Proposal for IESL Day Hackathon 2017

Project: Expert Miner -- Discovering Earth Resources In Sri Lanka Using Hyperspectral Imagery

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What is Hyperspectral Imagery?
Hyperspectral imaging, like other spectral imaging, collects and processes information from across the electromagnetic spectrum.
Whereas the human eye sees color of visible light in mostly three bands (red, green, and blue), spectral imaging divides the spectrum into many more bands. This technique of dividing images into bands can be extended beyond the visible. In hyperspectral imaging, the recorded spectra have fine wavelength resolution and cover a wide range of wavelengths.
Hyperspectral sensors and processing systems are used for applications in astronomy, agriculture, biomedical imaging, geosciences, physics, and surveillance.
Certain objects leave unique 'fingerprints' in the electromagnetic spectrum. Known as spectral signatures, these 'fingerprints' enable identification of the materials that make up a scanned object.

What is "Expert Miner"?
Expert Miner is a software program which uses Hyperspectral Image analysis to pinpoint the natural earth resources in Sri Lanka.

Why is "Expert Miner" useful?
Since mining is a capital intensive process developing countries such as SriLanka find it hard to reach local investors. The reason being, the traditional methods used for exploration such as geological method has a low success rate, and when it fails, most of the costs are identified as losses. Expert miner assists in increasing the success rate and gives a significant assurance regarding the existence of a mineral.

Target users
The mineral mining companies
Oil mining companies
Government

Similar products and competition

There are no similar product at the moment since HSI is a relatively new technique.
The alternatives are the traditional geological and geochemical processes which are risky and costly (Since expedition may fail). Expert miner reduces the risk involved in expedition.

Technologies and resources

Hyperspectral image data of Sri Lanka from Nasa Satellites (available for free)
Hyperspectral spectrums of minerals from universities (available for free)
Numerical computing packages- MATLAB, Python (Numpy, Scipy, Matplotlib)
University of Peradeniya servers (http://www.tesla.ce.pdn.ac.lk/)

Revenue Model

Selling the software to mining corporations.
Consultation services for mining corporations.

Marketing strategy

As the early birds into this field, Expert Miner would be able to capture a significant portion of the market.
Since HSI is a relatively new technique, due to the lower competition we could achieve economies of scale at a much faster rate.

Customer perspective

Mining is a risky business, thus the investor confidence is low. This is due to the higher failure rates at the initial stage. Expert Miner increases the investor confidence by giving a significant assurance even before starting a project.

Feasibility

The costs incurred are low (or none) since all the tools and data are available freely.
The product would be highly seeked by the industry since it solves one of their major problems and the benefits outweigh costs vastly.
Thus the product is feasible in every way.

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