COMP704 Research and Development Project

VN01 3D acupuncture healthcare data management and treatment system

Research & Upskilling Plan

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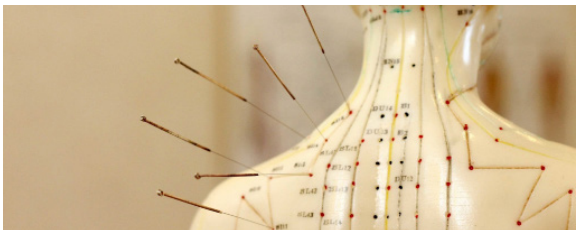

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TABLE OF CONTENTS

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Version	Timestamp	Description	Responsible members
1.0	15 Oct 2022 22:45	Initial plan and goals for achievements for Research phase and Upskilling phase of the project, based on the initial scope of the Project.	**Nhan Nguyen Cao** *(21142377)*
2.0	14 Nov 2022 19:25	Update the plan for new Domain knowledge phase to match with the new approach of the Project.	**Nhan Nguyen Cao** *(21142377)*

I. RESEARCH & UPSKILLING SCOPE

The viability of the project is greatly influenced by Research & Upskilling, which accounts for 50 percent of the project's overall scope. Research also provides team members with the knowledge and expertise needed in the project's specialized field – which is Acupuncture.

For our project of “A 3-D acupuncture healthcare data management and treatment system”, the scope of the Research phase is planned to cover the following scopes:

1. **Domain Knowledge Research**: As the project aims to be an assistant for the persons working professionally within the field, ensuring the correctness from the specialized field is vital. The first scope of the Research phase is Domain Knowledge Research, covering both having the basic understanding about the Acupuncture field and acquiring the required information to be included in the final system.
2. **Technical Research & Upskilling**: To cover up the requirements of the technical skills that are out of scope of prior experience of all team members. This include:
    a. **Tool Feasibility Research**: To perform a basic evaluation about the technologies used in the project (based on the planned list of technologies to be included in the Technical Stack) and decide whether they are able to fulfill the list of requirements proposing for the project.
    b. **Technical Skills Upskilling**: To acquire the basic skills required to use the technologies (especially the new and unfamiliar ones) for applying and integrating into the final system to build and develop the proposing list of features. This can cover both gaining experience through online lessons, demo projects or performing technical experiments.

II. RESEARCH & UPSKILLING GOALS

The objectives and expected outcomes for the Research phase and Upskilling phase of the project, which is before the Development phases, include the following points:

- **Having the basic understanding about Acupuncture**: All team members have very limited understanding about Acupuncture prior to the project. To be able to acquire basic understanding *(noted: the level of understanding required for this project should be limited to only the basic concepts within Acupuncture field, not too deep knowledge or those topics that are still in research)* about Acupuncture, the Journal Articles Research is one of the approaches.
- **Acquiring the information required for the functionalities of the system**: The project no more proposes the feature of the Acupuncture Points Combinations Recommendation System. Instead, more Domain Knowledge about the Acupuncture points and Meridians are planned to be included, and supporting both Vietnamese and English language. The important points are provided in the personal slide of MMed. Minh Ma Hoang, one of the two specialist consultants. However, it still requires collection into ready-to-be-integrated format. For the remaining acupuncture points and information about the meridians, it should be collected from the suggested medical books.
- **Evaluating the feasibility of the project in terms of the technologies used**: Research in depth about the tools used for the project, even for those with experience before, ensure that the selected Technology Stack is feasible to be used for developing the list of functionalities proposing for the project. We want to have a careful consideration before making final decision, and make sure that there would be no difficulties arise during the implementation of the project that are caused by technology limitations of the tools.
- **Acquiring the basic skills for applying technologies for implementation of the project**: Not all technologies listed in the Technology Stack of the project are those used by all team members before the project. Especially the use of Three.js library for rendering 3D model and items into browser environment (which is a completely new topic for all team members), which is not easy to use but requires a moderate level of proficiency to be able to apply for developing the features of the system. Upskilling phase is a good time to make sure the responsible team members for related technologies applied in developing specific features or components / modules of the final system are fully equipped with the technical skills required for development.

