GALGOTIAS UNIVERSITY

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AGRICULTURE DATABASE USING SATELLITE

A Research paper Project - 1

Submitted by

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1.Abstract

Agriculture database using satellite data is used to keep record of the agriculture sector where farmers and agribusinesses have to make innumerable decisions every day and intricate complexities involves the various factors influencing them. An essential issue for agricultural planning intention is the accurate yield estimation for the numerous crops involved in the planning.

The agricultural information system provides its users and researches to get online information about, the crop, statistical details and new tendencies. The trends of the crops act so that these will be pretty important to the users who access these via the Internet. The main features of the information system includes information retrieval facilities for users from anywhere in the form of obtaining statistical information about fertilizer, research institutes and researches, land availability, diseases, suitable soil concentration for the corresponding crops, statistical information about exports and etc.

The database will provide the data from the satellite which is free for the normal user in an easy manner because extracting the data directly for the various purposes is difficult.

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CHAPTER NO. TITLE

2. Introduction

Developed countries are using Management Information System to assist deferent task for their end users or clients. Other than that developing countries have to provide Information for their peoples who are interested.

- Smart farming is important for tackling the challenges of agriculture production in terms of probability, environment impact.
- Food security, sustainability.
- As the global population has been continuously increasing a large increase on food production must be achieved maintaining the same time availability and high nutritional quality across the globe.
- To address these challenges, the complex, multivariate and unpredictable agriculture ecosystem needs to be better understand by monitoring, measuring and analysing continuously various physical aspect phenomena.
- Large scale observation is facilitate by remote sensing performed by means of satellites and various other aerial vehicles.
- This implies analysis of big agricultural data and use of new information.

This provide easy access to the database for all type of data manipulation. Security of the database is ensured by the use of a password for updating purposes.

This Information System is a very urgent requirement to make and Information System available on line. Definitely this will be helpful to the people who does higher studies on crops, investors scientists, research student, planters, importers, exporters ect. This agricultural system fulfill above requirements.

3. PROJECT OBJECTIVES

A. Developing an user friendly agricultural Information System for the worldwide web which fulfill the Agriculture Interested People's requirements.

B. Targets : Mainly Sri Lankan crop such as coconut, rice, tea, rubber ect.

C. Provide all the information for the Research Institutes , Buyers , Planters and Investors.

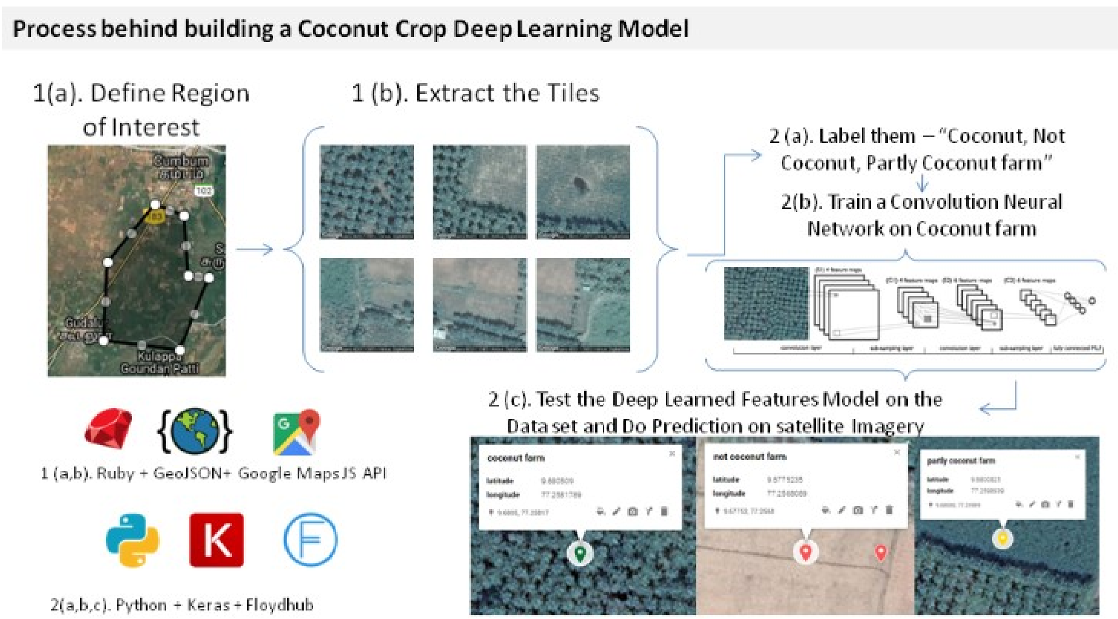
D. Database updating can be done by authenticated users in the research institute thought Internet

