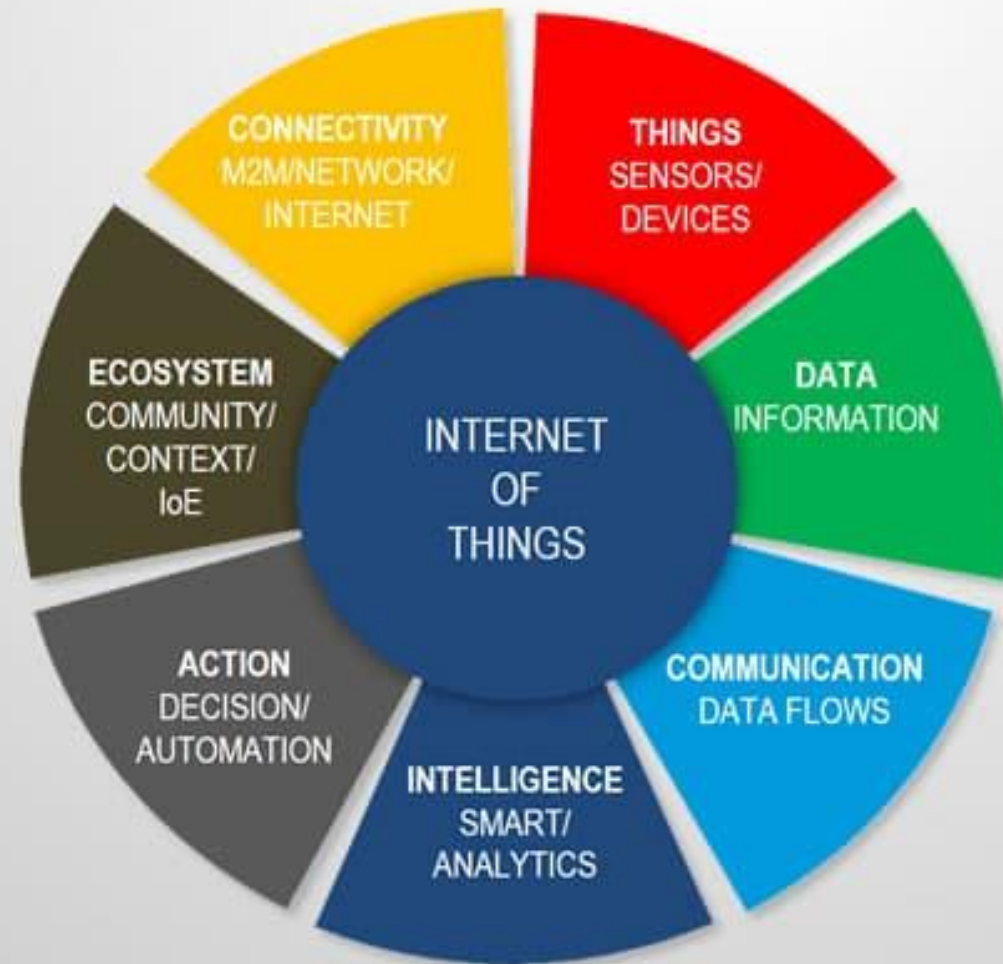# Internet of Things

By: Matthew Dinh

What is the Internet of Things?

- The **Internet of Things (IOT)** is the network of modern devices that are constantly interacting with each other over the internet.

- This can be better understood as the communication of devices to exchange information and communicate.

- Examples can be seen all around us through our phones, cars, cameras, doorbells, computers, and other things we use on a daily basis.

