



UNLOCKING HIDDEN SIGNS OF MENTAL ILLNESS

Taylor's University uses AI to change the way mental illness is diagnosed

Identifying micro facial expressions can lead to a life-changing diagnosis for a person with mental health problems. To capture and process these tiny expressions, Taylor's University turned to artificial intelligence (AI) to observe and interpret the emotions of people with mental illness and special needs. Using emotion recognition software and machine learning, the university's research is changing the way mental health is diagnosed and treated.

Tanjung Rambutan is a small, peaceful town in the Malaysian state of Perak. But because it is home to Hospital Bahagia Ulu Kinta, the country's oldest psychiatric institution—previously known as the Federal Lunatic Asylum—it came to be associated with mental illness.

"It's not what people imagine," says Dr. Anasuya Jegathevi Jegathesan, a counselor and associate professor at Taylor's University, a private educational institution in the Malaysian state of Selangor. "Hospital Bahagia is actually a great facility. It's now a center for health, not just sickness."

According to Dr. Anasuya, the persistent negative connotations made it even more vital to promote mental health in Malaysia, especially amid the country's rising mental health problems—in particular among its youth. [A recent report by non-profit Relate Mental Health Malaysia](#) shows suicide as a leading cause of death among Malaysians aged 15 to 29.

To help address this problem, Taylor's University launched the Centre for Human Excellence and Development (CHED) and appointed Dr. Anasuya as its director. The center's goal is to revolutionize research in psychology and behavioral sciences in Malaysia.

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INDUSTRY: HIGHER EDUCATION
REGION: MALAYSIA

VISION

Promote better understanding of mental health problems and encourage early intervention through research

STRATEGY

Use AI to gain data-driven insights that can lead to better diagnosis and treatment

OUTCOMES

- Gains the ability to identify and interpret micro expressions and gestures using AI
- Analyzes emotions and behaviors that can help improve diagnoses and treatments
- Delivers insights based on the local population's unique biological and cultural profiles

Identifying expressions and emotions in real time

Together with local firm Glueck Technologies, CHED created a socio-behavioral laboratory equipped with AI—the first of its kind in Southeast Asia. The lab comes with 13 face-tracking cameras, a virtual reality interface, brain scanners, and emotion recognition software.

During an experiment, the cameras track and capture even the tiniest expressions and gestures of participants, then send the data to the emotion recognition software for analysis and visualization. This allows researchers to identify—in real time—expressions and emotions that are difficult to catch using traditional methods such as behavioral observation. Using such profound information about emotions and behaviors, researchers can contribute to better diagnoses and treatments.

“As a counselor who also does therapy, I see a lot of potential in our new capability, not just in research but in helping my students to help people with mental health issues. How people react through their facial expressions can create a change in conversations with individuals with mental illness,” says Dr. Anasuya.

Better understanding mental and behavioral health issues

The lab is now blazing a trail in socio-behavioral research by using its own technology to gather and process data about the local population. With this capability, Taylor’s University expects to gain a better understanding of mental health issues and human behaviors—to provide accurate diagnoses for more Malaysians.

“Previously, we relied on data that wasn’t backed by technology,” says Dr. Anasuya. This data also didn’t provide a full picture of the mental and behavioral health of the local population because it didn’t take into account Malaysians’ biological and cultural profiles.

“Now, we have the software to look into micro expressions and gestures to identify emotions. And then we contextualize our research within Asia, focusing on Asian facial features, for example, particularly those of minority groups such as Malaysian Chinese, Malaysian Indians, and Malaysian Malays,” says Dr. Anasuya.

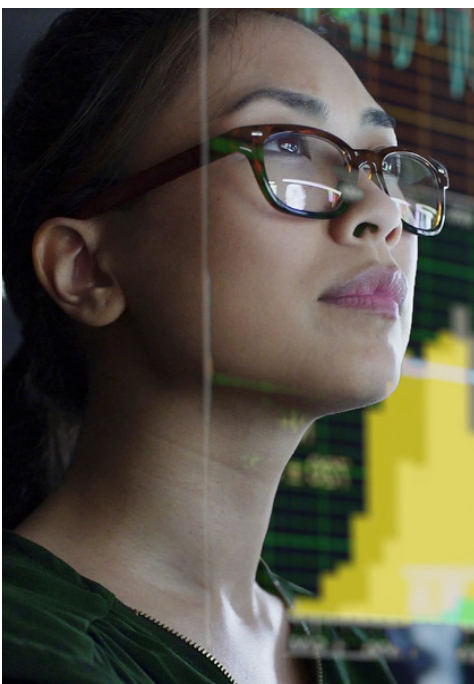
“So, we’re talking about groups that are not usually addressed in research. This is especially important because research shows that emotions are culturally driven as well,” she adds.