E. Most of the reference information for the cultivators and decision making level people in Agricultural Field in Sri Lanka. Ex. Latest fertilizers , Special chemicals.

F. Monitoring and Baking up Database and Users details for future use. Ex. Data mining /Data warehouse and Analyzing purposes.

4. PROJECT SCOPE

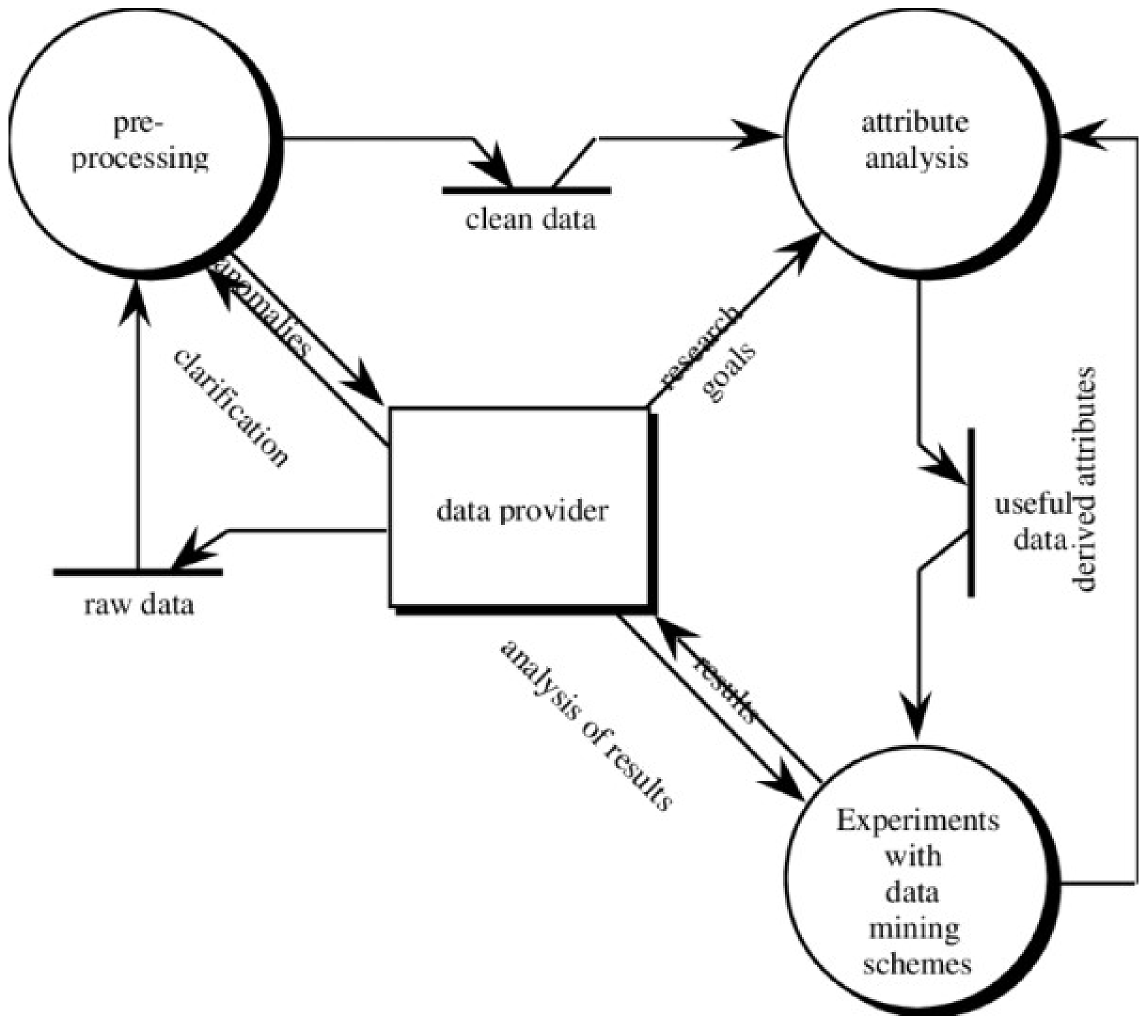
Any user can retrieve data form the Information System. Authenticated users in each major Institute are given permission to insert information though the internet but not to delete. Only data administrator can delete unnecessary information and modify the database.



