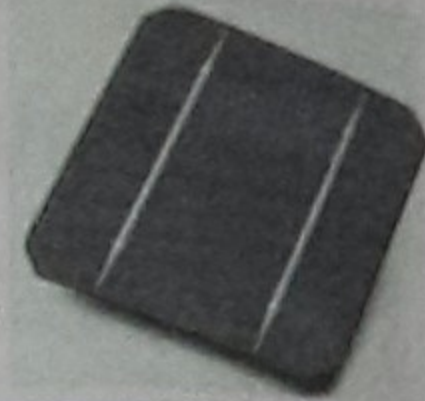




Solar cell

A solar cell or photovoltaic cell is a device that converts solar energy into electricity by the photovoltaic effect. Photovoltaics is the field of technology and research related to the application of solar cells as solar energy. Sometimes the term solar cell is reserved for devices intended specifically to capture energy from sunlight, while the term photovoltaic cell is used when the source is unspecified. Assemblies of cells are used to make solar modules, which may in turn be linked in photovoltaic arrays.



Dhaka Friday October 24, 2008

startech@thedailystar.net

TECHSPOTLIGHT

Grid-connected solar power shines at DU campus

DR. REZAUL KARIM MAZUMDER

WOULD you like to be a proud owner of an electric power generator? Would you like to produce clean and pollution-free green power without fuel at your home? Would you like to earn money by feeding your surplus power to the national grid from this system?

Yes, you too can have it, if you have a bright sunny roof-top or a compound at your home.

Our country is a low-economy country and per-capita energy consumption is one of the lowest in the world. The conventional resources in Bangladesh are inadequate for supplying the energy needs of our economy.

The only dependable indigenous gas, which is the major source of primary energy in the country, is used mainly for the production of electricity and fertilizer. According to expert's opinion our gas reserves will be exhausted within 2020. Therefore, we must find alternative sources of energy to maintain the energy supply of our country.

Renewable energy, which is environment friendly, inexhaustible and sustainable, can be considered as one of the important alternatives and it can play a significant role in the energy scene of the country. The most viable sources of renewable energy in the country are solar, wind, biomass, and biogas. At present contribution of energy from solar and wind is only 0.1%.

It is encouraging that private organisations and NGOs have come forward by taking different projects to utilize solar devices and to provide photovoltaic (PV) electricity to villages in Bangladesh where national grid line has not yet reached.

Today, Solar Home Systems (SHS) are gradually becoming popular in the rural areas in Bangladesh. But in cities, where the power supply is insufficient, fluctuating and failure is a regular event, grid-connected PV system can be a good power source if installed on the roof-tops of the building. In the remote areas if the supply of power in the existing grid is needed to be increased to keep pace with the increasing demand, this system can be a good solution as the system is modular and easy to install.

The power produced by the roof-top grid-connected PV system can be used to supply local loads, with the excess energy fed into the local grid for use by other customers. At night,

