SIH25015: Intelligent Pesticide Sprinkling System Determined by the Infection Level of a Plant

Mode: Hardware

Two tasks: Identification of disease, regulate the pesticide level

Identification: Disease/ pest should be given as input by capturing the plants through cameras. To check the environmental conditions (soil moisture, temperature) of the field, sensors is required. Environmental conditions play role in the severity of disease. These both will help in disease prediction.

Regulating the pesticide level: Check for severity of disease and calculate the dosage level of pesticide. Electronic sprayers are needed to spray the pesticide for the required.

Ok with smaller farms but becomes difficult with wide areas. For large field purpose, only drones can be helpful for capturing images. Mobile cameras are not sufficient to capture each and every plant in a field. The field should be partitioned in terms of blocks in system’s view. The captured images should be forwarded to the system in order to find severity and dosage level for each block. A network pipeline should be maintained within each blocks to regulate the level of pesticide spraying. Here the sprinkling is not done for each plants but for each blocks. Within a block, most probably every plants share the same extent of infection, not much difference will exist. So we need a monitoring system to i) monitor each blocks ii)calculate dosage level iii)sending them to sprinkling system. The system should also predict the pesticide being used or else ok with farmer’s choice. But we must know what kind of pesticide is going to be used ,bcoz to have a knowledge about its ingredients and their composition.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH25024: Comprehensive Cloud-Based Practice Management & Nutrient Analysis Software for Ayurvedic Dietitians, Tailored for Ayurveda-Focused Diet Plans

Mode: Software

This stmt aims to combine Ayurveda with modern technology. Dietitians, patients can be able to use this platform by having their own personal accounts, suggestions, cusines and dietary plans. So first need to develop a database that contains Ayurvedic properties of each ingredients, their taste (out of six: Sweet, Spicy, Salty,..) and medicinal values. The tables may include food, patients, ayurvedic properties, diet plans,.. An additional feature we have to incorporate is that including modern nutrition metrics like calories, macro and micro nutrients in food tables, digestion type(easy/hard) and tastes. We also need details of users like their age, gender so that our suggestion should be made accordingly. We need logics to combine caloric/nutritional requirements with Ayurvedic rules. The product should suggest Ayurvedic dietary plan for users based on their health conditions. We can also add reporting like giving their suggestions in terms of downloadable pdfs, easily understandable charts.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH25026: Develop API code to integrate NAMASTE and or the International Classification of Diseases (ICD-11) via the Traditional Medicine Module 2 (TM2) into existing EMR systems that comply with Electronic Health Record (EHR) Standards for India.

Mode: Software

NAMASTE codes: 4,500+ standardized terms for Ayush disorder

International Classification of Diseases (ICD-11): 529 disorder categories & 196 pattern codes for traditional medicine.

EMR platforms: interface for supporting diagnostic entries

We need to build a mapping engine to relate NAMASTE codes with ICD-11 TM2 modules with use of ontologies (SNOMED CT and LOINC) to provide correct semantic context. The system should Support multi-coding (traditional + ICD-11) in clinical forms and workflows.

i) Gather requirements like patient info, diagnoses, his/her clinical observations from user side. From system side, collect NAMASTE codes, ICD-11 lists.

ii) We need to define EMR and map traditional codes to FHIR resources (condition, observation and procedure).

iii) Authentication should be given importance. Link ABHA (India’s health record IDs) for good security purposes.

Overall, the product should be able to transform paper based records to digital formats by mapping techniques. It also helps healthcare practitioners in easy search of disorders with respect to patient records and aligning Ayush with national and international reporting standards.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH25036: Development of Sensor for Detection Of Microplastics

Mode: Hardware

Tasks: Optical detection, ML classification, Result

Optical detection: Components like diodes, spectrometer, cameras are used for finding objects. They should be monitored by microcontrollers to receive signals.

ML classification: Classification of received objects whether a microplastic or not.

Result: Displaying results in web dashboard, or with mobile apps

Coming to water bodies, first we need enough light source for object detection with help of LED, lasers,... They can be fit in the detection chamber. For this we need to maintain a filtration chamber to avoid large particles entering into the system(optional). Image capturing can be done with sensors like cameras and diodes. They are controlled over by microcontrollers(Arduino) to process signals. ML model is trained in a way such that it separate microplastics from all other objects like dust particles, or anyother wastes. We need connectivity between all these equipments. The output is like whether the captured object is microplastic or not. For some interactive display, we can also show out the captured image of objects.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH25068: Real time Groundwater resource evaluation using DWLR data

Mode: Software

We need to collect data from 5260 DWLR stations across India to visualize groundwater utilization. Visualization varies with different locations with different time periods. We should clearly understand the fluctuations in water level and its recharge rate dynamically from input data. Our product should provide tools for users (government, farmers, researchers) to evaluate groundwater availability, so that they can plan and manage accordingly. We can find analytical patterns in recharge estimation and trend detection. The interface should vary according to users’ role (officials, public, researchers). Since it is asked to develop a mobile app, we can make alerts through notifications during dry seasons. In this statement the major task deals with collecting a wide variety of data and analysing trends.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH25094: One-Stop Personalized Career & Education Advisor

Mode: Software

Choosing of right career path is complex due to abundant availability of courses, colleges, job roles. So students have difficulties to find their personalized guidance according to their interests.

i) We need to gather features needed by students, professionals and career assessment frameworks for recommendation algorithms. DB is based on users, careers, courses, institutions, job roles.

ii) Starting form user registration, we need to match user profiles with available careers and job opportunities. We can make use of collaborative and content based filtering along with NLP for parsing the text. The model can also have a inbuilt mentor chat to have user friendly environment.

iii) Needed with integration of API for college/course/job like Coursers, Linkedin or govt portals. It can also come up with payments for premium services.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH25104: Language Agnostic Chatbot

Mode: Software

The aim is to develop multilingual chatbot (minimum 5 languages) to resolve queries and doubts rised by the students. The govt portal or college’s official website, whatsapp,.. can make use of this chatbot to have a good reach.

i)Identify the local language support requirements of the system.

ii) Since it is purely based on NLP, we should develop a conversational AI platform with multilingual support.

iii) Then add this feature in websites, mobile apps where users are in need of multiple languages.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

SIH12507: Develop computer programs (in any language, preferably Python) to identify the design principles behind the Kolam designs and recreate the kolams.

Mode: Software

Tasks: Analyse patterns, Recreate

Analyse patterns: Kolams are of many varieties that differ region to region. Some examples include dotted kolams sharing similar patterns connected by dots, Rangolis that make use of freehand art, 3D patterns which are being designed by colors, Muggulu kolams,.. We need to extract mathematical pattern behind these deigns like graph, geometry, repetition, symmetry and matrix. Finding the patterns in kolams make easier to generate our own patterns.

Recreate: We need to process the image (OpenCV,..) to identify dots and lines which is similar to graphs and edges. The challenge is find the pattern behind this image. Once pattern is identified we can recreate the design with Python libraries. We should make use of rule-based pattern generation for making it more accurate.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*