AI, ML & Cybersecurity

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AI, ML & Cybersecurity

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Outline

- Why is it important today?
- What have we done?
- What we can do?

Cybersecurity

- Using open and standards-based IP network and delivery for a device a consumer wants to use is certainly good business: it allows a direct, more personal – and ideally, more profitable relationship with those who purchase and consumer content.

- But, it also opens up significant new risks that could lead companies' content, data and business systems to be compromised. And those risks, if not mitigated, represent a true existential risk.

[Accenture "Are Media and Entertainment Companies Ready", 2016]

NCSAM

- October is Cybersecurity Awareness Month, making it the perfect time to take review your online security measures.

WBU initiatives

- Share threat data, successful defence methodologies and technologies, best-practices and architectures

- Address third-party vendors:
  - Inspire them to take action to keep up with broadcasters' needs, including moving to virtual solutions rather than hardware
  - Focus on vendors of hardware/software, and suppliers of cloud services, of all types.
  - Move towards more concrete contractual language with vendors and suppliers.
  - Provide broadcasters with guidance on issues to be aware of when outsourcing

WBU initiatives

- Outline a basic cyber control programme provide information on the core security operations and minimum requirements to implement a successful security program.

- Provide input to technical standards: educate technical departments to ensure core security principles are embedded in core architecture, equal in importance to other initial considerations, when adopting new IT systems.

R 141-146 and R 160 & 161

[https://tech.ebu.ch]

EBU and Cybersecurity

- EBU has a well-established Cybersecurity Committee and has developed numerous Recommendations in recent years:
  - R141 – Mitigation of distributed denial-of-service (DDoS) attacks
  - R142 – Cybersecurity on Connected TVs
  - R143 – Cybersecurity for media vendor systems, software and services
  - R144 – Cybersecurity governance for media companies
  - R145 – Mitigating ransomware and malware attacks
  - R146 – Cloud security, including procurement, architecture and cloud service provider assessment
  - R160 – Vulnerability management procedure towards media equipment vendors
  - R161 - Responsible vulnerability disclosure programme for media companies

[https://tech.ebu.ch]

WBU Cybersecurity

- Establish and maintain best practice recommendations to prevent, detect and mitigate cyber attacks from threat agents
- Establish minimum cybersecurity technical standards / requirements to be incorporated by equipment manufacturers and service providers, including all forms of cloud services
- Develop consensus positions on cybersecurity issues in support of the WBU-TC
- Provide assistance in cyber security training and education to Unions and their members, as the need arises
- Represent WBU positions on cyber security to external forums

WBU Joint Cybersecurity Recommendations

- WBU Joint Cybersecurity Recommendations for Media Vendors' Systems, Software and Services
  - Can be used for hardware, software or cloud services.
  - Can be included in RFI's, RFP's and RFQ's to industry to measure a potential supplier's level of cyber maturity.
- Recommendations associated with basic cyber controls

https://apb-news.com/the-wbu-tc-approach-to-cyber-security/

Basic Cyber Controls

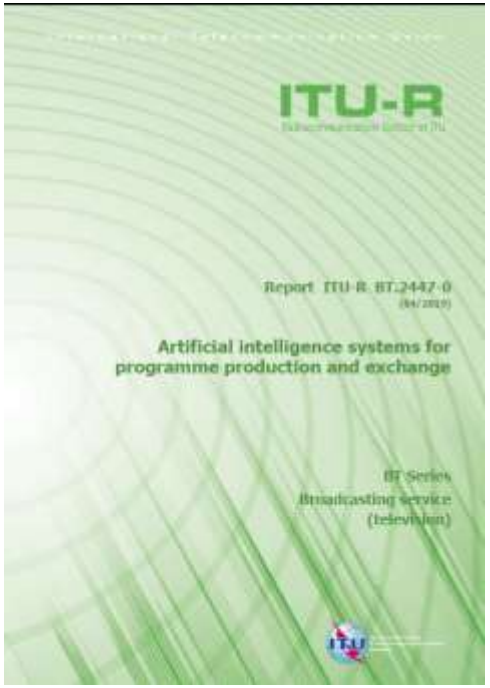
- Maintain an inventory of every physical device (i.e. PC) and system.
- Maintain an inventory of every software platform and application authorized for use.
- Ensure all software systems are patched and operating systems are at their latest release
- Institute proper “Identity Management”.
- Institute Multi-factor Authentication (MFA)
- Institute Privileged Access Management (PAM)