DEFINING IOT: 7 CHARACTERISTICS
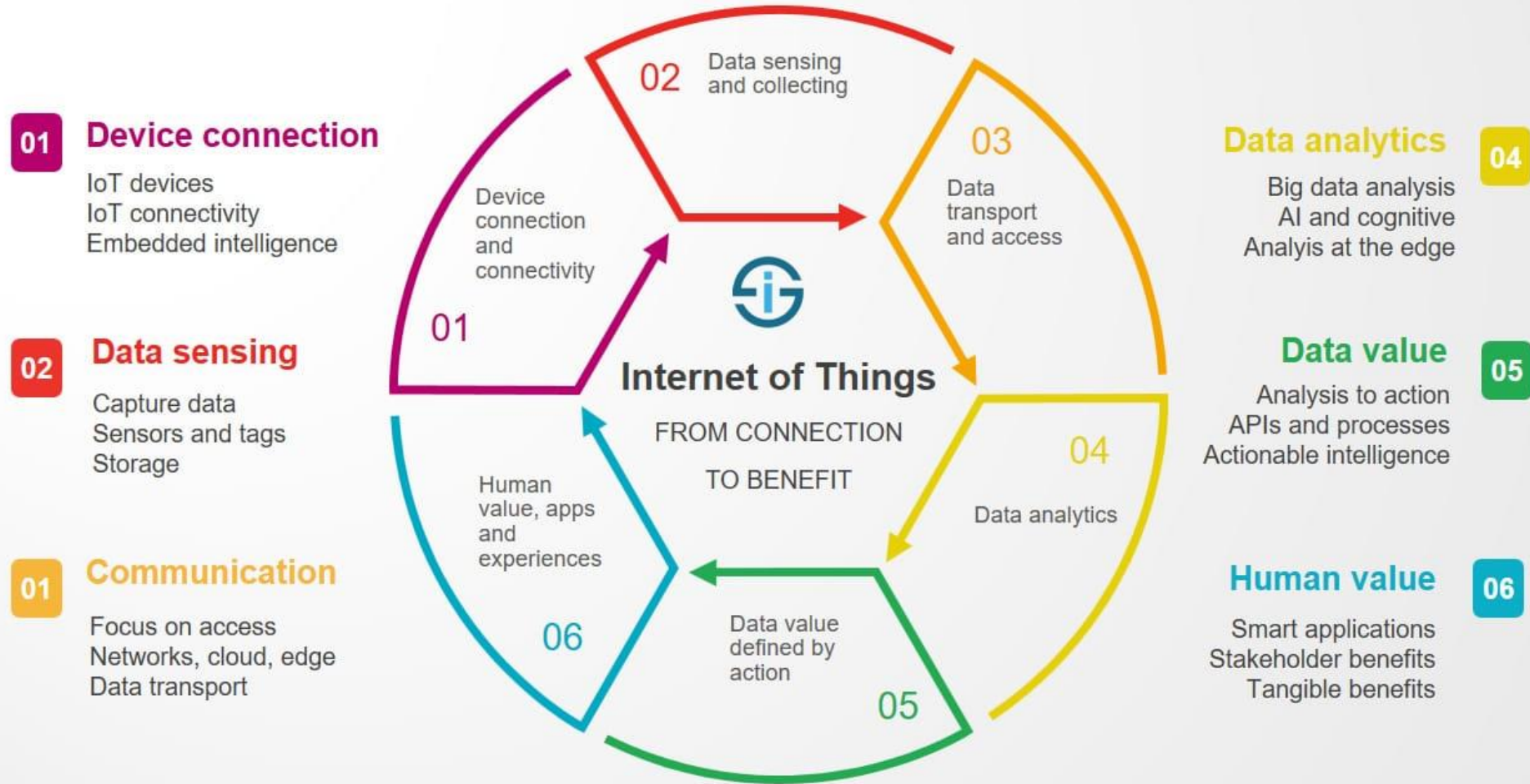
Why is it important?

- The IOT is what connects the internet to our everyday lives.

- Modern society is almost completely reliant on the technology, including the internet. Almost all technology on the internet are connected through the IOT.

- Another reason why the IOT is so important is that it reduces the work needed to be done by humans and, instead, automates it to devices and sensors to do the same job.

Why is it important? (continued)

- The ability for devices to be able to access cloud networks allows for smaller storage on the devices themselves and allows for more complex algorithms or computations to be done outside the device itself.

