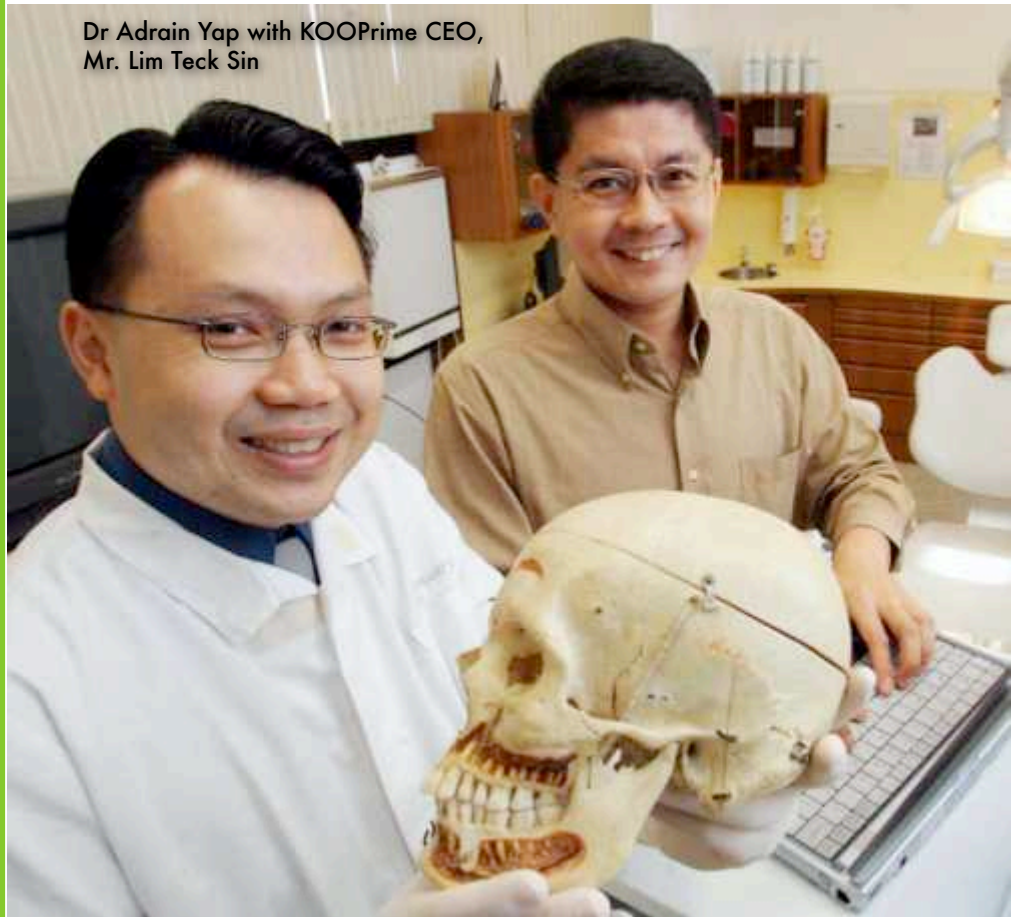


KOOP'

SPRING '06

Dr Adrain Yap with KOOPrime CEO,
Mr. Lim Teck Sin



Clinical Decision Support System for Diagnosing Jaw Pains

Singapore, Nov 05 ~ A Clinical Decision Support System (CDSS) is recently developed between KOOPrime and Dr Adrain Yap, an associate professor at the National University of Singapore (NUS). This is a system positioned as a computer-aided tool to support clinicians in their diagnostic efforts.

To demonstrate its capability, CDSS was tested by Dr Yap on patients who are suffering from Temporomandibular Disorders (TMD). These are patients who are in so much pain from jaw joint disorders that they often can't open their mouths more than two fingers

wide. This is especially so when patients are under stress and involuntarily clench their jaws and grind their teeth. Frequently, patients find themselves visiting various specialists (from neurosurgeons to ear-nose-throat doctors) but are still unable to relieve the suffering.

As Dr Adrian Yap mentioned, 'TMD is not very well-covered in the Asian syllabus, and the awareness of it is very low in Asia, unlike in the United States'. Given that only senior doctors in countries like Singapore have the experience to spot the problem, a diagnosis aided tool like CDSS thus comes in useful.