Undertaking these steps can prevent up to 70% of cyber attacks

ITU Report on AI systems

ITU Report on AI systems for programme production and exchange

- New broadcasting technologies driven by Artificial Intelligence (AI) are being introduced to the broadcasting workflow.
- These technologies intend to increase productivity, efficiency and creative opportunities during programme production, and to convey information to viewers quickly, accurately and automatically.
- AI has been deployed in international events to optimise and gain operational efficiency to edit short video clips.
- AI has also been deployed in many broadcast operations including language translation, AI-driven announcer, meta-data creation, to animate sign language, captioning, face detection and recognition



AI, ML and DL

- Artificial Intelligence is a branch of computer science that aims at creating intelligent technology capable of replicating human learning and problem solving skills

- Machine Learning provides computer systems with the capability to learn from data without being programmed

- Deep Learning is a further development of ML, enables computer systems to imitate the workings of the human brain in problem-solving

Deployment of AI in broadcasting

AI has already been used to produce highlights at the 2017 US Open, a tennis event. Cognitive algorithms were used to identify key moments of each game – Cognitive algorithms were taught by developers/researchers to spot signals of noteworthy moments, such as players' celebrations and the level of fans' noise.

AI Adoption Drivers - Production

AI Adoption Drivers in Content Production & Post-Production:

- Saves time and resources by automating routine tasks such as highlights creation in sports production
- Enables media technology buyers to cover second-tier events and tap an additional revenue source
- Enables media technology buyers to better track both production and post-production workflows while generating metadata usable throughout the content supply chain

AI Adoption Drivers - Monetisation

AI Adoption Drivers in Content Management & Monetisation:

- Saves time and resources by automating routine tasks such as content tagging and speech-to-text
- Enables media technology buyers to better search their existing catalogues through techniques such as image recognition
- Enables media technology buyers to increase revenue opportunities by leveraging their full archives

AI Adoption Drivers - Delivery

AI Adoption Drivers in Content Distribution & Delivery:

- Saves time and resources by automating routine tasks in content distribution and monitoring
- Enables media technology buyers to optimize distribution of high quality content to different devices and platforms
- Enables media technology buyers to increase subscription growth and customer retention by delivering a more personalized experience to viewers