5. DATA FLOW DIGRAM:

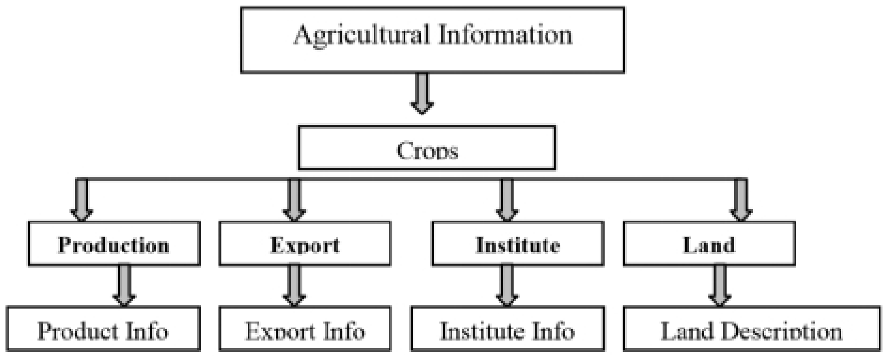
Data flow design is concerned with designing a sequence of functional transformation that converts system imports into the require outputs. The design is represented as data flow diagram illustrated how data flows through a system and how the output is derived from the input through a sequence of functional transformations.

Data flow diagrams are useful and intuitive way to describing a system. They are normally understandable without special training, especially if control information is excluded. They show end-to-end processing. That is the flow of processing from when data enters the system to where it leaves the application can be traced.



pre-
processing
clean data
attribute
analysis
anomalies
clarification
research
goals
data provider
raw data
useful
data
derived attributes
analysis of results
results
Experiments
with
data
mining
schemes

INSERT DATA TO THE SERVER



6. LITERATURE SURVEY:

6.1 Implementation or architecture diagrams

EOS for in-season agricultural decision support

EOS sensors provide measurements of crop reflectance and structure that

can be related to biophysical properties, such as LAI,

height, yield and growth stage (Figure 2). However, it is important to note that EOS rarely provides direct measurements of these biophysical properties; instead, it is common to exploit EOS data within a data science approach and use crop models to link EO measurements to crop dynamics of interest (Figure3).

Yield prediction is a major area of interest within agriculture and numerous models have been developed for crops including wheat, maize, sugar beet and potatoes. Typically, a series of direct ground measurements of the crop are recorded throughout the year, such as tiller number, leaf area index, crop height, weed infestation, and are used to monitor production. Yield is then usually forecast using regression against previouslymeasured yield data. Key parameters that can be estimated from EO are increasingly incorporated into yield models, for example weed infestations from high spatial resolution data or vegetation indices used to infer LAI. The main advantage of EO in this context is the ability to rapidly assess parameters over far larger spatial areas than can be recorded on the ground.