III. RESEARCH & UPSKILLING PLAN

III.1. DOMAIN KNOWLEDGE RESEARCH

- **Description**: Domain Research aims to fulfill the team members with basic understanding about Acupuncture and acquires some basic information about the Acupuncture Points and Meridians, in both Vietnamese and English, to be included in the Search system of the website and to be displayed with the 3D model.
- **Method**: Scan the .pdf file or personal slides suggested by Dr. Minh, and type the filtered content into Spreadsheet. Data to be involved in the Dataset would be collect in two different languages: Vietnamese (to match with expectations of Stakeholders) and English (for marking and final asessment purpose).
- **Sources for collection**: There are some books suggested by Dr. Minh, but not all of them are publicly shared with digital .pdf file. Buying a printed paperback version is not a good idea, since it is required by all team members, not just one, and medical books are also usually very experience. The bolded items in the following list are the ones agreed to be used by the team, and have the .pdf version available in the Google Drive workspace of team:
  - Từ điển châm cứu (Hoàng Duy Tân)
  - **Học châm cứu bằng hình ảnh (Lê Quý Ngưu)**
  - **Anatomical Atlas of Chinese Acupuncture Points (Chen Jing)**
  - WHO standard acupuncture point locations in the Western Pacific region (WHO Regional Office for the Western Pacific.)
  - The 361 Classical Acupuncture Points: Names, Functions, Descriptions and Locations (Stuart Lightbody)
- **Estimated time**: 6 weeks
- **Target**: Collect the following set of information:
  - Information about the 14 meridians to be included:
    - Meridian code
    - Meridian name
    - Meridian path description
    - Meridian main related diseases
    - Acupuncture points of meridian (code only)
  - Information about the 60 most commonly used acupuncture points (selected by Dr. Minh):
    - Acupuncture point code
    - Acupuncture point name (Transliteration and Vietnamese)
    - Acupuncture point description
    - Acupuncture point location (can be anatomically related)
    - Acupuncture point functionality
    - Acupuncture point triggering method
  - Basic information about the remaining 299 acupuncture points:
    - Acupuncture point code

  - Acupuncture point name
  - Acupuncture point brief description
  - Acupuncture point belonging meridian

Note: For the fields not available in any of the two required languages, please use Google Translate to translate the information from the remaining language. Besides, the books may use different version of the names of some acupuncture points, meridians. To make it compatible and ease the Integration step, please refer to the Wikipedia for "List of acupuncture points" and use the name provided in "Transliteration" column there as the default one.

- **Division**: Equal number of items to collect for each week:
  - **Week 1**: Collect data about 14 meridians:
    - Divided into 7 meridians / one member
    - 2 remaining members will cover another task besides data collection
  - **Week 2**: Collect data about 60 most commonly used acupuncture points:
    - Divided into 15 acupuncture points / one member
    - For each point, both Vietnamese and English information must be collected
  - **Week 3-6**: Collect data about the remaining 362 acupuncture points:
    - For each week, 75 acupuncture points data must be collected
      - Two members would collect 25 acupuncture points each
      - Two remaining members would collect 13 acupuncture points each
      - The selection of which members to collect more points will depend on the number of remaining tasks during that week. Since this phase is overlap with the upskilling phase of the project
    - For each point, both Vietnamese and English information must be collected

Note: Please refer to the Spreadsheet "Job Division for Collecting Additional Points" on Google Drive workspace for the detailed division of items to collect, per member and per each week.

- **Format for storing the collection**: The fields of information to collect for each item have been defined above. For format of the Spreadsheet, take note some of the following points:
  - Each member has been provided with two sheets (including name and the language to be collected. For example, Nhan Nguyen Cao would use the sheets Nhan (V) for collecting Vietnamese information, and Nhan (E) for collecting English information).
  - The fields to collect have been created by the default in each Spreadsheet.
  - Please collect the information corresponding to the order of points listed in the division Spreadsheet.
  - For field "Acupuncture point functionality", please convert the comma-separated format in the book to numeric bullet format in the spreadsheet.
  - Use the four colors chosen from the Sheet (Yellow, Blue, Red and Green) to mark the rows of the points corresponding to each Week based on the division.