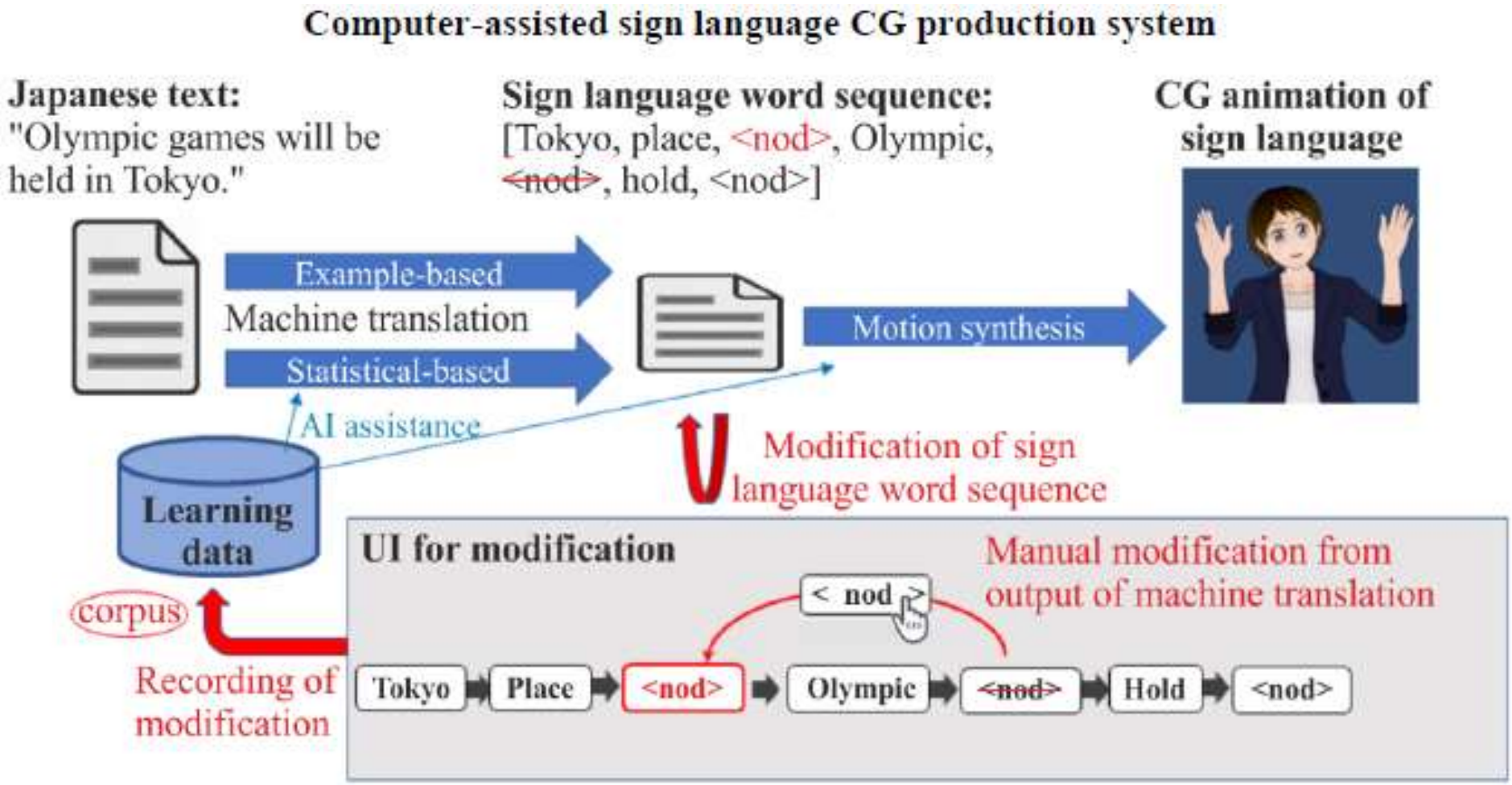
Examples

- Workflow optimisation & Content programming
- AI edited content generation for optimisation and operational efficiency
- Compliance tracking and content creation
- Bandwidth/Quality optimisation
- Captioning and Language translation