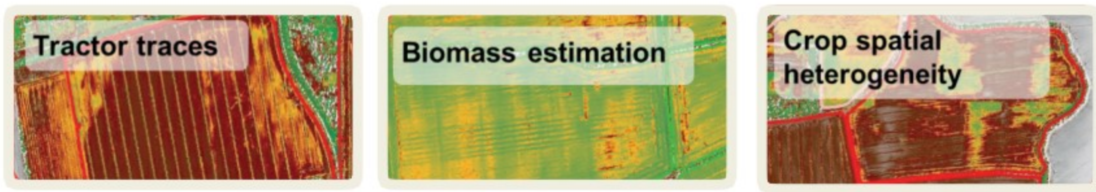


Figure 2. Example measures derivable through assessment of EO data (Imagery Source – Planet)

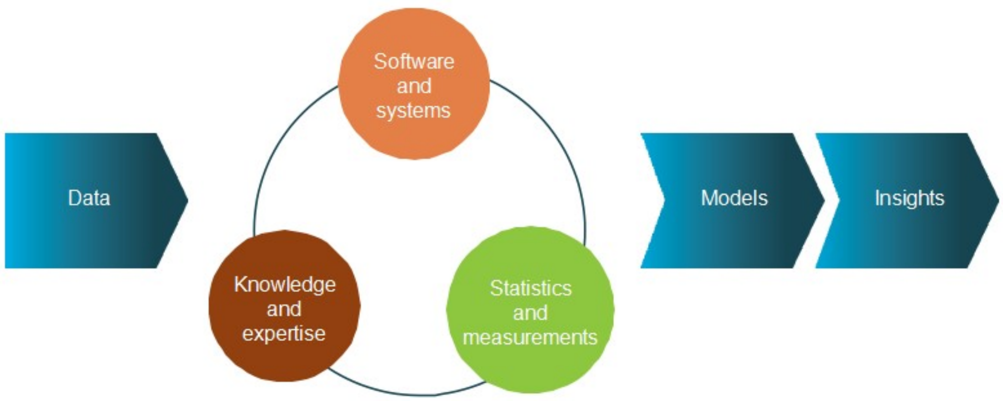


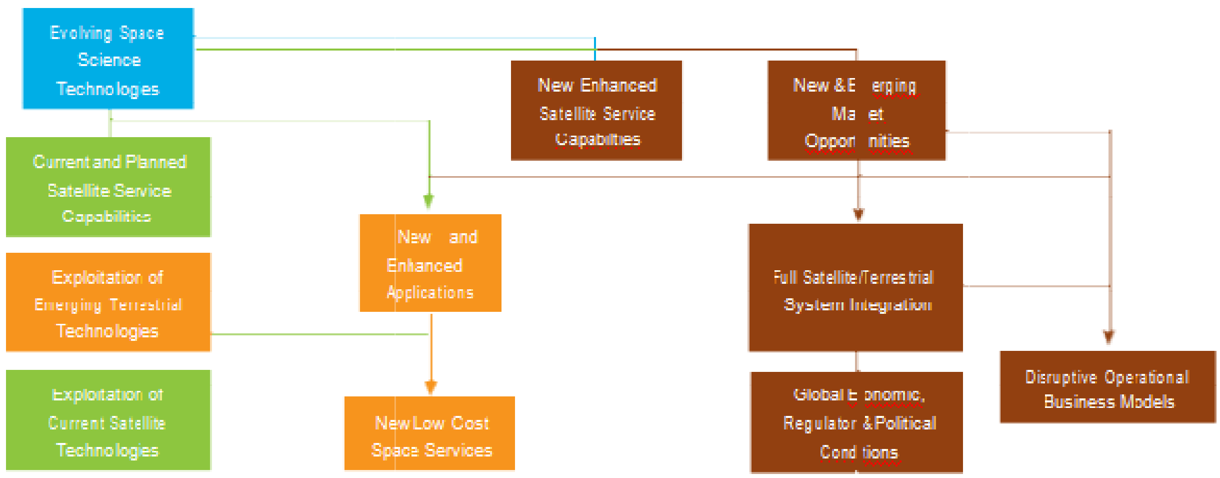
Figure 3. System integration required to turn data into knowledge