CDSS comes with two key modules, including a Questionnaire module to collect clinical information, and a Artificial

Intelligence module to recommend a diagnosis. With regards to TMD, CDSS is currently able to advise on the patient's physical problem and also on his psychological and pain handling status. Given the feedback, the doctor can then make an informed decision on the prescription of relevant treatments and psychological help.

This is probably a first in the world. As at present, clinicians in US have to collect and enter

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data in batches into a main-frame system. As such, it may take months for a diagnosis to be made.

Currently, the software system comes in English, Chinese and Bahasa Melayu. It is being used by researchers across Australia, Malaysia, Brazil and Hong Kong. Given that the same parameters (questions and rules) are being used in these sites, data collected are 'standardized' and facilitate comparative research across the region.

As highlighted by Dr Yap, 'Systems like this one cut off the problem of human subjectivity. Now we can get a diagnosis without too much personal expertise needed. This is a prototype of what is to come in the future of medical diagnostics.'

Explained KOOPrime's chief executive, Mr Lim Teck Sin, on the quality of results, 'The system that is developed is based on the same set of questions and diagnostic rule sets defined internationally. We look forward to improve the efficacy of systems in other disease areas as well. Going beyond diagnostic assistance, the team is also exploring ways to deploy CDSS for automated image recognition and interpretation, drug prescription, safety alerts, etc., thus improving patient safety, quality of care and efficiency in healthcare delivery'.



Effortless tracking of Zebrafish through the use of KOOPrime's Zebrafish Management System

Managing Millions of Fishes With a Single Click!

Singapore, Dec 05 ~ Zebrafish is increasingly becoming a popular animal model for research. Due to the external development of the transparent embryo, the Zebrafish is a prime model for genetic and development studies, especially when it has high reproductive rate, being capable of laying up to a hundred eggs weekly. It is thus without surprise that the Institute of Cell and Molecular Biology (IMCB) recently setup a state-of-art Zebrafish Facility to provide comprehensive services for basic research in both vertebrate genetics and developmental biology.

The facility currently manages more than ten thousand fish tanks. As such, IMCB needs a fully integrated data management system that caters for various aspects of the modern laboratory animal production and research center

operation. Customized from the KOOPrime's Animal Management System, the IMCB Zebrafish Management System is a web-based, fully integrated system that facilitates many aspects of data management and communication for the animal research facility. Built to be pervasive, users can access the system anywhere in the world via Internet connection. Various functions are organized in a user-centric manner and is fully customizable with the intention to replace traditional management systems such as paper ledgers and electronic spreadsheets. An important consideration is also to uphold the principles and guidelines setup for the proper care and use of animals for scientific purposes.

The Animal management System is divided into modules. Each module is designed to perform specific functional role of the management system. Features include, Animal tracking where each strain of zebrafish is tracked by unique ids generated by the system. Users will be able to

access the system and check the up-to-date status of the Zebrafish. Extensive recording of the animal data such as the wellness of the animals, daily observations, medications, treatments are monitored. Heritage tracking is also built in to locate the parental lines of each strain of Zebrafish.

Another important module is the task manager which allows users to view, create, edit and customize user task. Built-in security features and user management modules protects inadvertent loss of important data and can be customized so that certain users only get to access a subset of the system functionality.

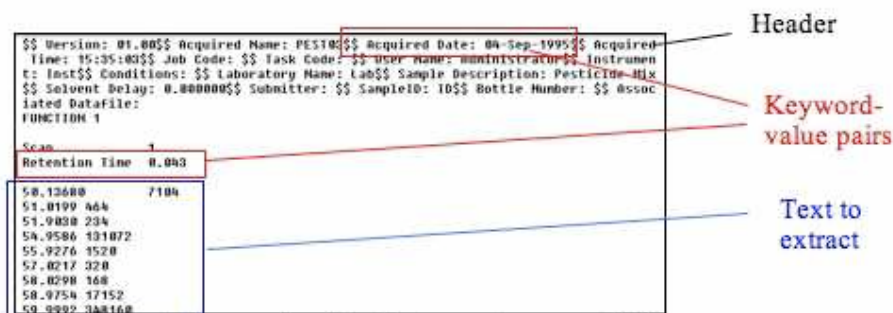
In addition, an account management module that connects to the IMCB SAP system is configured to keep track of the transactions and cost of each service orders (for both users internal and external to IMCB).