- In fact, the IOT is something that we should be well familiar with. Without it, we would be unable to swipe into the buildings to be able to attend classes here, as our student ID's have a chip inside them that the college uses to recognize students and allow access.
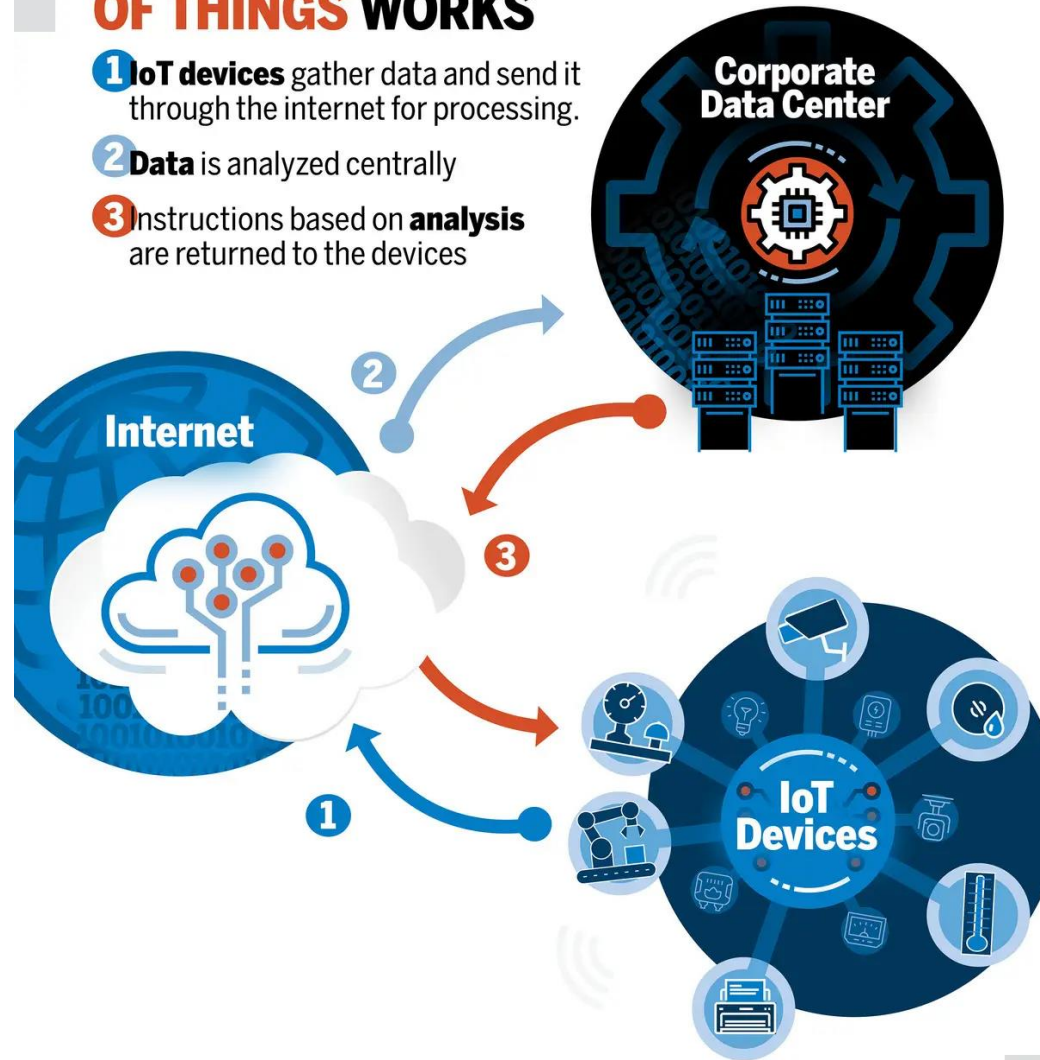
The Internet of Things
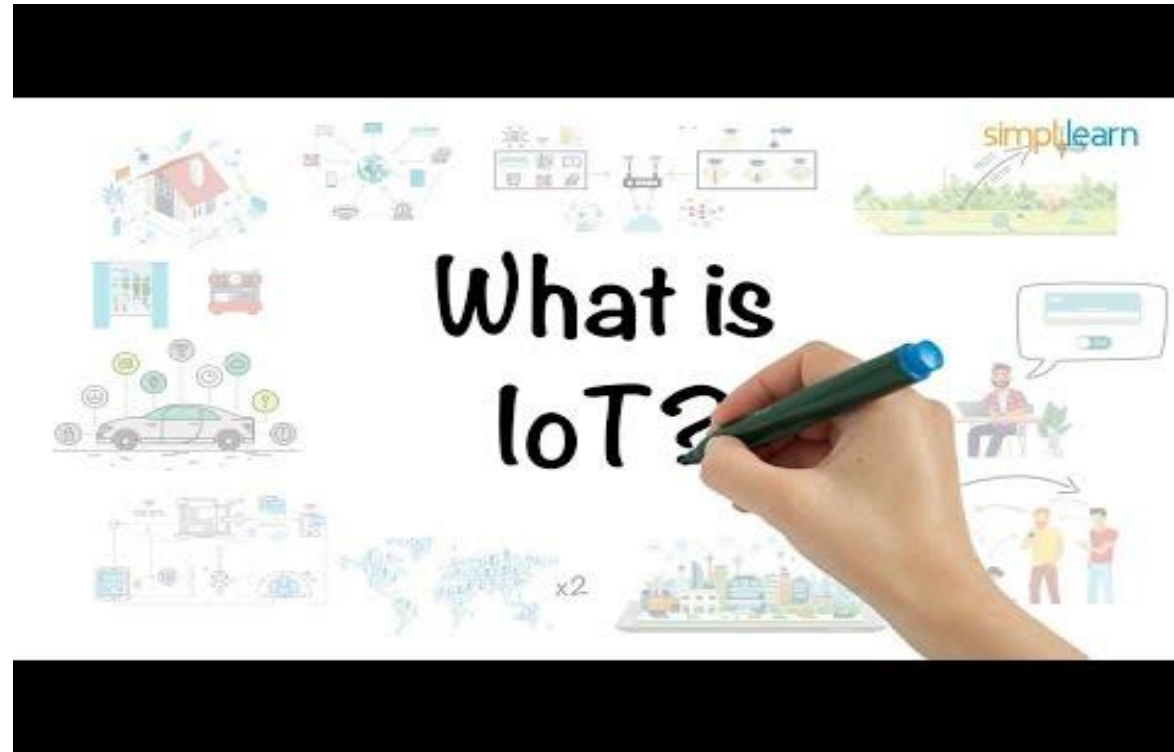## From connecting devices to human value