EO data can also be incorporated with more complicated numerical crop models that use agro-meteorological parameters (eg temperature, rainfall, radiation, crop type, soil type, nutrient availability) to estimate crop biomass, health and yield. EO data can be directly fed into these

models, providing spatial and temporal data necessary to update the model during the season and improve predictions. These systems can operate at local scales, such as Fruitlook (**www.fruitlook.co.za**), which is a

pre-operationalserviceofferingSouthAfricangrapeand deciduous tree growers weekly estimates of eight crop parameters to inform them on crop growth, water use and nutrient status, together with a forecast of soil moisture content. Fruitlook obtains its estimates by directly feeding EO data into energy and water balance algorithms.

6.2 SATELLITES FOR AGRICULTURE



The Satellite Applications Catapult periodically undertakes research to create technology roadmaps aimed at facilitating the understanding of future technological innovations in the satellite industry.

The innovations identified in this work will have positive impacts on the agriculture industry, particularly around frequency, cost and detail of information available both spectrally and spatially.

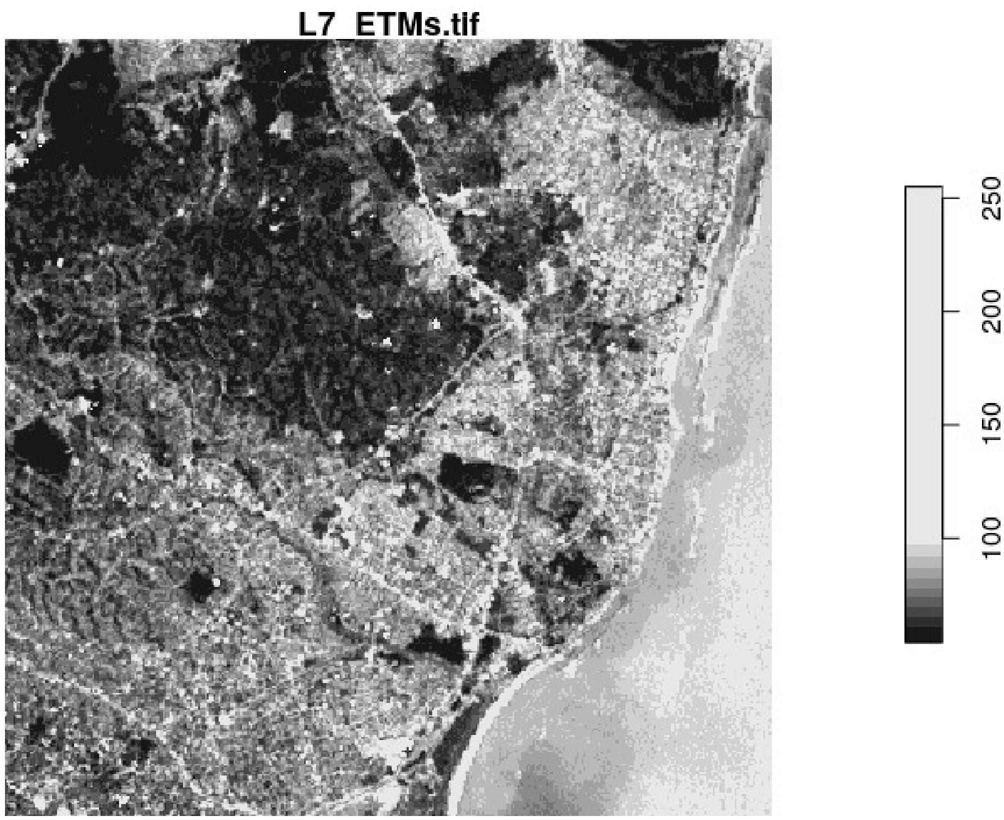
6.3 REAL TIME DATA

Greater demand in near real-time applications, especially from the commercial and defence markets, has led to the development of geostationary data relay satellites, such as ESA's European Data Relay Satellite System (EDRS), the first of which was launched in 2016.

