

Smart Lexi™

Groundbreaking Live Automated Captioning

2022



Executive Summary

Broadcasters increasingly want automatic captioning to be accompanied by a strong service element. Smart Lexi is an advanced automatic captioning offering that:

- Provides broadcasters with expert teams to fully support captioning
- Maintains significant cost savings over premium human captioners
- Makes captioning easy to scale up for large and complex production needs
- Helps to further increase the accuracy of automatic captioning

Introduction

Broadcasters are benefitting from advances in closed captioning. As in all other sectors of media, large-scale tech shifts are happening in captioning. These changes rapidly transform how viewers access, experience and enjoy content.

As captioning systems progress, broadcasters have been realizing new efficiencies. Captioning talent and solutions are meeting heightened demands for improved accuracy, connectivity, interoperability, security, ease-of-use and affordability. These steady upgrades have brought newfound flexibility to broadcast engineering teams' closed captioning workflows.

Adding quality captioning to programming has become faster and easier. Broadcasters worldwide saw that captioning goes beyond meeting accessibility requirements for viewers with hearing loss: Captioning benefits include improved engagement and longer average watch times. Automatic caption translation also powers significant new revenue streams for globally craved content such as sports channels, streamlining distribution to profitable new markets.

Service Converges with Automatic Captioning

The automatic captioning solution Lexi™, introduced in 2017 by EEG Video, brings valuable benefits to broadcasters. Building on EEG Cloud Services' globally adopted iCap captioning network, Lexi is capable of achieving over 95% accuracy. Its AI-driven Topic Models system ensures Lexi accurately displays highly customized vocabularies and phrases.

When Ai-Media acquired EEG Video in 2021, the combined companies formed a comprehensive one-stop shop for captioning services and solutions. Ai-Media's deep experience in managing captioning talent and teams was a logical fit with Lexi, which has seen wide adoption for live broadcasting, live streaming and events, videoconferencing, VOD programming and more.

Ai-Media and EEG's first joint offering is Smart Lexi™, an advanced

offering of the Lexi Automatic Captioning Service. A Captioning as a Service (CaaS) platform, it combines machine learning automation with expert human curation. Smart Lexi builds on Lexi's 96% accuracy, automation and affordability, adding unprecedented management and support.



Smart Lexi is ideal for content creators who want live captions at higher accuracy than out-of-the-box automated captioning solutions, or at a lower cost than premium human captioning services. It represents a unique layering of captioning techniques and technologies, leveraging in-depth research performed by content teams. These captioning professionals refer to internal databases and customer-provided documentation for expanded Topic Models.

The Smart Lexi solution has proven to be optimal for broadcasters by providing:

- the quality of premium human captioning at approximately half the cost of that service
- the added support of 24/7 monitoring
- onsite captioning management for particularly complex projects
- the ability to constantly update custom vocabularies with the help of Topic Model curation teams
- regular reports confirming accessibility compliance standards are met

This unique combination of features has made Smart Lexi the choice for broadcast networks that want affordable closed captioning while being fully supported by captioning experts. As a result, Smart Lexi users such as Sky News Australia and home shopping network TVSN are delivering high quality captioning to their audiences.

The affordability of automatic captioning technology, combined with highly experienced caption management, makes Smart Lexi ideal for multiple scenarios. These include broadcasters that need 24/7 monitoring or constantly updated custom vocabularies. Highly complex projects, such as global summer or winter sports competitions with thousands of programming hours and dozens of live streaming events to live caption, are also turning to Smart Lexi.

A Captioning Partner for Broadcasters

Since the original launch of Lexi in 2017, a wide range of content creators have easily added live captioning, quickly improving their accessibility and compliance with Americans with Disabilities Act (ADA) guidelines. In its standard version, Lexi proved to be a cost-effective and high quality automatic closed captioning solution for broadcasters, streaming content, governments and municipalities, corporate, educational users and more.

Lexi achieves a base accuracy of 96% and provides myriad workflow enhancements and expanded control to users. For many, the user experience with Lexi is that of automatic software that runs extremely well after setup, for an optimal convergence of high quality captioning and cost savings.

However, as an Automatic Speech Recognition (ASR) solution, the standard Lexi offering does not provide broadcasters and networks with the high-level support of premium human captioning services. “Many broadcasters have come to view their human captioning provider as a production partner,” says Bill McLaughlin, Chief Product Officer of Ai-Media. “They appreciate the significant cost savings of automatic captioning, but they also want the people and expertise that human captioning agencies provide.

"With Smart Lexi, broadcasters will still realize excellent cost savings. This benefit comes without any noticeable drop off in service and responsiveness, thanks to Smart Lexi's skilled management, monitoring and Topic Models curation teams. Networks receive industry-leading automatic captioning supported by a full-fledged production partnership."

