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### How Machine Learning can enhance cybersecurity in Indonesia

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## INTRODUCTION

On June 20, 2024, the Indonesian National Data Center was targeted by a ransomware attack, resulting in the disruption of digital services for 210 institutions<sup>[1]</sup>. This event underscores the importance to enhance cyber security in Indonesia.

Machine Learning (ML) technology plays a crucial role in enhancing cybersecurity by offering quicker and more precise analysis and response capabilities<sup>[2]</sup>.

### Ransomware attack behind massive disruption to national data center

The government said on Monday that last week's breach at the National Data Center (PDDN), which disrupted immigration processing and other public services, was a ransomware attack.

Ruth Dex Juwita and Radhyya Indra (The Jakarta Post)

PREMIUM Jakarta • Mon, June 24, 2024



Fig 1. Indonesia's Ransomware Attacks News<sup>[3]</sup>

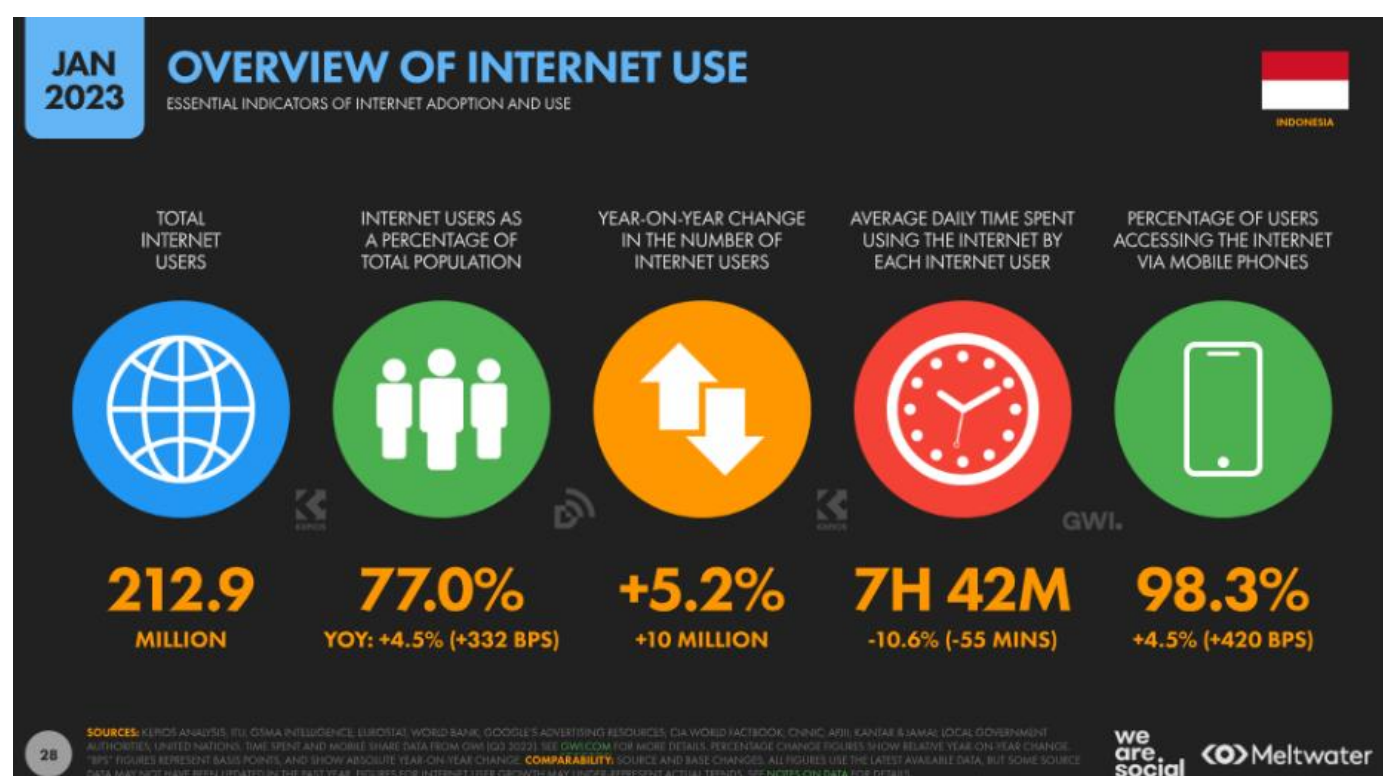