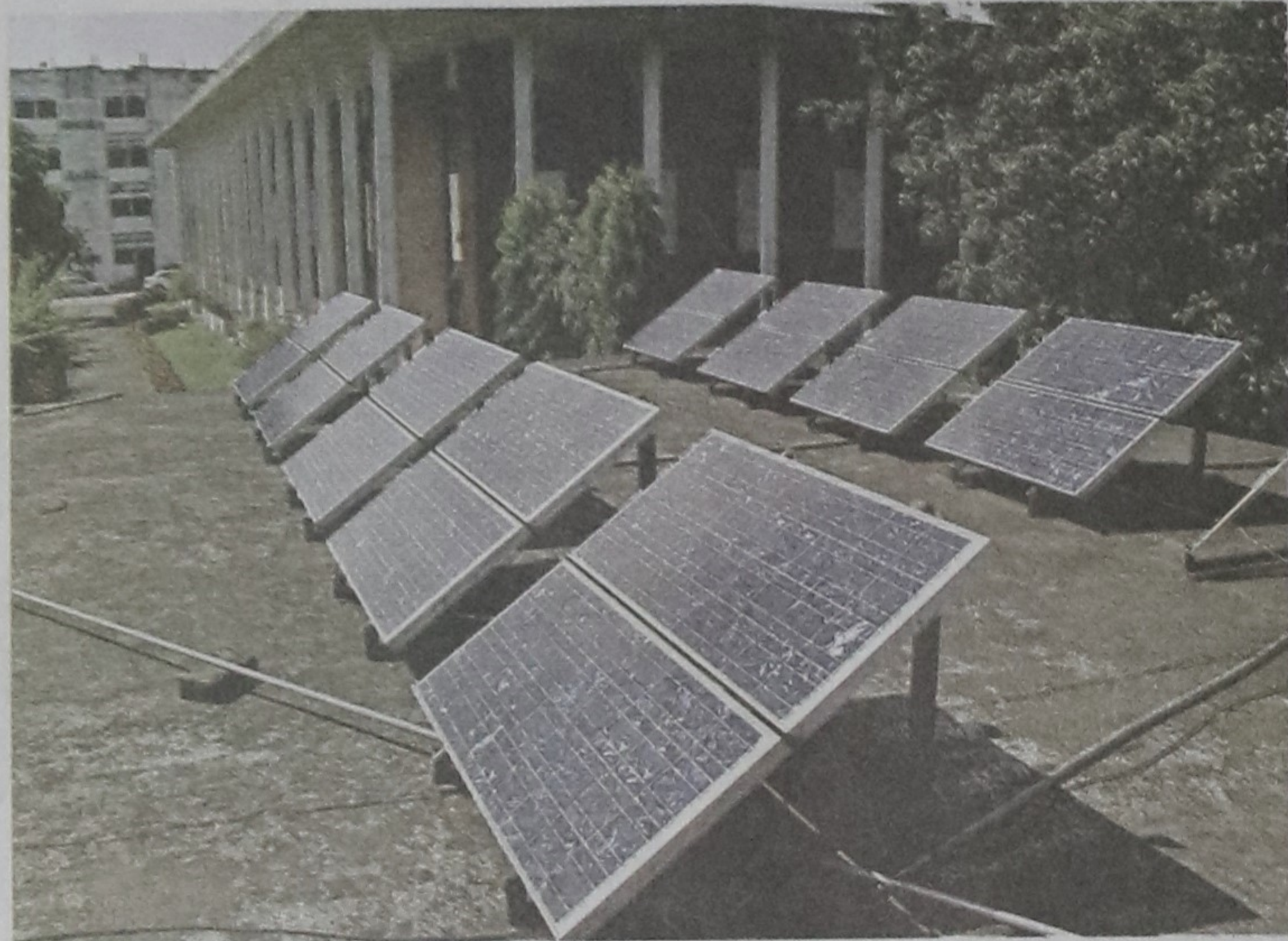


Fig 1: Rooftop grid connected photovoltaic system at the Renewable Energy Research Centre (RERC), University of Dhaka.

System Size (kW)	System Price (Taka)	Annual Energy Generated Q kWh	Rest of 3000kWh Consumption (Q-3000) kWh	Without net-metering			With net-metering			Life-Cycle (Yrs)
				i=0% e=10%	i=5% e=10%	i=10% E=10%	i=0% e=10%	i=5% e=10%	i=10% E=10%	
1.1kW	6,60,000	1806.75	285	6.18	11.18	19.32	6.18	11.18	19.32	20
2kW	10,22,000	3285	285	5.27	9.52	16.46	4.85	8.76	15.14	20
3kW	14,91,000	4927.5	1927.5	5.12	9.25	16.00	3.68	6.66	11.51	20
5kW	24,78,000	8212.5	5212.5	5.11	9.23	15.96	3.12	5.65	9.76	20
6kW	29,68,000	9855	6855	5.09	9.21	15.93	3.00	5.44	9.40	20
10kW	49,56,000	16425	13425	5.11	9.23	15.96	2.81	5.08	8.78	20
24.5kW	1,10,00,000	40241.25	37241.25	4.62	8.36	14.46	2.40	4.34	7.51	20

the local loads are simply supplied by the grid power. If the PV system is large enough, it can supply more energy into the grid than is used by local loads. Instead of receiving a bill every month from the utility supply office, the owner of the system would then be able to earn money by generating surplus electricity.

Grid-connected PV power systems are being installed in cities in different countries of the world. Government policies are being framed to encourage and popularize this system by providing necessary regulations and incentives in many developed and developing countries. From the gradual decrease of prices and increased rate of installation of the systems in the cities all over the world it can be easily comprehended that this system will become an important source of electricity in a very short time in the urban areas.