Inside Smart Lexi™

When a broadcaster chooses Smart Lexi, they get much more than Lexi's sophisticated automatic captioning capabilities. The broadcast engineers are fully supported in four ways by the expert teams at Ai-Media and EEG:

1. **Initial setup** and commissioning of the system
2. **Custom dictionary management** for Topic Models, to maximize the live transcription system's accuracy
3. **Live support for job scheduling and management**, including top-priority tech support for any issues
4. **Constant monitoring** for caption quality assurance

Exploring each support phase in-depth illuminates the white glove service that differentiates Smart Lexi.

Initial Setup

This phase starts with establishing responsibilities and access for personnel connecting to the EEG Cloud, where iCap is hosted and plays a central role in Smart Lexi's operation.

Coordinators are set up with standard access to EEG Cloud. They are trained on how to start/stop an automatic captioning session – also known as an Instance – manually, as well as how to schedule an Instance.

Team Leaders/Managers are set up with admin permissions – they

can invite new users to sign up for EEG Cloud. They are responsible for setting up new instances and configuring the Instance settings.

Custom Dictionary Curators are set up with standard access to EEG Cloud and are trained to use the Topic Models system.

As part of the initial setup, the Smart Lexi team integrates several supporting systems into the platform.

Lexi Live Instances are enabled when a Team Leader sets up one Lexi Instance per captioning encoder and applies the default settings. This is typically a one-off process and these settings generally remain unchanged moving forward, including parameters such as line height, language, accent and timeout settings. These preferences are confirmed with the client in advance, with any necessary encoder settings alterations carried out by a Smart Lexi Team Leader.

CaptionCast is an EEG application that streams live captioning to smartphones, tablets and personal computers. Its web-based view of captions makes CaptionCast ideal for monitoring and is set up for each captioning encoder via the iCap Admin portal.

Lexi Leash is an application that connects to an EEG Cloud Services account to easily create, monitor, stop, re-start and log Lexi Automatic Captioning jobs. Lexi Leash is installed with Smart Lexi setup, so that captioning managers can quickly monitor session status and restart jobs similar to previous sessions with one button click.

Administrative applications are also included in the initial setup process. These include the Airtable collaborative platform for generating reports on operational requirements, and TimeSite for billing.

Custom Dictionary Management

A key component of Smart Lexi's high performance is Topic Models, also known as Custom Dictionaries. An AI-powered feature, Topic Models greatly improves accuracy of transcriptions, particularly in the case of unusual or domain-specific words and phrases, or proper names and places.

A Topic Model consists of text-training data such as common phrases

expected to be heard during the audio program, proper nouns which are desired to be recognized but would not be found in a standard dictionary and pronunciation clues for any new words. Smart Lexi captioning accuracy can be greatly improved by careful curation of appropriate Topic Models.

EEG and Ai-Media Team Leaders manage content teams that assist in boosting this accuracy even further with Smart Lexi. The team reviews all captioning transcripts, constantly updating Topic Models specific to a broadcaster's programming.

Although each Smart Lexi customer's needs are unique (as shown by specific examples below), the typical Custom Dictionary curation process consists of four main steps:

1. Creation of a generic base custom dictionary and house style during the initial onboarding process, including terms such as the network name, program names, presenter names and recurring consistent terminology.

2. Researching of new terms daily either by independent online research or by using the broadcaster's newsroom system/ materials, collating lists, adding phonetic pronunciations to terms where applicable and importing/adding terms to the Topic Model.

3. Reviewing the previous day's logs for discrepancies, with new terms added and outdated terms removed as necessary.

4. House styles can be used to address both formatting preferences and ASR recognition errors, when there is high confidence that the term identified will consistently need to be replaced with another term.

In the case of network uses, the frequency of Custom Dictionary updates depends on the nature of the programming. The home shopping network TVSN, for example, is updated hourly, building on the Custom Dictionaries that have been prepared in advance.

TVSN sends the Smart Lexi team catalogs for all products the night before for each program. Next, the Smart Lexi team creates detailed

Custom Dictionaries in advance, based on the catalogs sent the previous night, then schedules them to run at the correct time slot.

For Australia's Sky News network, Topic Models are updated daily. The Smart Lexi team reviews Australian news websites and Electronic News Production System (ENPS) export files to create Custom Dictionary lists. The Custom Dictionaries are further updated during ad breaks.