Fig 2. Internet User in Indonesia<sup>[4]</sup>

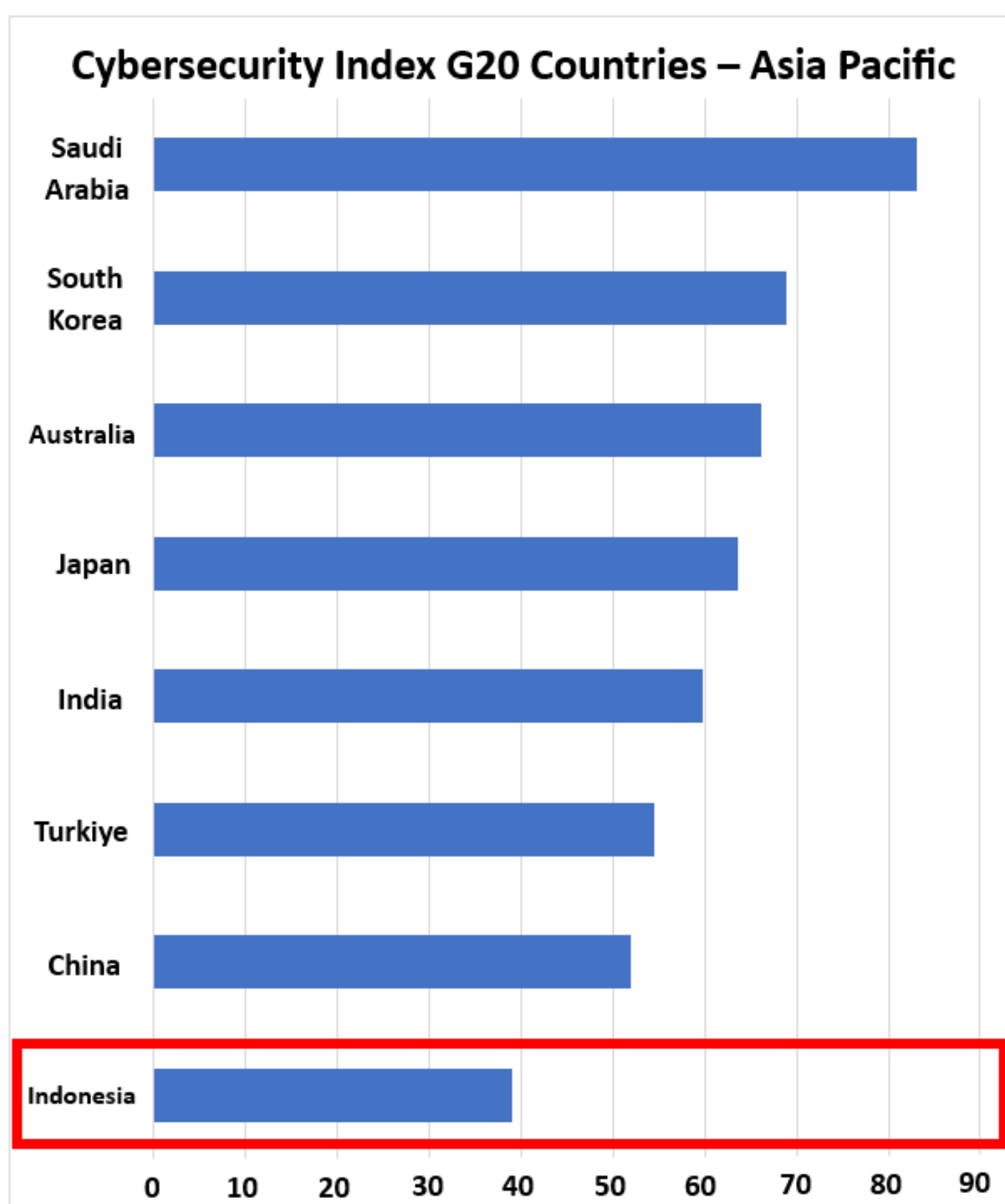


Fig 3. Cybersecurity Index G20 Asia Pacific Countries<sup>[5]</sup>

## METHODOLOGY

**Literature Review** : Gather and evaluate available articles & websites regarding ransomware attacks in Indonesia, as well as the utilization of machine learning technologies in the field of cybersecurity.

## RANSOMWARE

Ransomware is a form of malicious software (malware) that targets a computer or network by encrypting or locking the data within it, rendering it inaccessible to the owner<sup>[6]</sup>. The perpetrators responsible for developing this ransomware subsequently blackmail monetary compensation from the data owner in exchange for the decryption key or instructions on how to unlock the encryption<sup>[6]</sup>.

## MACHINE LEARNING WAYS TO STRENGTHEN CYBERSECURITY

**1. Anomaly and Suspicious Behavior Detection**  
ML can be used to monitor network activity and detect anomalous patterns that may indicate a cyberattack<sup>[7]</sup>.