Example of one correctly collected and stored item in the Spreadsheet, colored Yellow to mark this point is included in the batch of Week 1:

Acupuncture point code	Acupuncture point name	Acupuncture point description	Acupuncture point functionality	Caution
LU-2	Yunmen	Below the lower border of the clavicula, 6 cun lateral to the midline of the chest. When the upper limb is flexed forward, this point is just in the midline of the subclavicular fossa.	1. Cough 2. Asthma 3. Oppression in the chest 4. Chest pain	

Acupuncture point code	Acupuncture point name	Acupuncture point description	Acupuncture point functionality	Caution
LU-2	Vân môn	Bờ dưới xương đòn gánh, ngang với cơ ngực to. Chỗ hõm giữa cơ Đenta. Từ đường dọc chính giữa xương ngực đo ngang ra mỗi bên 6 thốn.	1. Ho 2. Bồn chồn trong ngực, đau tức ngực 3. Suyễn 4. Viêm quanh khớp vai	

III.2. TECHNICAL RESEARCH & UPSKILLING

III.2.1. TOOL FEASIBILITY RESEARCH

- **Method**: There are two main methods suggested for Tool Feasibility research:
  - **Review the documentation**: For the tools experienced before the project, it is fine to either based on prior similar usage or review through the documentation (usually provided on the website of the tool) to see if the tool is feasible to provide the expected function for developing the features.
  - **Run some demo code or seek for demo similar projects**: For the tools new to all team memebrs, review the documentation to understand the tool is a must. Besides, can consider trying the tool to perform some specific tasks or finding some similar projects that have been built successfully using the tool that may cover the same functionality.
- **Focuses:** Some of the tools included in the Technology Stack of the project that should be covered in this step:
  - **Three.js:** Front-end team should research in depth about whether the library has been used successfully to build a similar project, providing a 3D medical human body model.
  - **Jest:** Unit testing may behavior differently between Front-end and Back-end side of the project. Despite having experienced before from the Front-end team, the Back-end team should consider research about how to use Jest for covering unit test with Nest.js Back-end project.
  - **Puppeteer:** Automation testing is a completely new skill for all team members. Since this type of testing is planned to be included in the Front-end side only, it should be researched in condition of applying on React.js application, to understand basically the flow to use.
  - **CI/CD:** One team member has experienced with using CircleCI to set up CI flow before, so this is not a big challenge. However, setting up CD flow to deploy to different host services (for Back-end and Front-end), and the division of staging server and live server, should be included for research and experiments.

- **PyMongo:** Although Python was selected to be the language used for Data Integration, the library of PyMongo is completely new to the team. Following that, team should research about what is the easiest way to set up a notebook for integrating data from Spreadsheet directly into MongoDB database.
- **Vercel deployment:** Nest.js project is not very widely supported by all hosting services. As the team selected Vercel, which is based on the recommendations by some experienced people, over Heroku, which no longer provides free plan for hosting, team should research and attempt hosting a Nest.js project (can use old class projects) to see whether it could be deployed successfully into the Server.

III.2.2. TECHNICAL SKILLS UPSKILLING

- **Scope:** This plan provides details for Upskilling in the important library for the project, Three.js
- **Method:** Consider two following methods to be applied during Upskilling phase:
  - **Learn from video:** There are not many courses about Three.js that are provided for free. Instead, going through some short videos on Youtube can be a good method to apply.
  - **Learn from projects:** The scope of features provided by Three.js library is very large, and it is not good to study all of them. Instead, it is good to learn about the basic concepts first, then do some demo projects (should choose those having some similarities with the features list of the final system) to learn about the mindset and skills to apply the library.
  - **Perform technical experiments:** As a way to evaluate the feasibility, research about different techniques and solutions to develop the features for ths system, it is good to just initialize some demo projects and apply the skills learnt directly on the features validating. For example, it is good to try to render a 3D model (download a free 3D demo model from the Internet) and experiment about the appreciated camera angles that is expected to be used in the final system. Applying this method not only provides the required skills for later development phase, but can be reserved to be implemented directly into the final system.