01 Device connection
IoT devices
IoT connectivity
Embedded intelligence

02 Data sensing
Capture data
Sensors and tags
Storage

01 Communication
Focus on access
Networks, cloud, edge
Data transport

Data analytics 04
Big data analysis
AI and cognitive
Analyis at the edge

Data value 05
Analysis to action
APIs and processes
Actionable intelligence

Human value 06
Smart applications
Stakeholder benefits
Tangible benefits

02 Data sensing and collecting

03 Data transport and access

01 Device connection and connectivity

Internet of Things
FROM CONNECTION
TO BENEFIT

04 Data analytics

05 Data value defined by action

06 Human value, apps and experiences

HOW THE INTERNET OF THINGS WORKS

1 **IoT devices** gather data and send it through the internet for processing.

2 **Data** is analyzed centrally

3 Instructions based on **analysis** are returned to the devices

Corporate Data Center

Internet

IoT Devices

YouTube Breakdown of IOT

- 3:00 to 4:15

IOT and HTML

- IOT devices act as the hardware that HTML and other languages are ran on to have value for humans.
    - IOT devices can either take data from a page through the internet or collect data to later display on a page using HTML.
- As technology improves, more and more devices are beginning to be able to access the internet, like our refrigerators or watches, which means websites that use HTML must become more responsive to a wider variety of devices.

IOT and Artificial Intelligence

How do they work together?

How does IOT and Artificial Intelligence Interact?

- So, we now know how IOT works. Artificial Intelligence (AI) can be used in this process to collect and analyze given data taken from sensors or other devices.