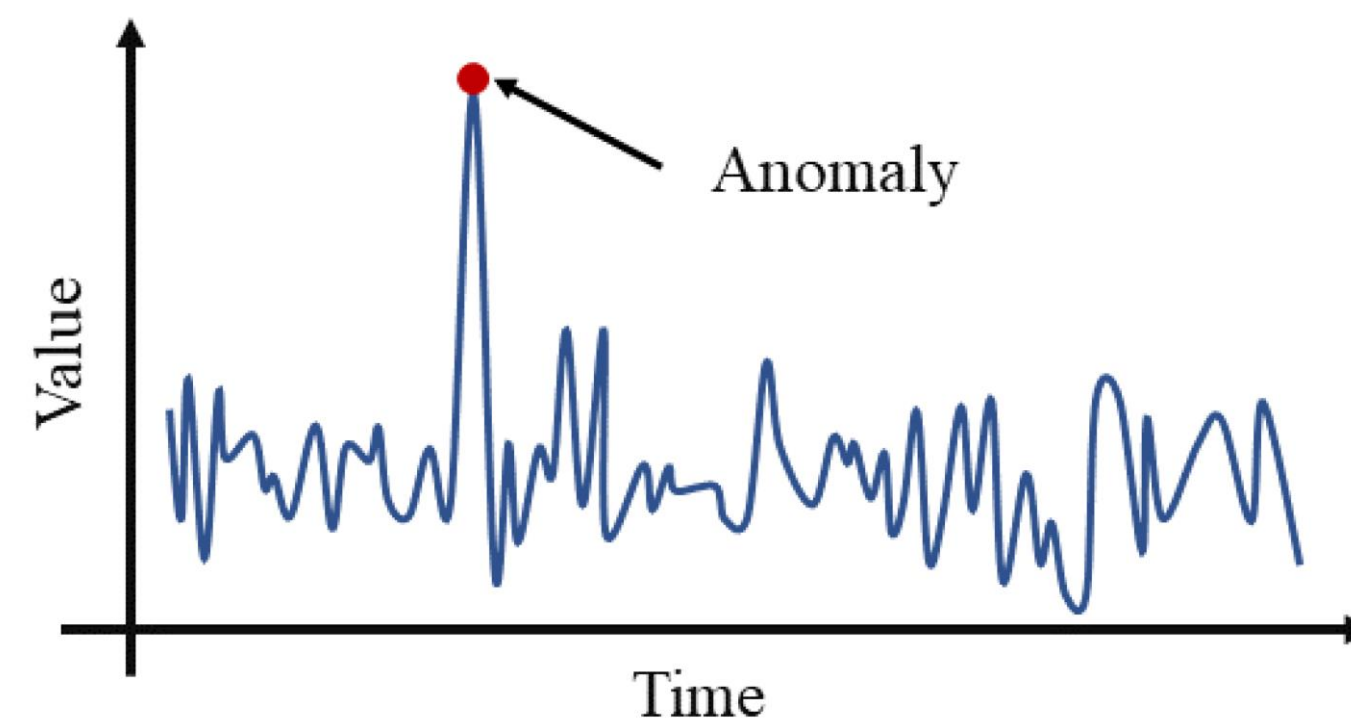


Fig 4. Anomaly Detection illustration<sup>[8]</sup>.

**2. Pattern Based Attack Prevention**  
ML can recognize attack patterns that have occurred before and provide early warning