COMP704 Research and Development Project

VN01 3D acupuncture healthcare data management and treatment system

Research & Upskilling Plan

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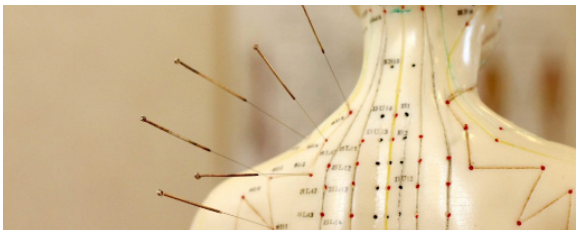

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Version	Timestamp	Description	Responsible members
1.0	15 Oct 2022 22:45	Initial plan and goals for achievements for Research phase and Upskilling phase of the project, based on the initial scope of the Project.	**Nhan Nguyen Cao** *(21142377)*

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. **Journal Articles 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 Journal Articles 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**: Besides the 3D model and the basic information required for display, the functionality of an Acupuncture points Recommendation system requires data about different combinations that are commonly used to cure common diseases. This is the main reason why our team selected the Journal Articles as the main sources for Domain Knowledge research, as we planned to acquire those combinations from the results of the published Journal Articles within the field.
- **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. JOURNAL ARTICLES RESEARCH

- **Description**: Journal Articles Research aims to fulfill the team members with basic understanding about Acupuncture and acquires some common acupuncture points combinations used to cure common diseases.
- **Method**: Scan Research Papers and Journal Articles, to collect suggested Acupuncture points combinations. At this stage of the project, all collected data should be stored in the shared Spreadsheet for all members "***RESEARCHED PAPERS, ARTICLES REPORT***" on team's Google Drive workspace, which will be inserted into the Database during the Development phase.
- **Sources for collection**: To ensure the trustfulness of data collected, it was suggested by the Supervisor that some famous libraries for storing Medical Journal Articles (based on her prior experience of researching in Medicial field during her PhD degree):
  - **PubMed**: https://pubmed.ncbi.nlm.nih.gov
  - **Clinical Trials**: https://clinicaltrials.gov
  - **Chinese Clinical Trials**: https://www.chictr.org.cn/
  - **National Center for Biotechnology Information**: https://www.ncbi.nlm.nih.gov/

  Besides, feel free to search **AUT Online Library** (https://librarysearch.aut.ac.nz/) using some basic keyworks like *acupuncture, acupuncture data, acupuncture data mining,* etc. to search for Articles and check whether there are digital version of the articles shared through the platform.

  Noted: As proposed by our Client, Dr. William Liu, in case of receiving an Article Paper but the language of the paper is Chinese, and thus, not publicly shared through the above websites, feel free to ask Dr. William Liu in Google Meets group. Dr. William Liu would support finding the papers in native Chinese journal article libraries to see whether he could get it and share to the team.
- **Target languages of papers**: There are two common languages of articles in Acupuncture field, Chinese and English. However, it is usually recommended that the Chinese ones seem to be better and there are more journal articles about Acupuncture in Chinese than English. Because of that, we would not limit to only scan the papers in English, but also Chinese. Following this plan:
  - **English**: Skim, scan the papers, identify the method used, and acquire the results.
  - **Chinese**: Seek for the English abstract of the paper (almost available for all papers that are accessible from the above sources), to evaluate the method and collect the required combinations.
- **Estimated time**: 5 weeks
- **Target**: 100 papers for the whole team
- **Division**: Equal number of papers reviewed for each member:
  - **KPI**: 5 papers / member / week (estimated 1 paper for each billable day of the project) => Estimated 20 papers / week for the whole team

- **Format for storing the collection**: Please collect the following piece of information for each paper:
  - **Paper ID:** Unique to each paper. This would be used to make sure team members do not duplicate the paper scanned by others.
  - **Paper Title**
  - **Paper URL**: Include the direct URL to the page where the paper was accessed (from the above Collection sources), not the URL of the .pdf version of the paper
  - **Disease**: The English name of the disease the paper is researching about
  - **Combination**: List the acupuncture points involved in the combination in any order. The points should be listed by their codes, and separated by a comma with ONE white space (follow the format to prevent conflicts during Integration step). In case the paper suggested multiple combinations, select a confidence threshold (or choose the one included in the Conclusion of the paper) and collect ALL combinations passing the threshold, fill each in one row in the Combinations sheet.

Example of one paper and one combination collected that has been put into the Spreadsheet in true format:

Paper ID	Paper Title	Paper URL	Member	Status	Disease
10.1159/000521346	Analysis of Acupoint Selection and Combinations in Acupuncture Treatment of As	https://autuni.sh	Nhan Nguyen Cao	OK	Asthma

Paper ID	Disease	Combination
10.1159/000521346	Asthma	BL-13, BL-20, BL-23, EX-B1
10.1159/000521346	Asthma	BL-13, GV-14, BL-12

Noted: The Spreadsheet has been formatted to automatically check for duplication. When you type in the Paper ID, the Status column would display "OK" and color green if the paper is not duplicated. Otherwise, it would display "Duplicated" and color red.

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.