- Target advertising
- AI-driven announcer
- Sign language CG synthesis
- Metadata creation
- Video, audio detection and recognition
- Face detection and recognition
- Content personalisation

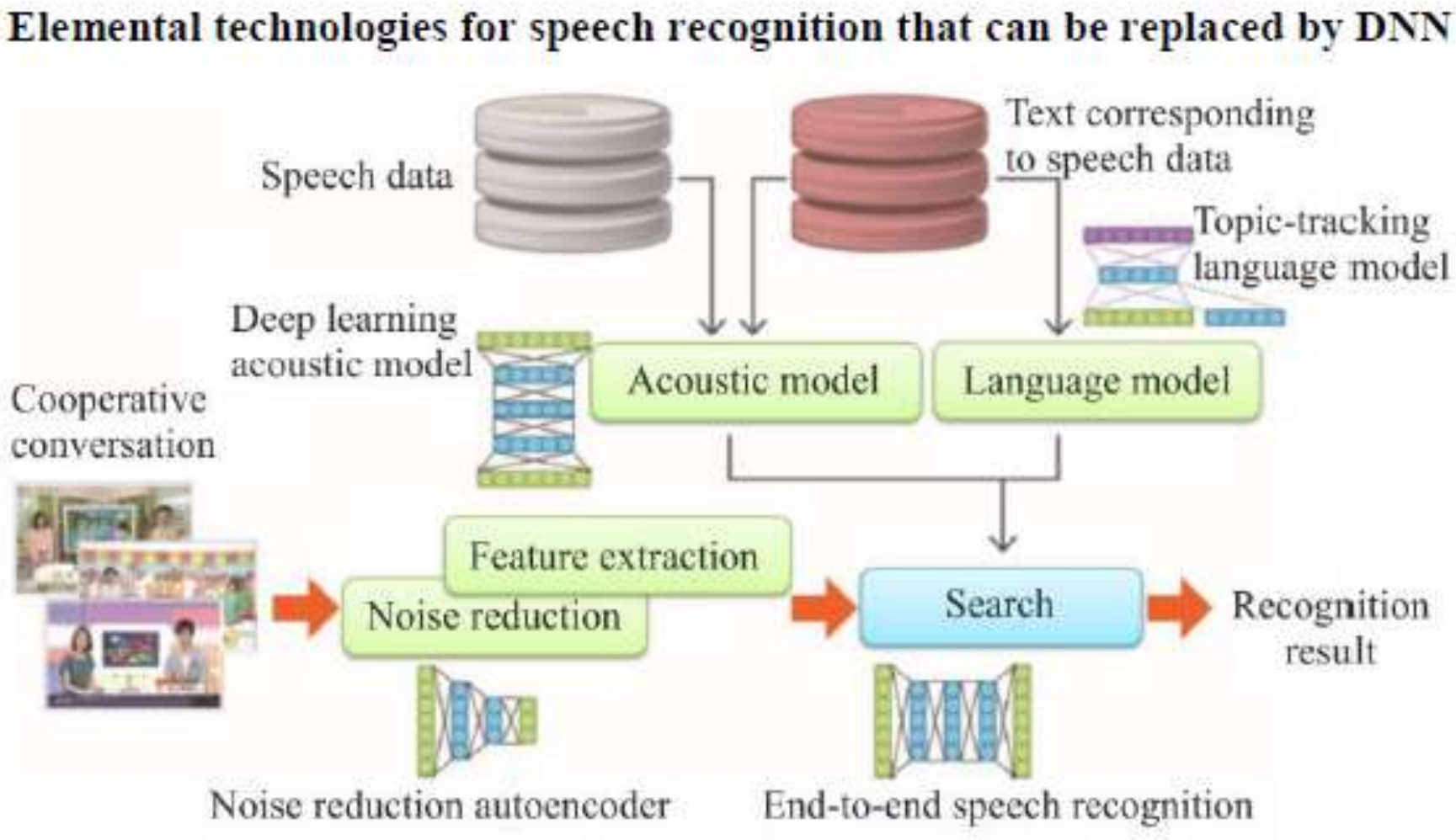
[ITU report BT 2447]