Roof-top grid-connected PV systems are also being installed



Fig 2: The author looks at the wiring diagram of the system.

in our neighbouring countries like India, Thailand and Indonesia. The future of PV-grid electricity in Bangladesh is also very bright as we have bright sun light throughout the year.

Realizing the significant potential of this technology a model of 1.1kW rooftop grid connected photovoltaic system

has been developed and successfully installed (Fig.1) at the rooftop of Renewable Energy Research Centre (RERC), Dhaka University under the financial assistance of the Ministry of Science and Information & Communication Technology. Wiring diagram of the system is shown in Fig.2.

The installed system was run for several days in different weather conditions and the performance was found to be quite satisfactory.

To understand the financial viability of the system, a preliminary economic analysis of the 1.1kW roof-top grid-connected PV systems along with various sizes (Table) has been made. In the analysis standard methods of economics have been utilized considering various factors, viz., capital cost, life-cycle of the system, interest rate, inflation rate, operation and maintenance cost with and without net metering benefit. The above estimation was made by considering an average demand of 3000kWh for a four-member family. It is also seen from the table that a system of 2kW power for a single household can produce surplus energy that can be fed to the national grid.

For 0% to 10% interest rates and 10% depreciation the unit-price of electricity with and without net-metering facilities will be respectively Tk.4.85-15.14 and Tk.4.85-15.14 only. As the system size becomes larger, the unit-price with net-metering decreases rapidly. The unit-price of electricity for the 1.1kW system at the above interest rates and depreciation is from 6.18 to 19.32 taka only.

At present Bangladesh is going through severe electricity crisis. In this situation, this system can be a good alternative small-scale power source on the roof-top of the building in the cities that does not require any fuel. It is observed from the preliminary economic analysis that the system would be financially feasible if subsidy is given and net-metering regulation is framed by the government. Moreover, the impact of the system on the environment friendly issue should be considered as the system does not pollute the environment at all. From the performance study it is also found that the system works efficiently. For emergency power supply of multistoried building Rajuk should frame some incentive based-building-acts to encourage the integration of solar PV system as a part of future design and implementation.

The author is a Professor at the Dept. of Applied Physics, Electronics and Communication Engineering, University of Dhaka.

TECHVIEWS

Computers that understand how you feel

MAHDIN MAHBOOB

TECHNOLOGICAL marvels continue to amaze us everyday and this news is no exception! A navigation system able to provide fast emergency services while at the same time taking into consideration human stress; this is an example of a complete new type of dialogue system developed by a PhD candidate at the University of Twente (Netherlands), Trung Bui. His dialogue system recognizes the user's emotions and is then able to react to them.

Dialogue systems are basically computer systems which communicate with humans and which are used especially for information provision such as in the speaking computer that provides important travel information. Normally, these computers do not take human emotions into account even though this is an important component of human interaction. The problem with human emotions is that they are often difficult to interpret, and that is especially true for a computer, which basically is, nothing more than a machine!

Raising one's voice can, for example, indicate enthusiasm but it can also be a sign of anger. Therefore, we require extra information to be sure which of the two emotions is present. Human beings are trained to combine various types of information (which may sometimes be quite vague) and still be able to draw the correct conclusions. Dealing with uncertainties is how-

