

Headline  
Date  
MediaTitle  
Section  
Journalist  
Frequency  
Circ / Read

The reinvention of Mimos  
29 Jun 2009  
The Edge  
NetV@lue 2.0  
N/A  
Weekly  
20,000 /

Language  
Page No  
Article Size  
Color  
ADValue  
PRValue

English  
2,3  
1146 cm<sup>2</sup>  
Full Color  
20,493  
61,479



# The reinvention of Mimos

BY AISHAH MUSTAPHA |

Once upon a time, there was a research and development (R&D) house with a bleak future, both in terms of R&D and its commercialisation. After decades of constant changes in its direction and tumultuous ventures, it seemed to have lost its way, caught between two different targets — profit making and hardcore R&D.

Three years ago, a new chief was appointed and things started happening, stirring up the silent house. Highly qualified talents were hired and researchers started getting recognition and rewards for their efforts in testing the barriers of science and technology. Industry was abuzz with the products coming out of the house which companies could put to good use. Failed commercial ventures were sold off so that the house could focus solely on R&D and technology transfer to support industry players.

This is the tale of the government research agency set up in 1987 — the Malaysian Institute of Microelectronics Systems or Mimos, as it now prefers to be known. In the last three years, Mimos has seen 526 patent disclosures with a record 191 patents filed. Before July 2006, a measly total of two had been filed.

All this came about due to the introduction of the Intellectual Property Reward Scheme (IPRS) by its CEO, Datuk Abdul Wahab Abdullah. True to its calling as a research agency, Wahab wanted to inculcate a culture of innovation and established key performance indicators

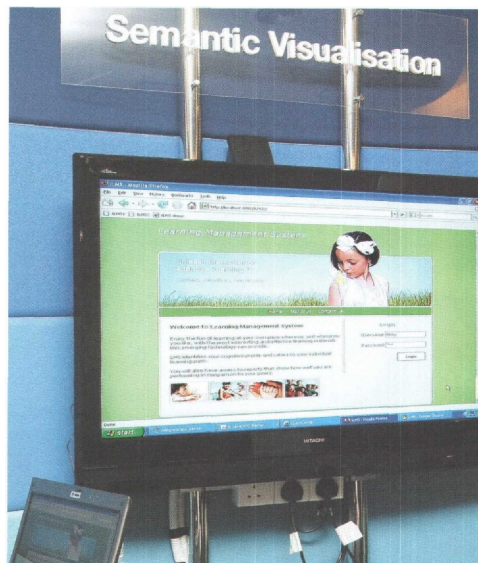
that emphasised this among its employees. With the IPRS, employees are rewarded for basic things such as disclosing an invention that has merit, even if no patents are filed or granted.

Today, Mimos has alliances with 18 local and 22 foreign universities as well as research institutes and is more than ready to work on its technology roadmap, specifically in the areas of knowledge technology, advanced informatics, grid computing, information security, wireless communications, and microsystems.

"We will create the platforms, and the industry will take it to the next level by creating the verticals," says Wahab. Technology platforms are packaged core technology which can then be further developed into products by customising its hardware, software or features. Industry players are already biting the bait, with 21 technology prototypes developed so far. Wahab has about 76 technology transfer applications and potential recipients under negotiations in the pipeline.

## Making sense with semantic search

In terms of search queries, semantic is the way forward. Semantic technology involves interpreting the human language to something a machine can understand and compute. For example, if a person were to query "halal restaurants near KLCC", the terms "near" and "halal" would be instantly understandable to a human, but not to a machine which deals with discrete data. Mining these kinds of data will require developing ontologies (a knowledge representation of a domain by establishing



Haniza showcasing the adaptive e-learning based on semantic visualisation platform

concepts, properties and its relationships), knowledge base and using artificial intelligence — the essence of semantic technology.

But why delve into semantic which will see fierce competition, especially from big technology players such as Microsoft and Google? Wahab says that the local interpretation and knowledge that Malaysia has will be beneficial to the local industry. "If you take the subject of rice or halal markets, there are plenty of things that Malaysia has that are different and unique from the rest of the world. Besides, we need to stop relying on technologies from outside."

Mimos has partnered with foreign institutes such as the German Research Center for Artificial Intelligence and local universities for its Semantic Technology Center. The semantic platform will cover general information and also the medical, financial, education, and agriculture industries.