AD for live sports

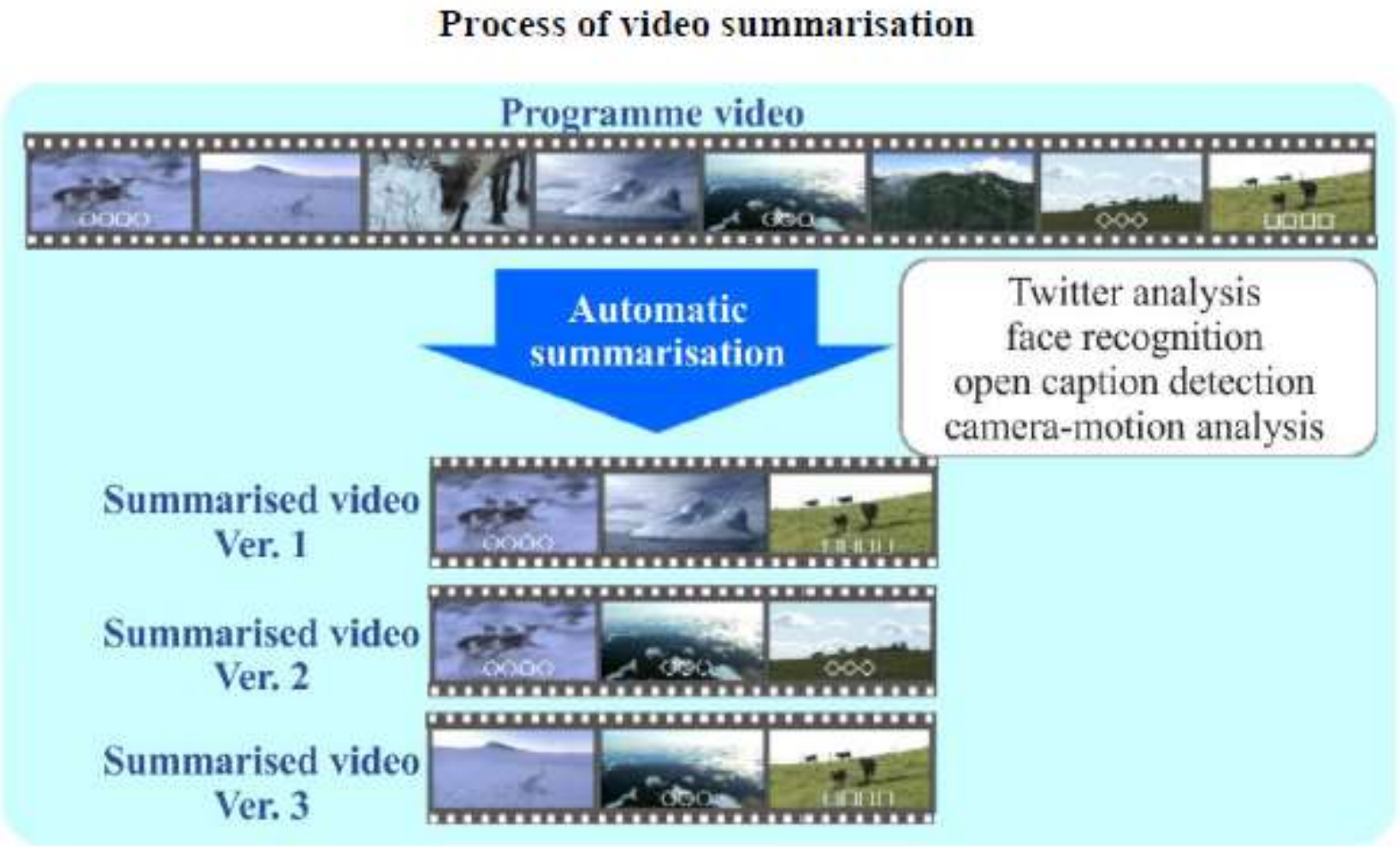
Sign language



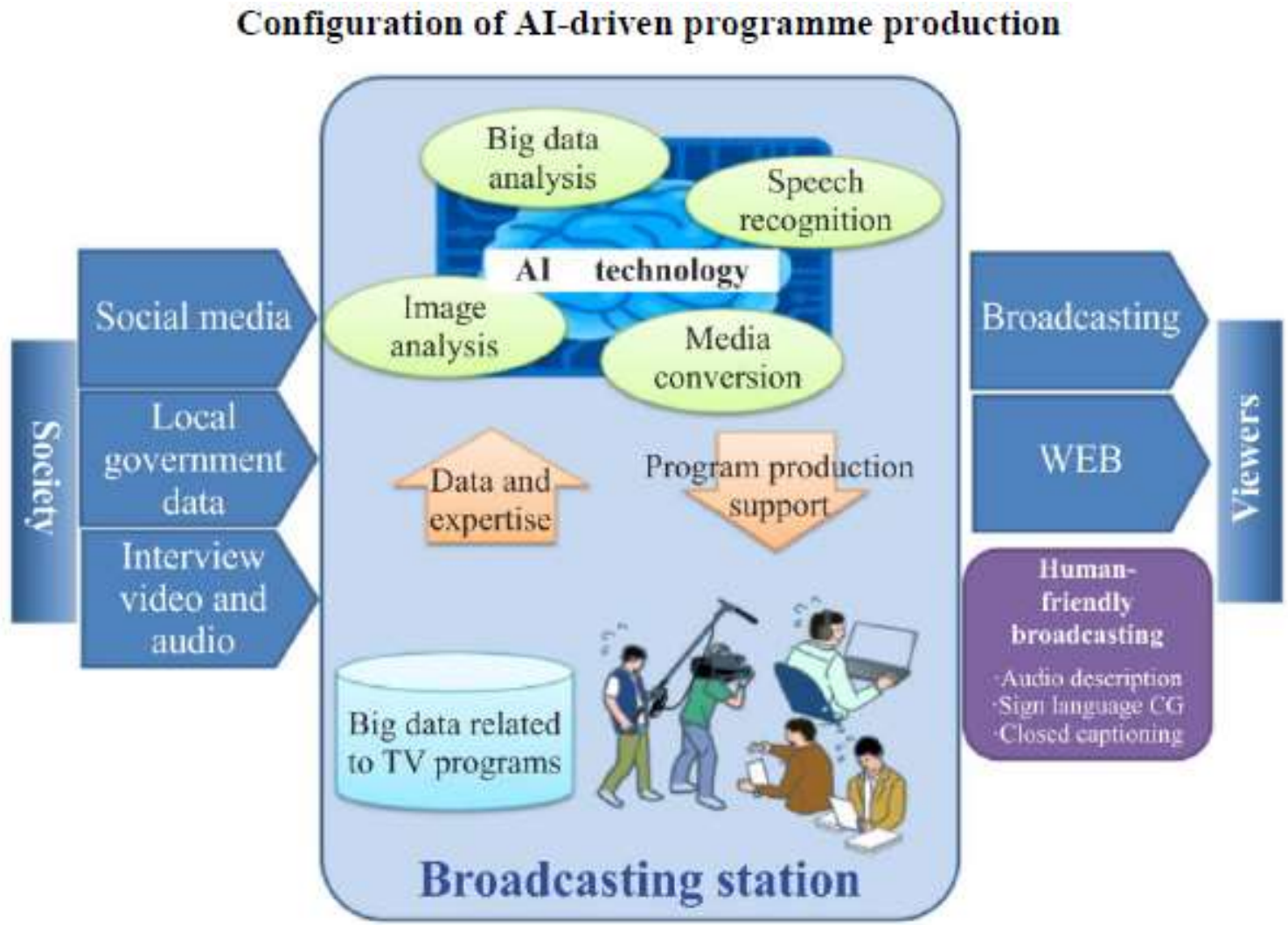
Captioning


Elemental technologies for speech recognition that can be replaced by DNN
Speech data
Text corresponding to speech data
Topic-tracking language model
Deep learning acoustic model
Acoustic model
Language model
Cooperative conversation
Feature extraction
Noise reduction
Search
Recognition result
Noise reduction autoencoder
End-to-end speech recognition