if similar patterns reappear<sup>[9]</sup>. This can help in preventing attacks before they successfully executed.

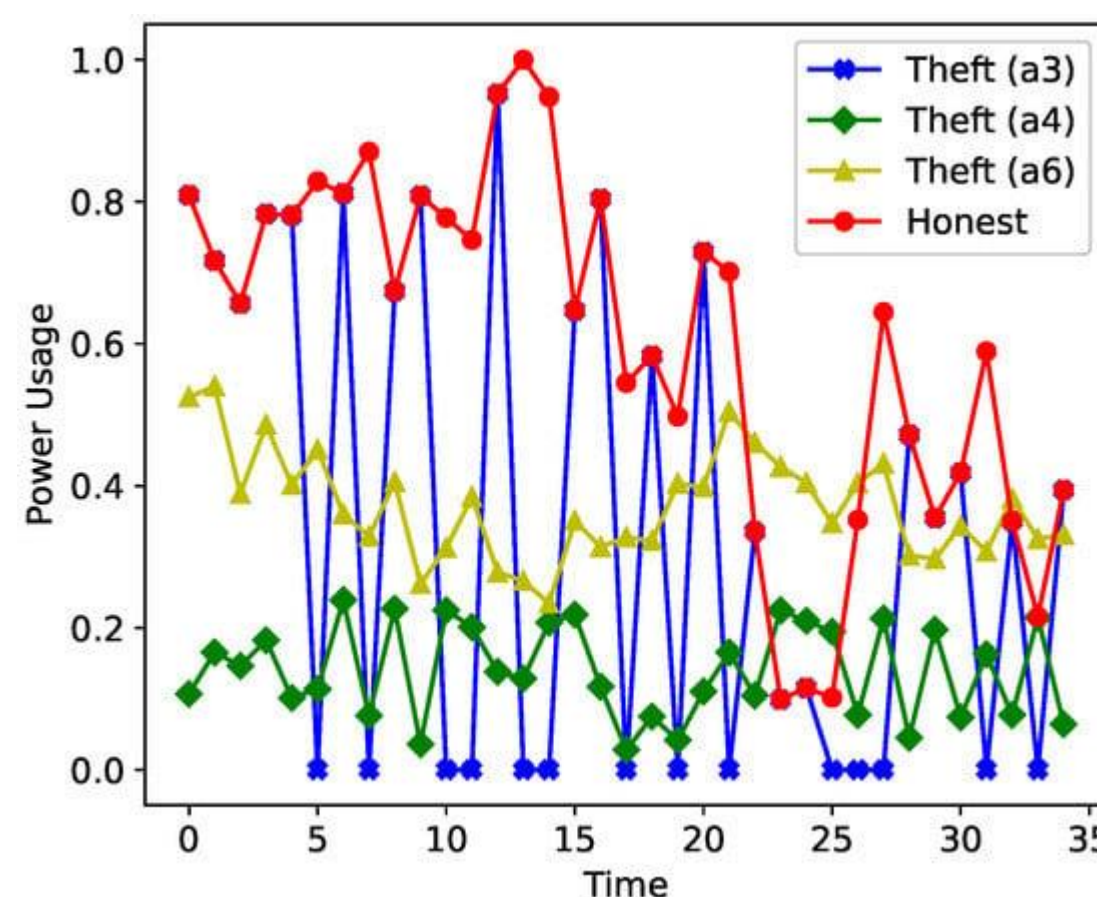


Fig 5. Pattern Based Prevention Illustration<sup>[10]</sup>.