Complex queries can also be presented as visual graphs instead of keywords with Mimos' semantic platform. Users can drag and drop

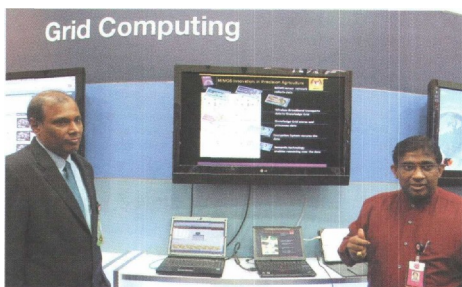
relationships and concepts to build a large query, which is useful to detect fraud in the financial sector. With precise calculations and variables, a query is able to shortlist suspicious transactions and accounts.

In the education sector, Malaysia's first psychometrician (a professional who uses scientific measures for psychological attributes) Dr Haniza Yon helms the development of an adaptive e-learning system. With this, the curriculum is tailored to a student's preferred learning style and natural intelligence. Before a course is started, two tests are conducted where data is mined to profile the students. "We have so many ways to present the lessons to the students according to what their learning preference is — visual, auditory, and even kinesthetic (movements)," says Haniza.

Meanwhile, Infovalley and In-Fusion Solutions are two companies that are licensing the semantic technology for the medical field. In-Fusion is developing a hand-held wireless device with semantic knowledge base for diagnosing pediatric and cardio-



Two Mimos researchers exhibiting the multicasting with IPv6 technology



Thilal Raj (left), vice-president of software development and central engineering at Mimos, looks on as a colleague explains the role of grid computing in sectors such as telecommunications, agriculture and animation



vascular health patients. Infovalley's Informant system is based on the semantic visual browser technology from Mimos.

#### 4 for 1 video camera

One impressive technology in the security area is the use of video stitching from a few video cameras to produce one video of the entire landscape of a surveillance area.

Essentially, you will be able to "flatten" the combined 3D videos and zoom in and out of targeted areas. This is useful in museums and exhibitions where every nook and cranny around the displays needs to be guarded.

The principal researcher of advanced informatics, Lai Weng Kin, has also managed to add in a feature that detects aggressive behaviour in videos. By programming behavioural analysis software, any movement or action that could start a brawl will alert security. According to Lai, this technology is already in use by US intelligence, but is not exported here due to tight export controls.

"You wouldn't have been able to produce this technology 10 years before, because you would need supercomputers to do heavy loads of computation. But processors have caught up and today, it only requires two CPUs (processors) to run it," says Lai.

#### Wireless communications

In the wireless space, Mimos is developing a host of platform solutions. One is WiWi, a wireless WiFi router supported by a WiMAX backend designed for a fast and convenient set-up of a WiFi hotspot. It can further be customized to support other communication protocols such as CDMA, a 2G wireless technology platform. In fact, the WiWi has won a Malaysia Good Design Mark Awards in 2008 for its ease of use and seamless design. WiWi will be one of the technologies used to extend the coverage of TM's Streamyx wireless zone.

In addition, Mimos is also developing multicasting with IPv6 (Internet Protocol version 6). Multicasting allows users to enjoy high bandwidth contents simultaneously over the Internet. With multicasting, requests for the same contents are grouped into one. The server load will decrease, as it



Researcher Kow Weng Onn posing beside a visual graph representing all the relationships of search query 'Pulau Sipadan'

does not see multiple requests but a single user. Multicasting popular contents present a more efficient way to disseminate contents than using caches.

Telekom Malaysia Bhd (TM) has recently signed a three-year collaboration agreement with Mimos for R&D and the transfer of technologies in grid computing, semantic, and wireless access. TM is looking at investing RM100 million to RM150 million for its R&D investments.

#### Grid computing

Anyone who has watched Malaysia's first 3D animated film, *Geng*, by Les' Copaque would

have been thrilled at the quality of animation. The rendering process of the film was actually done using Mimos' grid computing.

Grid computing refers to a large network of high performance computers that can work on data intensive and heavy computation jobs. Mimos programmers have developed a simple user interface for users to queue their jobs in the grids. Users only need to submit their batch jobs over any terminal connected to the network, and wait for it to finish computation.

Mimos definitely has ambitious plans to offer grid computing services to the public and private sector. Thillai Raj, vice-president of software development and central engineer-

ing, was quoted as saying that these services should be available as easily as water and electricity to businesses, universities and research institutions.

These are all only small pieces of the big pie that Mimos is baking under its roof. After decades of being neither here nor there, the industry is finally reaping the benefits of Mimos new focus on applied R&D&C with the "C" representing commercialisation by industry and not Mimos.

Watch Mimos because there is more coming from this reinvigorated organisation. ■

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