Highlight or Summary video clips

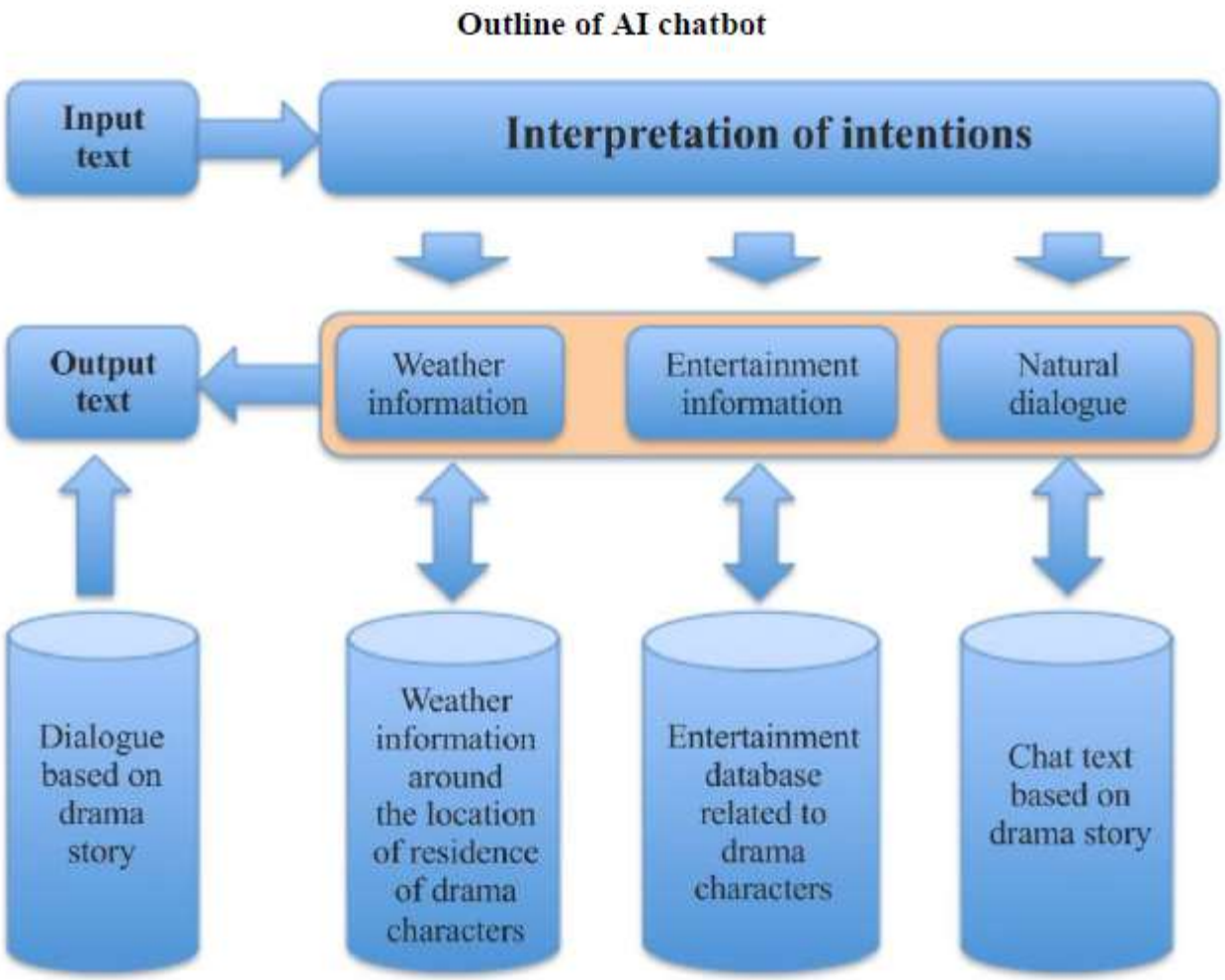


Programme production



Media analysis

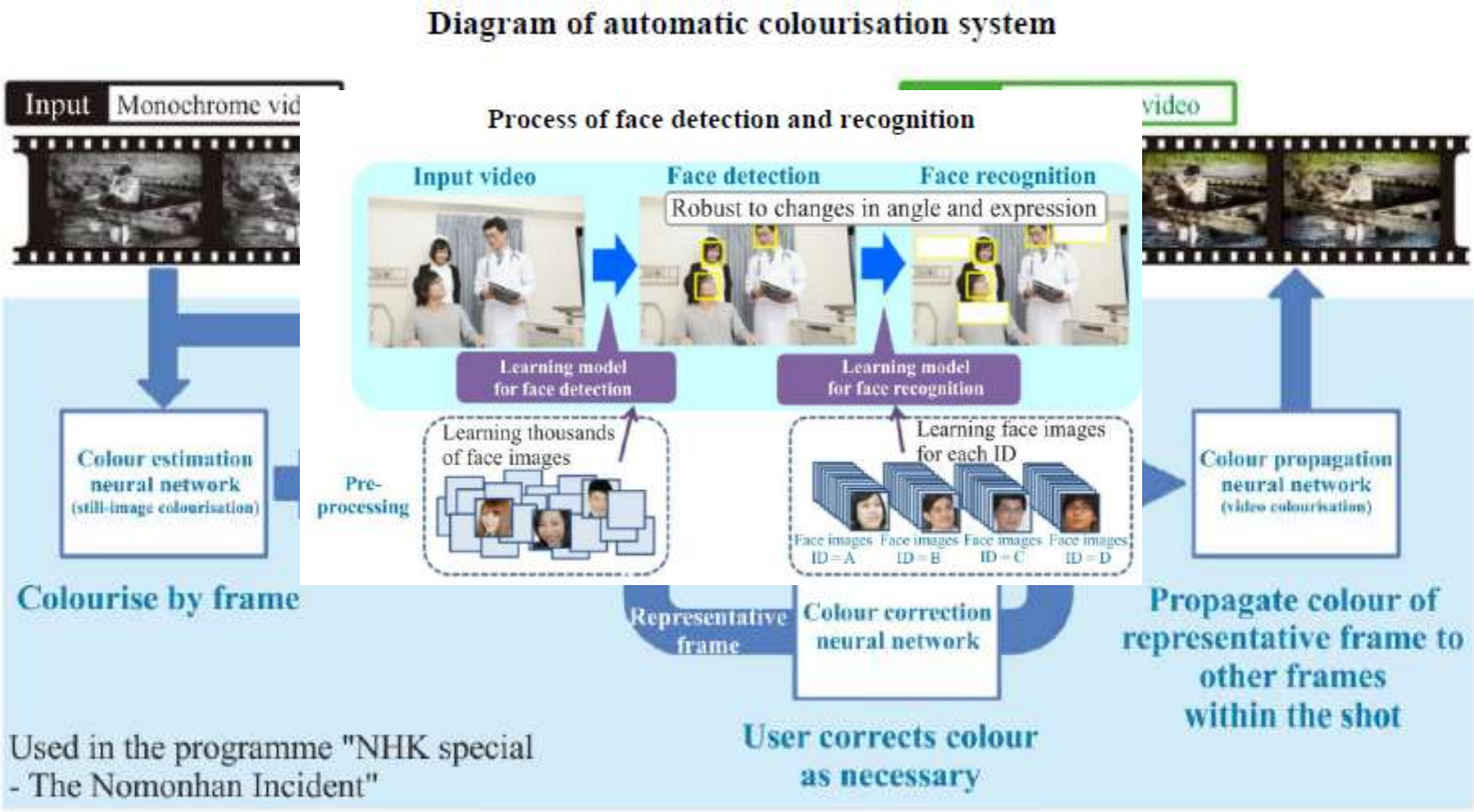
Chatbot


Outline of AI chatbot
Input text
Interpretation of intentions
Output text
Weather information
Entertainment information
Natural dialogue
Dialogue based on drama story
Weather information around the location of residence of drama characters
Entertainment database related to drama characters
Chat text based on drama story