**3. Auto Response**  
ML can automate responses to threats, reducing the time needed to respond to attacks and minimizing the impact<sup>[11]</sup>. This includes actions such as isolating infected devices or disconnecting networks.

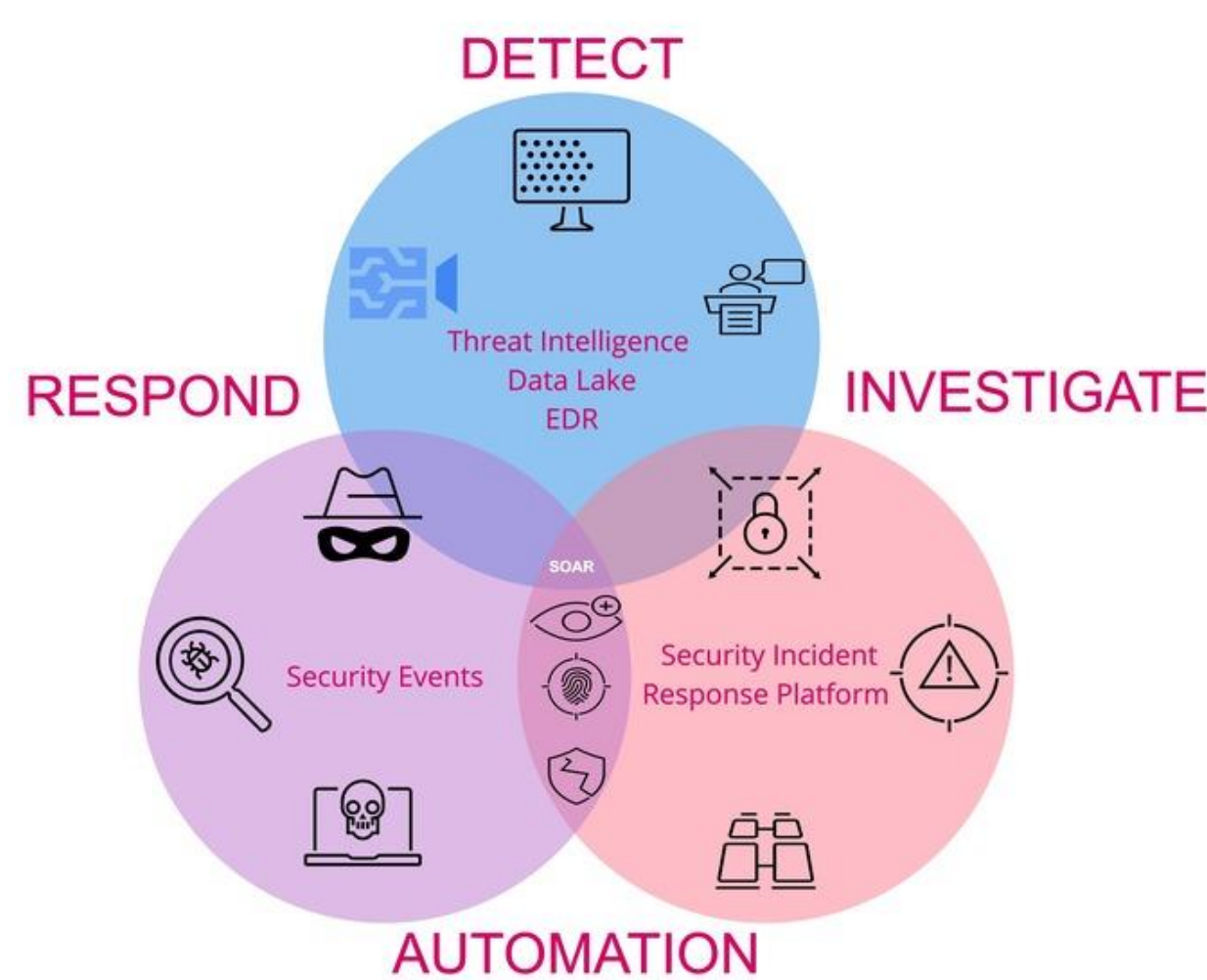


Fig 6. Pattern Based Prevention Illustration<sup>[12]</sup>.