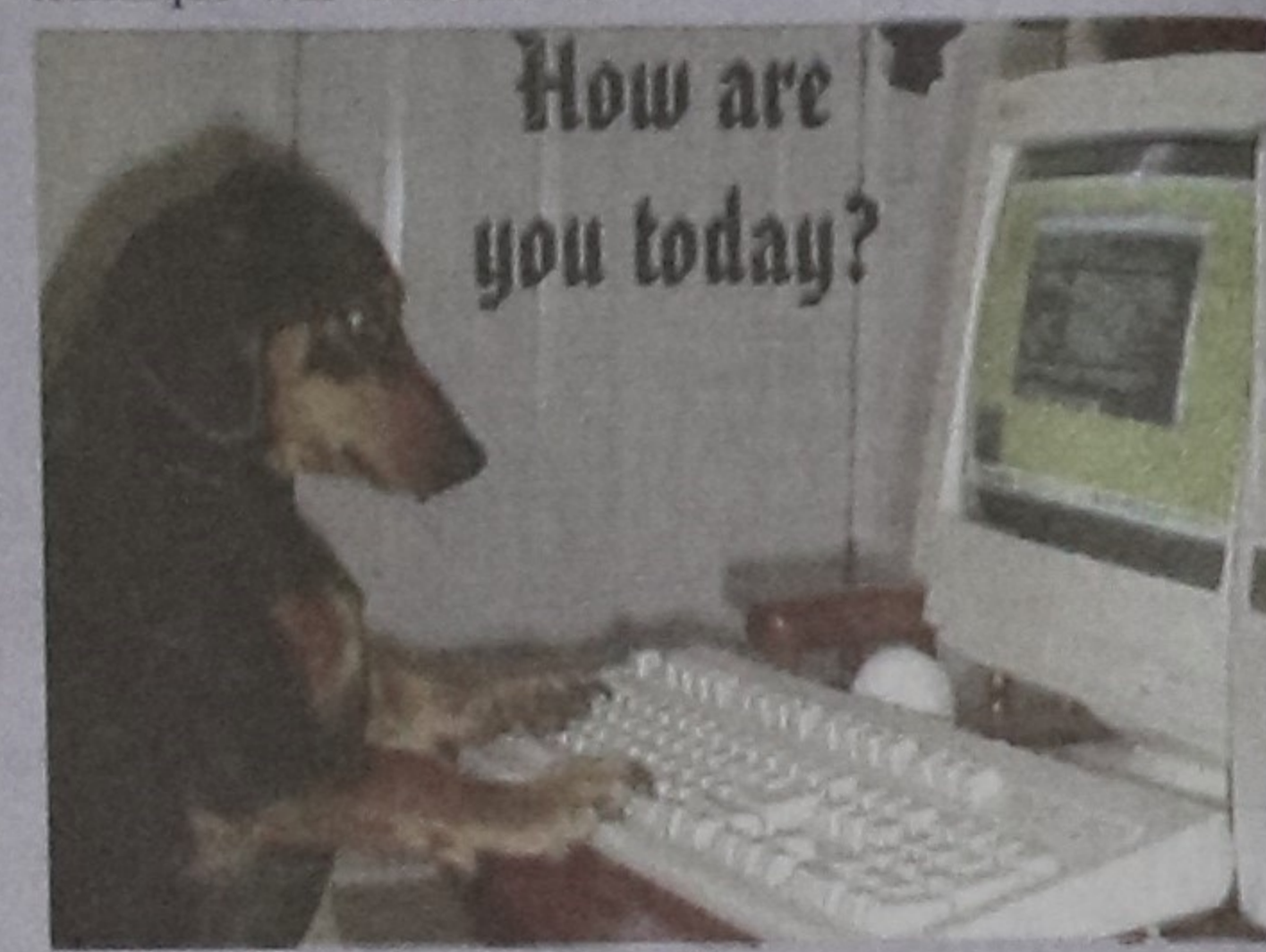
ever difficult to program into computer software.

Bui developed a dialogue system that, unlike others, could take emotions into account. To do this, he used a mathematical technique developed in the 1960s for controlling factory processes called Partially Observable Markov Decision Process (POMDP).

He demonstrated that this technique was suitable for

POMDP. In contrast to the latter, the DDN-POMDPs split dialogue systems into two levels. They make a choice between looking far ahead and seeing whether the necessary calculating power is actually available.

To illustrate the effectiveness of the DDN-POMDP, Bui had applied it to a navigation system for emergency services that took the stress experi-



integrating the user's emotions into a dialogue system because it could deal with uncertainties. The method performs better than existing systems as long as it is tested with small-scale dialogue problems.

However, for larger problems the method requires too much calculating power. That is why Bui developed a hybrid strategy which combines the Dynamic Decision Network (DDN) technique with

enced by the user into account. The navigation system receives input from a separate stress module that measures an emergency worker's stress levels, taking these into account when the user is in communication with the system. Whenever the user's stress levels become raised, the system will anticipate, for example, that the user is more likely to make mistakes and for that reason will request confirmation more often.

TECHNEWS

ICT management workshop for govt officials held

STARTECH DESK

ICT Management workshop for government officers of Bangladesh designed by National Centre for Information Systems Research (NCISR) of the Australian National University (ANU) came to an end through the completion of last and third batch of the workshop on October 20.

A total 99 officers including the ICT focal points of the various ministries, joint secretaries and deputy commissioners attended the two-day long workshop during the three offerings at Bangladesh Computer Council (BCC).