Another example is an international summer and winter sporting event, where Topic Models originate from data provided by the broadcast network. Other independently obtained sources are added from there, covering:

- Sport-specific terminology
- Athlete names and country affiliations
- Commentator names
- Event-specific information such as venue names and locations

Each Topic Model is created with general sports terminology in advance of the beginning of Smart Lexi's use during the events. Next, the Topic Model is updated with final rosters for each sport as these become available. The Topic Models are further updated during the events, based on news updates as well as observational feedback of Smart Lexi performance.

Developing the individual Topic Models for each sport, as well as each country or participating team and their rosters, requires meticulous research and organization. Smart Lexi content curators must be detail-oriented every step of the way. They thoroughly research each sport, including watching past videos to listen for any common words or phrases spoken by announcers.

Throughout the airing of the international sporting event, the Smart Lexi team analyzes incorrectly captioned words from the day before. From there, Topic Models are updated for higher performance, ensuring a consistent increase in accuracy over the course of the event. This part of the process is where the hybrid design of Smart Lexi is a major benefit, combining human curation and dedicated service with AI-powered captioning technology.

Live Support for Scheduling and Management

Smart Lexi Coordinators play a key role in maintaining its workflow. The key functions they oversee include:

Starting and stopping Lexi Instances – Instances of Lexi can launch in four ways: a GPI trigger, manually via the Lexi Live page on EEG Cloud, manually via Lexi Leash, or from EEG Cloud's Scheduling feature.

In the case of one of our broadcast customers, there are four encoders set up that require scheduling management by Smart Lexi coordinators. Certain studio sources have fixed hours, so a recurring Lexi session is scheduled. Since other studio sources are subject to ad hoc hours they require daily manual scheduling. In those cases, the broadcaster's personnel send a daily breakdown of programming to Smart Lexi Coordinators the night before airing.

Another broadcast customer, in comparison, has only one encoder, which simplifies the scheduling process. In either case, Smart Lexi's overnight Coordinator imports the client schedule into Airtable, identifies any irregular programming and schedules it in Lexi for the following day.

Caption monitoring – Smart Lexi Coordinators monitor Lexi captions while on air and are on call to get captions back on air in case there's a dropout.

In the event of an on-air outage, Coordinators will be alerted and perform basic troubleshooting steps to get captions back on air. These steps include restarting the Lexi instance, diagnosing the issue using the Lexi Instance history page, or using a different ASR engine as a backup. In the event that all other options have been exhausted, the Coordinator will enter into iCap and respeak.

Creating and maintaining the Airtable report – the Smart Lexi Coordinator responsible for creating the next day's report imports the schedule from the client and keeps the current day's program report up to date. This includes tracking source changes and listing incident reports.

The Airtable report is an essential component for billing, tracking

incident reports and verifying sources. It can also serve as a useful reminder for the Coordinator to conduct on-air spot checks.

Captioning Quality Assurance

Quality assurance – Ai-Media favors the NER model for measuring caption accuracy, which assesses live caption quality in a way that is more objective and scientific than previous models. The NER system is increasingly recognized as the best method for measuring live captioning accuracy: It is repeatable and can be applied broadly, with growing global adoption.

Sky News, for example, requires four NER assessments per month to be submitted. A regional caption quality assurance (QA) team would generally complete 2-4 Smart Lexi NERs per week. Those results are used to inform prompt updates to Topic Models.

Incident reporting – Using a Smart Lexi dropdown in the project tracking application Jira, the Coordinator logs any on-air captioning incidents within Jira and adds reference comments to the daily report in Airtable. These incident reports are reviewed and a monthly summary is sent to the broadcaster.

Archives – All Lexi captions are archived on the EEG Cloud. They can be easily downloaded on demand in multiple formats, including .txt

Captioning Scales Up

With Smart Lexi, highly accurate, affordable automatic captioning is broadcast-grade. Its convergence of EEG's advanced technology and Ai-Media's expert teams advances the expectations for captioning.

"The Custom Dictionaries in Smart Lexi's Topic Models are built by people with years of captioning experience. They achieve much better results than typical speech-to-text software..."

Its Lexi AI-powered platform continues to push the envelope for ASR caption quality. “The accuracy of automatic captioning has come a long way,” says Kirilly Winfield, Associate Product Manager for Ai-Media. “The Custom Dictionaries in Smart Lexi’s Topic Models are built by people with years of captioning experience. They achieve much better results than typical speech-to-text software.

“That additional expertise adds so much value,” Winfield continues. “Broadcasters take captioning very seriously for compliance with accessibility standards, but quality captioning is complex. Networks appreciate that Smart Lexi takes care of the complete captioning process, even at very large scale, at a significantly lower cost than premium human captioners. We make captioning so much easier for them.”

Visit here to learn more about Smart Lexi.