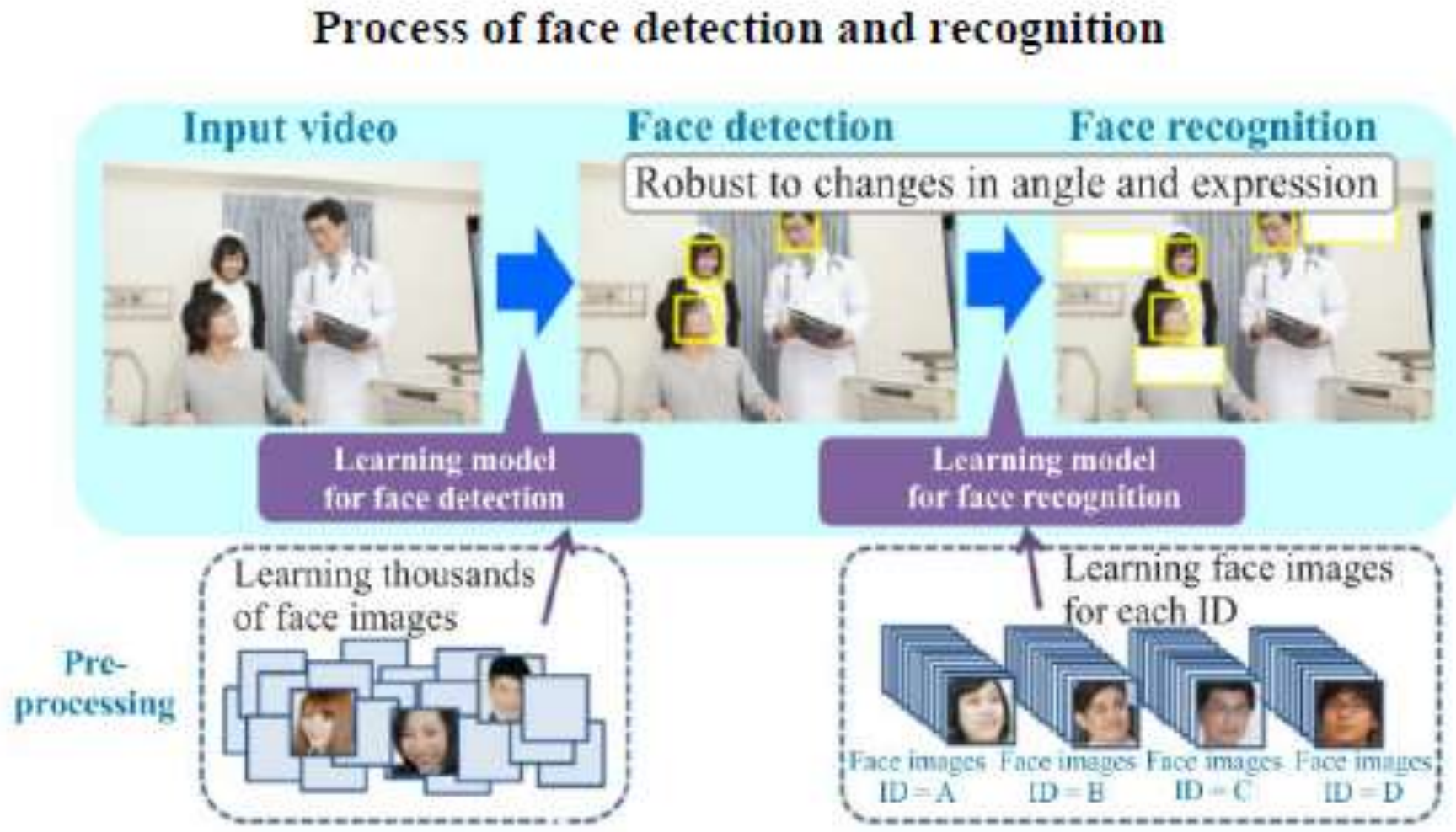
AI driven news

AI-driven announcer in a news programme

Automatic colourisation of Monochrome TV



Face detection and recognition



Summary

- Increasing deployment of AI, ML and DL in Broadcast
- Expect to bring increased productivity and efficiency
- Cyber security also can combat using AI
- Need to pay attention to Cyber Security in complete value chain (E2E)
- AI, ML and DL could be an affordable tool to cater accessibility for differently able people/audience

Thank you for your patience and listening

Thank you for listening

and

for your patience