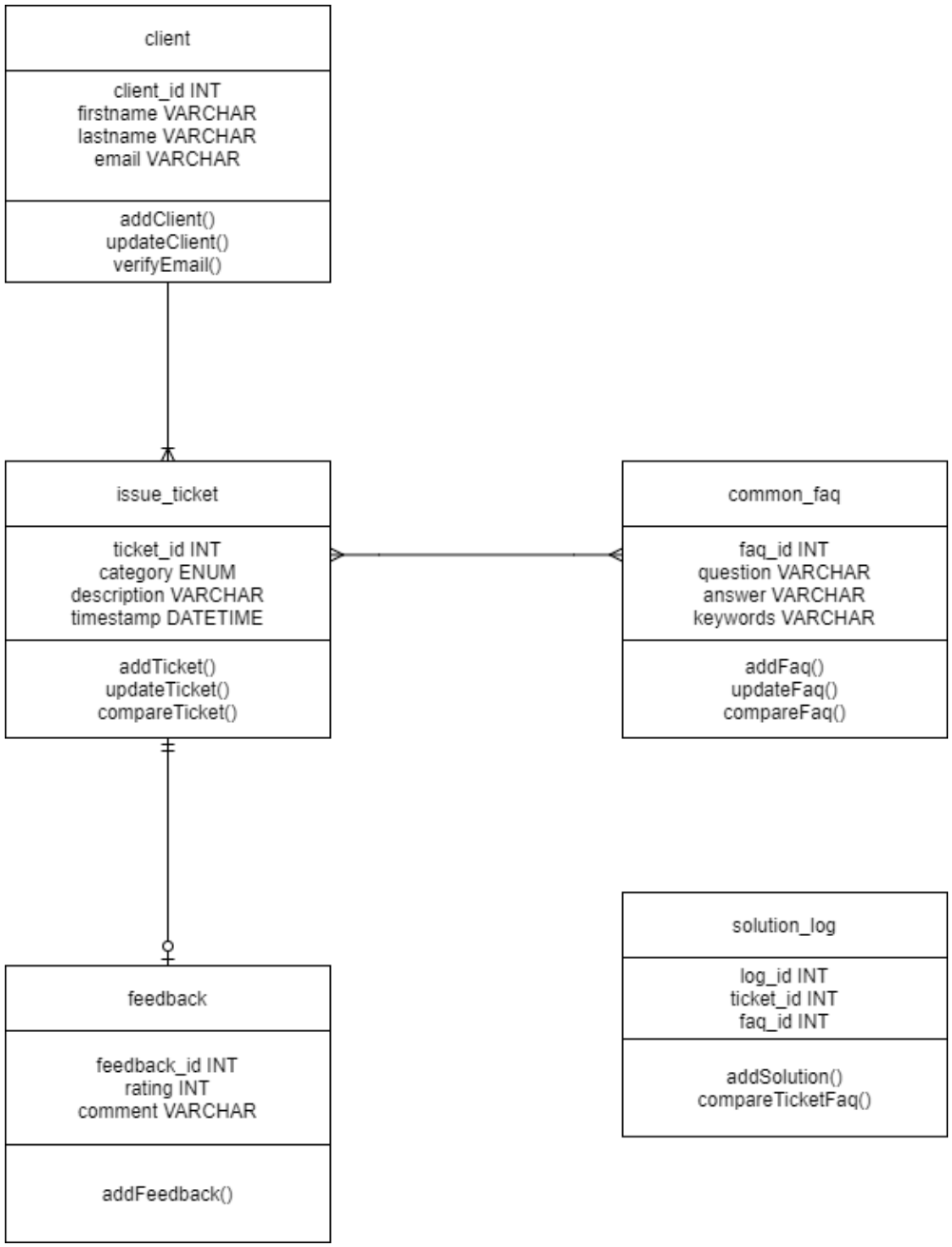
- Activity Diagrams



- Sequence Diagrams

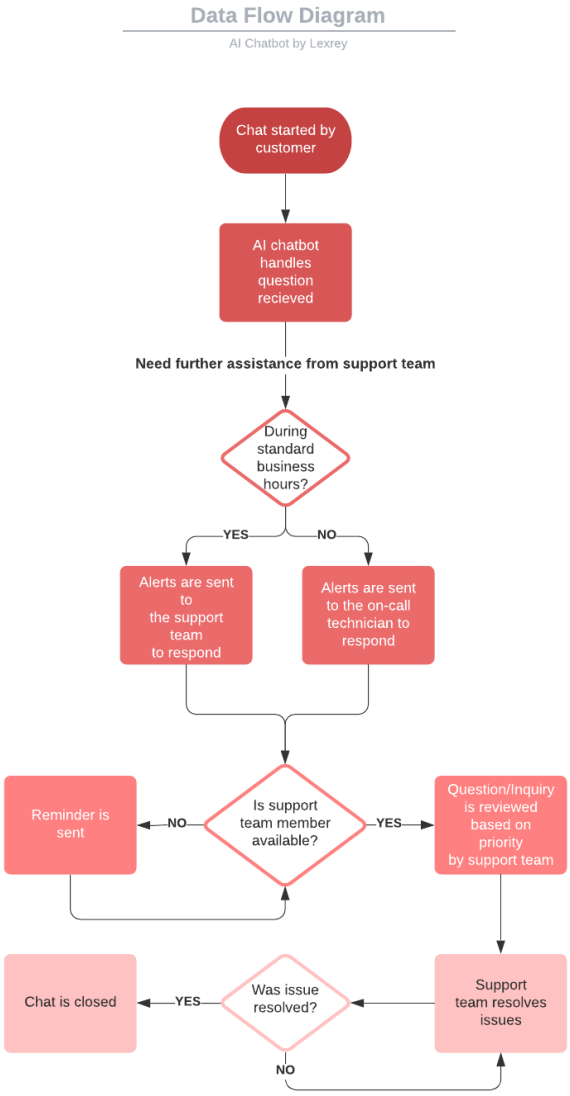


- UML Class Diagram



3.4 Process Modelling

- Data Flow Diagram



4.0 Non-Functional Requirements

The non-functional requirements for a system are typically constraints on the functional requirements – that is, not what the system does, but how it does it (e.g. how quickly, how efficiently, how easily from the user's perspective, etc.).

Non-functional requirements may exist for any of the following attributes – Performance, Reliability, Availability, Security, Maintainability, Portability.

Often these requirements must be achieved at a system-wide level rather than at a unit level. State the requirements in the following sections in measurable terms (e.g., 95% of

transactions shall be processed in less than a second, system downtime may not exceed 1 minute per day, etc).
The chatbot has to interact with the user at the highest accuracy which is 90% minimum to be expected upon model training completion.
The website has to be optimized and has to run smoothly on most browsers.
Compatibility has to be maximized with Google Chrome, Mozilla Firefox and Microsoft Edge.
Sqlite3 would provide quick and efficient access to a database.
Flask on the back-end is smooth and easy for a web browser to handle which will be the main component to transfer data to our Views on the front-end.
React on the front-end will ensure optimal experience while keeping appealing design in effect.
Fundamentals of optimal runtime will be kept in place, expected run time of most of our algorithms is O(n^2) and any algorithms that would cause a slower runtime than that will not be approved by our Quality Assurance team.

5.0 Logical Database Requirements

Will a database be used? If so, what logical requirements exist for data formats, storage capabilities, data retention, data integrity, etc?

A database will be used in order to store client information on our system. The plan is to integrate a database by connecting Python and Sqlite3.
The chatbot would be able to access the database and assist clients with registrations or with any modifications regarding their personal information.
Data formats would be mostly Strings, Integers and Date Time. Personal information stored in the database will be private and would under no circumstance be released outside the company.

6.0 Other Requirements

Additional requirements, if any.

7.0 Approval

The signatures below indicate their approval of the contents of this document.

Project Role	Name	Signature	Date
Front-end developer	Yukina	Yukina	Nov 7/21
Front-end developer	Robertha	Robertha	Nov 7/21
Back-end developer	Rhose	Rhose	Nov 7/21
Back-end developer	Paolo	Paolo	Nov 7/21