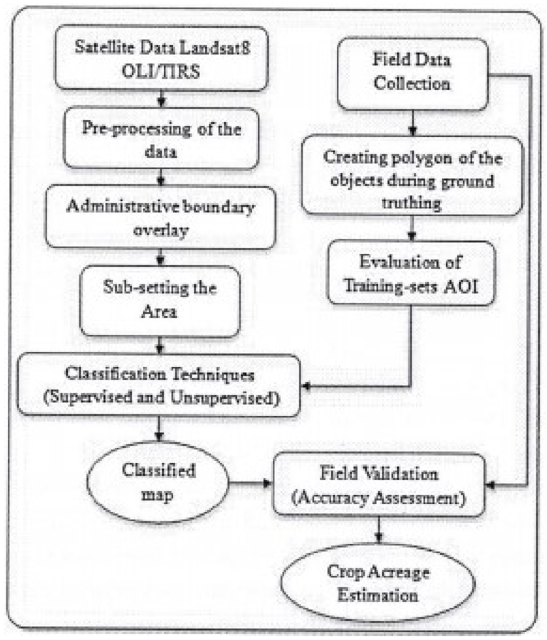
Such satellites will enable EO satellites in low Earth orbits to have almost continual communication with ground control stations. This will facilitate near real-time data transfer from satellite to ground.

6.4 FIELD DATA COLLECTION

Field survey data is an essential component which provides information about geographical condition and to validate satellite imagery. The random sampling technique was applied for each land cover type and the required number of sample points for each land cover type was obtained. The sampling technique was applied with unsupervised classified map which was generated through K-means clustering techniques. On visual interpretation and help of Google Earth each land cover type was identified on the basis of their unique spectral signature and the Mentha crop showed unique features (signature) in the May month in between all land cover types. The field survey data was conducted to verify and sample the ground location during the transplanting stage (early mint), middle stage and the harvesting stage of mint crop from month March to June



The GPS points were chosen for each land cover type and the field data details were noted with the crops types, date of showing, showing areas and growing status were noted with their geographical location.



7. EXISISTING SYSTEM

1. API to satellite images for the crops

Data: NDVI, EVI, TRUE and FALSE colours

- NDVI (Normalized Difference Vegetation Index), EVI (Enhanced Vegetation Index) are the most common indicators for assessing vegetation progress over time
- TRUE and FALSE colours used to visualise vegetation cover and differentiate it from urban land or any other land not used for agricultural purposes, it is also helpful for distinguishing between different types of vegetation
- 4 presets of custom palettes for NDVI images
- Based on Landsat 8 and Sentinel 2
- Data are available for the most of agricultural areas

2. API to special parameters for agri

Data: accumulated temperature and precipitation, soil temperature and moisture

- Accumulated temperature and precipitation is essential to make a right decision depends on a threshold setting. Temperature quantity index calculated as the sum of daily temperatures. Humidity quantity index expressed as the sum of daily precipitation.
- Soil temperature and moisture are essential indices that allow your customer to adjust irrigation work and prevent crop roots damage.

8. PROPOSED MODE

SOFTWARE:

Web authoring tool as front page dream weaver .

Web browsing Tools Ex.

Internet explorer, Firefox, Chrome. Database SQL server , Oracle or my SQL .

User Interfaces Java ASP or PHP.

Windows Plat forms or Linux Plat form.

Web server Apache or IIS (Internet Information Services).

HARDWARE:

Pentium II or higher processor.

Internet connection least or dial up connection

Live ware System administrator / Data Administrator.Programmer who has knowledge in on line databases.

9. REFERENCES

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