With its user-centric user-interface and robust backend , KOOPrime aims to continue to expand the usage of its Animal Management System so that it can not only serve the Zebrafish users, but also other animal facility users in Singapore and beyond.

Managing 'Semi-Structured Text'

Singapore, Dec 05 ~ 'Semi-structured text' refers to documents that convey information via layout and format of text. This includes many of the web-based documents, instrument generated data, bio-databases,

and et-cetera with defined formats. Embedded within such semi-structured text are **keyword-values** pairs, whereby the "keyword" values occur at the beginning of text while the corresponding "values" are separated by a delimiter, such as a space. For example, instrument generated data files often have a header, followed by tables of numbers that are separated by empty lines.



An example of an instrument generated file

What is frustrating is that not all the data in such text are useful or relevant. Users often have to manually extracted chunks of text and copy them into software like Excel for formatting. The efforts become tedious when users have to perform such information extraction work for tens or hundreds of files on weekly basis.

The Semi-Structured text System (SSS) is hereby developed between Institute of System Sciences and KOOPrime to address

such issues. An objective is to deliver to the market a system that will allow users to automate the extraction process themselves. SSS is to provide a mechanism for users to visually mark out the keyword-values pairs, thus generating an **extraction template**. SSS can then proceed to extract the 'values' given the 'keywords' identified in the template. SSS is thus a

time saving tool that facilitates users to extract information from large batches of raw data files and in a consistent manner.

Of interest is that SSS also allows users to define a couple of popular formats, e.g. delimited or XML formats so that the extracted data can be in a format suitable for immediate importing by Excel, SPSS and

various analytical software.

SSS is presently implemented in Java and can thus run on most software



Main screen of SSS that loads a raw data file for processing

platforms. An integratable version is to be released in the near future to allow SSS to be fully automated as a component for end-to-end workflow system like the KOOPplatform.

Expressed Sequence Tags - Simple Sequence Repeats

Malaysia, November, 2005 -

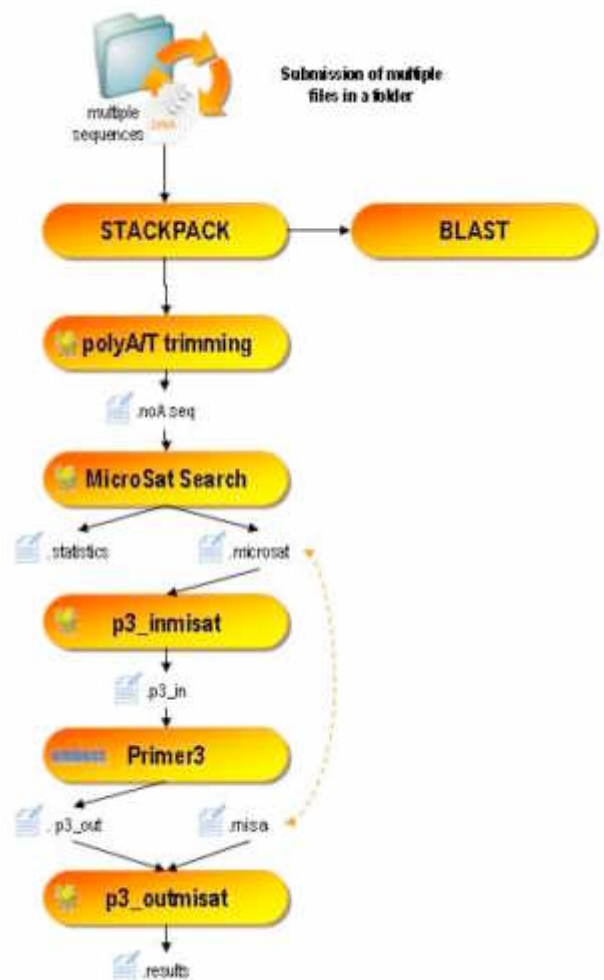
Molecular markers are useful tools for assaying genetic variation. Simple Sequence Repeats (SSRs) have been used for functional diversity study in natural population or germplasm collections. SSRs are also useful for construction of genetic map due to their co-dominant inheritance, multi-allelic property, reproducibility and relatively abundance.