The workshop was developed as part of the eGovernment capacity building project initiated by Australian National University (ANU) under the AusAID's Public Sector Linkages Program (PSLP). Bangladesh Ministry of Science and ICT, Bangladesh Computer Council

(BCC) and Bangladesh Institute of Peace and Security Studies (BIPSS) were the jointly organised programme.

This applied project has evolved from an ongoing academic research where it was found that lack of knowledge is the principal barrier in ICT adoption in the public sector of Bangladesh, which included development of strategy document 'eGovernment for Bangladesh: A pathway to success', which was launched on October 18 by Professor M Tamim, special assistant to the chief adviser.

Australian High Commissioner to Bangladesh, Douglas Foskett, Sheikh Md Wahid-uz-Zaman, secretary, Ministry of Science and ICT and Maj Gen (ret'd) Muniruzzaman, president, BIPSS and Zobed Ali Sarker, ED, BCC also spoke at the occasion.

The objective of this applied research project was to develop

'know-how' among key decision makers and government officials in Bangladesh for the effective use of ICT in public sector organisations.

According to the pathway outlined in the strategy the ten days long workshop aimed at empowering senior public sector officials with a comprehensive ICT management handbook.

This handbook covers four separate modules - Introduction to eGovernment, Preparation of ICT Business Case, ICT Project Management and managing the outcome.

According to Ahmed Imran, ANU's eGovernment researcher and the project manager, the handbook is expected to serve as a ready reckoner for day to day management of ICT which has been specially designed to suit the context of Bangladesh.

PHOTO



THE ROYAL GOOGLE

A poster with an image of Britain's Queen Elizabeth II incorporated into the Google's logo is pictured at the company UK headquarters, in London, on October 16. The image has been incorporated to mark her visit to the internet giant's British headquarters. The Queen (inset) talks to Google employees during her visit.

PHOTO: AFP

TECHNEWS

Sony Ericsson to unveil Xperia X1 next month

STARTECH DESK

SONY Ericsson is expected to unveil their much awaited product line Xperia sometime next month in the Bangladesh market.

With the first product of this line the X1, they hope to create an elegant, premium and personalised mobile experience for Bangladeshi professionals who want to simplify their hectic lifestyle with just some short straightforward touch on the screen.

According to Sony Ericsson, Xperia X1 sets the example for a sophisticated combination of form with function in a full brushed-metal body. It boasts the world's first arc-slider form factor, helping users to perfectly view the screen while typing.

The diamond cut design on the four-way navigational keys and keyboard is ingeniously shaped introducing a "stressless" browsing experience by reducing strain on fingers!

At the heart of the X1 is the unique user interface of 9 different and customizable panels. According to X1 user interface designer Rui Yamagami, "I was inspired by windows in an apartment block, each X1 panel opens to reveal different applications contained within, just as each apartment window would show the diverse lives of its tenants."

With Xperia's four input options switch-

ing between applications and panels is just a matter of some simple finger movements. The touch screen navigation makes easier for consumers to navigate through the Internet or play videos with a stylus or a finger touch. Reading in X1 also comes effortless as documents can be simply scrolled through with the optical joystick and 4-way key.

Moreover, typing texts is a breeze with the QWERTY keyboard. In addition, for a more personal touch, you can use the stylus with handwriting recognition.

The Xperia X1 is Sony Ericsson's first Windows Mobile phone.

For web applications on the move, the X1 provides with all the connectivity options anyone will ever need. With 3G connectivity, integrated Wi-Fi and EDGE, using Internet will never be so much easier. The X1 also features a full HTML Web browser which helps users to browse through just like on computers.

A WVGA (800 x 480 pixels) screen gives the users a lot of space to view what they need to view. Moreover, with its wide aspect ratio and inbuilt speakers give consumers the ultimate enjoyment of DVD quality videos.

Anyone can create a movie with the X1's 30 frames-per-second video capture ability, showcasing subjects in a cinematic-like appearance. It is also the first Sony Ericsson



phone to feature the industry standard 3.5mm headphone jack, letting audiophiles enjoy music with any headphones of choice. With 3.2 megapixel camera and autofocus option, beautiful tangible memories can be created in just a moment. Further, with the free 4GB microSD™ memory card, the phone works as a portable photo album. Sony Ericsson believes that what truly matters for the modern Bangladeshi workforce is to excel in whatever they do through flawlessly working between different devices on the move. The ultimate goal of X1 is to create a premium converging experience of multimedia and office work for our modern professionals.