- Companies and businesses are using AI together with IOT to simulate intelligent decision making without human interaction and to predict possible future data, finding patterns or relationships in the data.
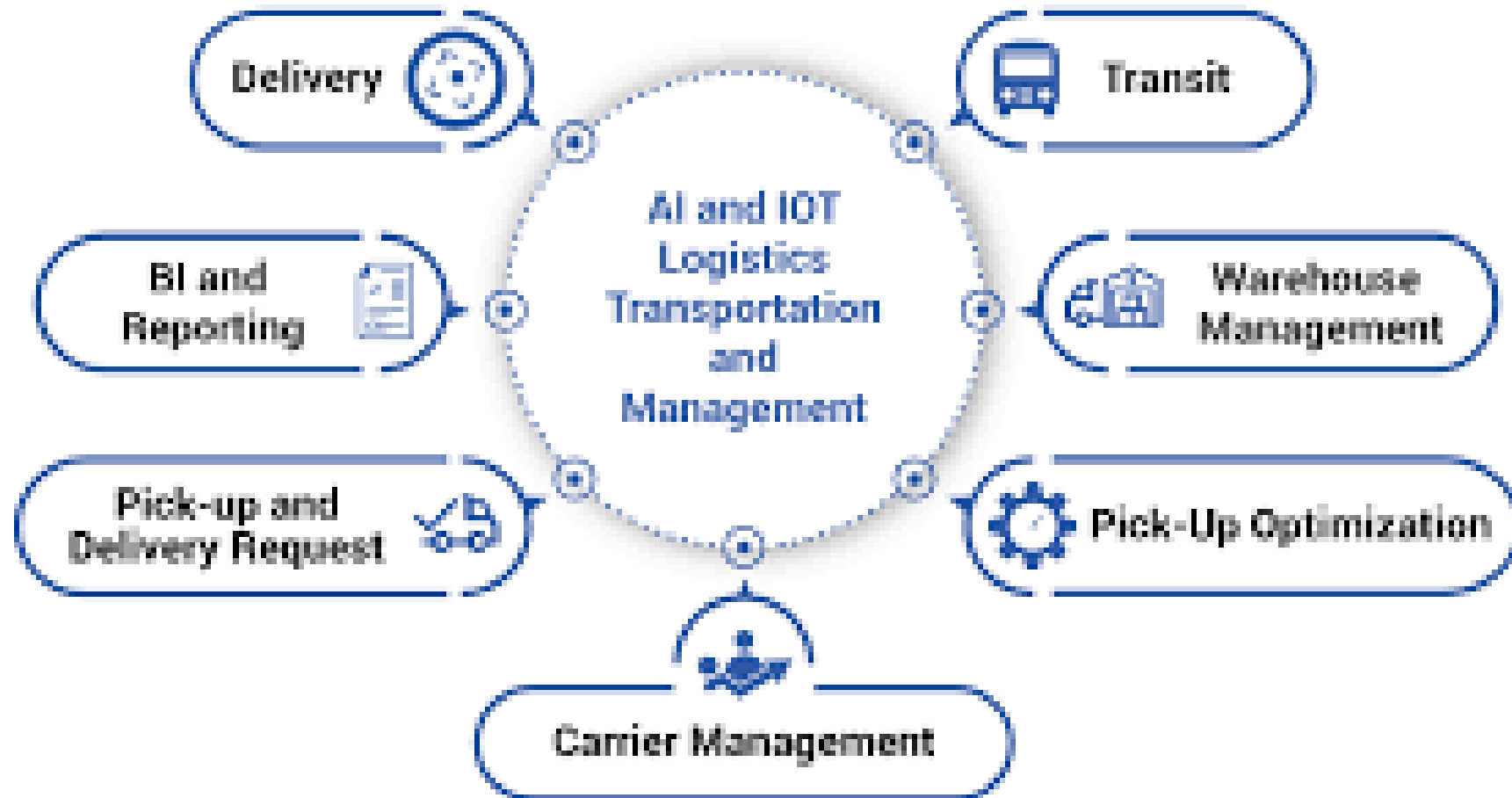
Benefits of the use of AI with IOT

- AI in the use of IOT in businesses can provide many benefits and open many possibilities.
  1. Increases efficiency by making smart decisions without the need of a person, improving processes or algorithms by itself, or recognizing patterns or relationships in data.
  2. Automates risk calculations and responses to certain processes.
  3. Allows incoming data from other devices on the IOT to be summarized and sent to other devices in a more compact way.
  4. Can handle, learn from, and predict future issues and resolve them in an optimized manner.

Examples of AI in IOT

- Self-driving Cars
  - Data from self-driving car routes are recorded and used to optimize future routes and driving using AI predictions and calculations.

- Retail Analytics
  - Data from consumer sales can be used with AI to regulate storage and predict future sales and products that will sell well.

- Manufacturing Robots
  - AI can monitor and record the activities of manufacturing robots to detect inefficiency, errors, or possible future improvements.

Examples of AI in IOT (continued)

- Traffic Monitoring and Management
  - Data collected overtime from traffic can be used to further optimize traffic light wait times or traffic flow.
- Autonomous Delivery Robots
  - Uses AI to calculate how to traverse terrain using data incoming from its sensors to observe its environment and surroundings.
- Large-scale monitoring and calculations for vehicles, such as trucks, planes, or ships.
  - Distance traveling can be made quicker and easier with devices on the IOT on the vehicle sending data to the AI to calculate how much fuel will be needed for a certain amount of distance and possible repairs or maintenance that will be needed.

Delivery

Transit

BI and Reporting

AI and IOT Logistics Transportation and Management

Warehouse Management

Pick-up and Delivery Request

Pick-Up Optimization

Carrier Management

Source: LeewayHertz

Siri, Cortana, Alexa

- These digital assistants are one of the biggest forms of the use of AI in IOT.

- Siri, on iPhones, or Cortana, on Windows computers, both use text or voice data and analyze it to understand the person's intentions and to complete the correct task on the web or device.

- Alexa takes this to another level, being interconnected throughout homes through multiple devices and interacts with these devices.
  - Examples of Alexa interaction: door locks, light switches, security cameras
  - All this interaction through one Amazon Echo and the IOT
  - Alexa also can record data and send it back to Amazon to further improve performance and sales data.

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