A popular form of the SSRs is the Expressed Sequence Tags-Simple Sequence Repeats (EST-SSR) markers. They are a cost-effective representation of transcribed genes. Their putative functions are often inferred by homology search using BLAST, etc. They have been mapped in several crop species, including oil palm whereby they proved to be useful for marker-assisted selection. While expressed sequence tags (ESTs) projects have generated vast amount of sequence data from plant species and proves to be a good resource for gene discovery, gene annotation and marker development, a cost effective and ease-to-use approach is needed to utilize the ESTs for EST-SSR data-mining purpose.

A set of automated EST-derived microsatellite (SSRs) markers discovery workflows for oil palm EST sequence database was recently developed to streamline the molecular markers discovery pipeline from ESTs sequencing to the design of flanking primers. The workflows successfully integrate bioinformatics programs like STACKPACK2.2, BLAST and primer3 on KOOPPrime's holistic platforms, the KOOPplatform and KOOPortal.

The workflows also address the mundane routine work and accelerates the discovery the molecular markers. As of December 2005, the automated workflows have successfully processed more than 20,000 ESTs sequences for the oil palm genetic research group at Malaysia Palm Oil Board.

Besides being a rich source for microsatellites analysis, EST sequences are also a potential source for many other types of markers, such as Single Nucleotide Polymorphism (SNP). The automated pipeline established for mining the EST-SSR will facilitate mining for such useful markers in future.



Workflow of a set of automated EST-derived microsatellite (SSRs) markers

Publication:

Chua B. H., Low L. E. T., Lee W. W., Rajinder S. and Cheah S. C. (2005) Automated procedure in the development of ESTs derived microsatellite in oil palm *Elaeis guineensis* Jacq. National Genetics Congress, Crown Princess Hotel.

(Chua B. H., Low L. E. T., Rajinder S. and Cheah S. C. are staff of MPOB while Lee W. W. is staff of KOOPPrime)

Presenting at Berjaya Times Square Hotel and Convention Centre, Kuala Lumpur



KOOPrime presents at AgriICT2005¹

Malaysia, 29 September, 2005 – The CEO, Mr Lim Teck Sin was invited to deliver an oral paper entitled “New Wave of Bio-Research Technology - Connecting Domain Knowledge Workflow” in a conference, AgriICT2005. The event has the official support of the Ministry of Agriculture and Agro-based Industry and is organized by the Malaysian Agricultural Research & Development Institute (MARDI).

The theme for AgriICT2005 is “Revolutionizing Agriculture Through Information and Communication Technology (ICT)”. The Malaysian government has identified agricultural industry as an important engine for the country’s development and rapid advancement in ICT has brought positive changes to the agricultural industry. Of importance are innovations in information technology that facilitate more efficient management of agricultural resources. KOOPrime has been moving along

such directions to deliver its solutions for the users in agricultural sector.

During his talk, Mr Lim addressed various bottlenecks of the industry and how ICT platforms can be strategically deployed to improve local agriculture by connecting domain knowledge holistically. He also highlighted that continuous advancement, especially in database technology, expert systems, data mining, precision farming, bioinformatics, biodiversity resource management, etc. will accelerate the advancement in agricultural industry and spearhead the Malaysian economy.

More than 200 researchers, entrepreneurs and development personnel from Malaysia representing both the corporate and government sectors met and discussed on development for ICT applications in agriculture as well as to chart new opportunities in agriculture through ICT. It is acknowledged ICT has considerable potential to revolutionize the agriculture sector of Malaysia.

About KOOPrime

KOOPrime was established in year 2000 with the endeavor to be the leading provider of IT products and solutions for the Biomedical industry. This is made feasible via its flagship product, the workflow-agent (KOOPPlatform) and web-services (KOOPortal) platforms that integrate components dealing with Data Collection, Data Warehousing, Data Mining and Data Visualization. Systems delivered are Cross-Platform, Cross-Language and Cross-Domain. KOOPrime currently have operations throughout Asia, with focus in Singapore, Japan, Malaysia, Thailand, China and India. KOOPrime has also established presence in Europe and USA. Find out more at www.kooprime.com.

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