## CHALLENGES

Some of the main limitations in dealing with cyber threats include resource constraints such as a shortage of cybersecurity experts and limited budget for technology development and training<sup>[13]</sup>, the increasing number and complexity of cyber threats and the challenges in maintaining the security of ever-evolving systems<sup>[14]</sup>, and challenges in coordination between agencies and sectors and difficulties in building effective international cooperation<sup>[15]</sup>.

## SOLUTIONS

There are three solutions for Indonesia to face the challenges<sup>[16]</sup>:

1. The government needs to continue to strengthen regulations and law enforcement in the field of cybersecurity.
2. The government and private sector needs work together to increase investment in cybersecurity technology, collaboration and human resources.
3. The public needs to raise awareness and understanding of cybersecurity, education in cybersecurity is needed.

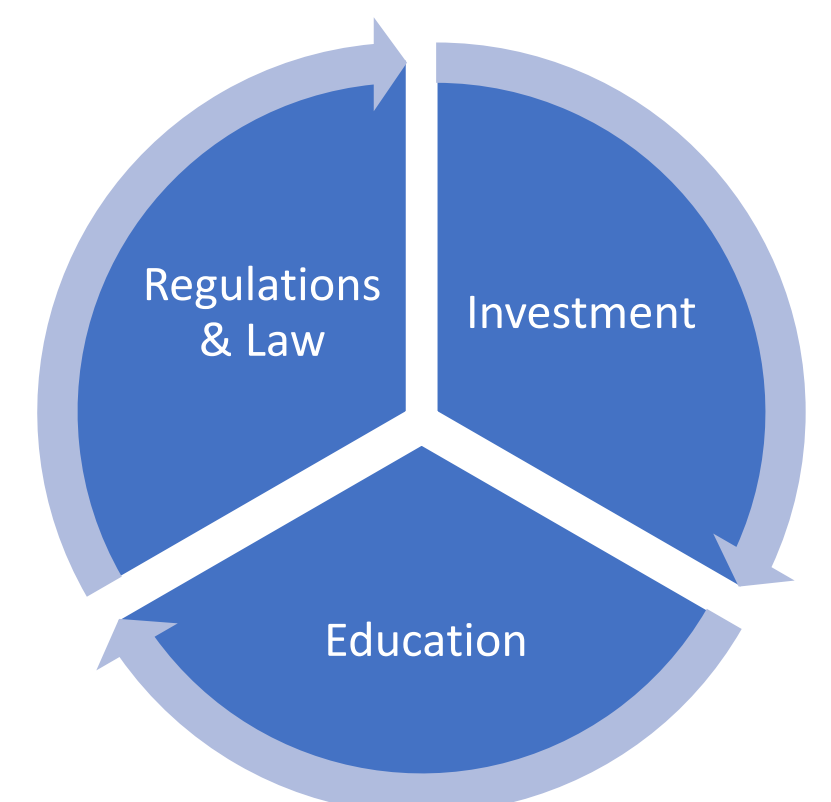


Fig 7. Solutions for Cybersecurity in Indonesia<sup>[16]</sup>.

## CONCLUSIONS

Machine learning can enhance Indonesia's cybersecurity by identifying abnormalities, recognizing attack patterns, and automating responses to threats. Although faced with limited resources and difficulties in coordination, there are solutions to enhance protection against cyberattacks, such as the current ransomware incident at the Indonesian National Data Center.

## References



## Contact



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