The lab’s emotion recognition software uses deep learning to mimic the brain’s ability to recognize objects. CHED and Glueck train the software to perceive different facial expressions of people from diverse countries so it can recognize and understand common human emotions.

To provide the computing power needed to train machine learning algorithms and process large amounts of data, Taylor’s University deployed HPE ProLiant DL385 Gen10 servers with NVIDIA® T4 Tensor Core graphics processing units (GPUs). The solution also powers the eye trackers, brainwave systems, and brain scanners in the lab. To keep their streamed video files, researchers use HPE StoreEasy, which can hold the data for up to 12 months.

“We have to capture and process data really, really fast because we need all 13 cameras running at the same time when doing an experiment. I must say the processing power of the HPE system with NVIDIA is pretty phenomenal,” says Dr. Anasuya.

“Our agreement in terms of support from HPE is also excellent, and that’s really important to us,” she adds.



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— **DR. ANASUYA JEGATHEVI JEGATHESAN**, DIRECTOR, CENTRE FOR HUMAN EXCELLENCE AND DEVELOPMENT, TAYLOR’S UNIVERSITY

Reducing mental health stigma

Beyond generating high-quality research, Dr. Anasuya hopes the new lab will break down myths about mental illness. These include the belief that mentally ill people must be isolated from society and placed in dedicated medical facilities.

“By bringing in new, non-invasive technology, we hope to reduce the stigma around mental health. So, we’re trying to move towards a future where people engage with mental health open-mindedly and proactively,” says Dr. Anasuya.

“Every behavioral research project we do must translate into helping people manage their lives better,” she adds.

Understanding individuals with special needs

For its first major project using the lab, CHED is studying individuals with special needs—starting with research on eating disorders among young people with Prader-Willi Syndrome. A genetic condition, Prader-Willi

Syndrome causes intellectual disability, behavioral problems, and obesity due to constant hunger.

CHED is trying to understand, down to the smallest details, how some parents interact with their special needs children, including those with Prader-Willi Syndrome. Its goal is to identify the social skills these parents have developed to interact with their children.

“Parents with special needs children have their ways of managing on their own,” says Dr. Anasuya. “But sometimes they don’t realize they have their own methods of socializing with their children.”

Researchers at Taylor’s University are analyzing those skills to see if they can help other families better interact with their special needs children—and improve how these kids engage with the people around them.

“We present those skills in a way that other people can see and say, ‘Oh, I didn’t know this. Let me try if I can learn to do this. Let me see if I can do this with my family,’” says Dr. Anasuya.

Unraveling truth from dishonesty

CHED is also gearing up to study the psychology of lying. This will be a collaboration with forensic criminology experts from other universities and the Royal Malaysia Police. The goal is to develop a non-invasive method of identifying micro facial expressions that reveal whether someone is telling the truth.

“That takes a lot of processing power because people intentionally try to hide the fact that they’re lying. So, to identify these micro expressions, you need technology that can do that,” says Dr. Anasuya. “With the processing power of our GPU-accelerated HPE servers, we’re looking to do exactly that.”

In addition to assisting law officers and forensic investigators, Dr. Anasuya says the research can greatly benefit human resource (HR) professionals. “It will make it easier for HR managers to identify and solve HR issues effectively, so I’m very excited about it.”





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Opening the lab to more research collaboration

CHED is looking to eventually open the lab to other organizations, particularly those in the private sector.

"We aim to have businesses come and use the tools at the lab for their own research. For example, they can run experiments to see how people react to their products," says Dr. Anasuya. "And we'll have other universities work with us to help us understand human behaviors better."

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SOLUTION

HARDWARE

- HPE ProLiant DL385 Gen10 servers
- NVIDIA T4 Tensor Core GPUs
- HPE StoreEasy
- Aruba 2540 Switch Series
- Aruba 2530 Switch Series

SOFTWARE

- Glueck sentiment recognition software
- TensorFlow

HPE POINTNEXT SERVICES

- HPE Foundation Care

KEY PARTNERS

- NVIDIA
- Glueck Technologies



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