

COMIQS

The Experience Intelligence Cloud: Creating TV That Understands



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The Experience Intelligence Cloud

It is a rare occasion when one witnesses the birth of a new product category based on the latest and greatest of computer science. This whitepaper will discuss the basic principles of this disruptive product, as well as how Comigo harnesses the power it entails to shift TV to uncharted territories...

However, before we touch upon the essence of what we are doing, let us begin with an observation:

Video quality is on the rise - in a short time it transitioned from SD to HD, currently catching the 4K wave and soon enough 8K will knock on the doors of our living rooms. This will be mixed with consumption experiences such as VR/AR (Virtual/Augmented Reality) that will make best use of the improved video quality.

Metadata has been on the rise as well, initially we needed an auxiliary paper guide to tell us what we are watching or what we will be able to watch, but with the digital revolution we get the metadata embedded as part of the video. Can you imagine watching TV without an Electronic Program Guide (EPG) available? Without a VOD catalog to browse?

We believe, that what we expect the metadata to do for us, is about to change yet again, with the introduction of a new kind of experience that is based on TV AI (Artificial Intelligence), that will allow us to streamline content interaction like never before.

Comigo calls this product category Experience Intelligence (EI). At the heart of it is the EI Cloud, a new kind of PaaS (Platform as a Service), which creates a superior OTT experience by automatic metadata enrichment, through crawling the best of the Internet, as well as automatic metadata creation, which makes use of **deep learning** for **NLP** (Natural Language Processing).

EI Cloud boasts the most innovative roadmap that allows the ongoing evolution of any OTT service and thus, TV AI is made available to every connected device with a whole new level of metadata interaction.

Deep Learning for NLP

Natural Language Processing is a field almost as “ancient” as computers, that focuses on “teaching” computers to understand the human language. Throughout the years, many algorithms were created to meet the challenge - steadily growing into semantic sentence analysis including part of speech tagging, entity extraction, topic modeling and finally sentiments which are conveyed in the text. However, language, any language, doesn’t just sit tight, but rather grows, adapts and inherits new words, contexts and even ways to communicate (emoticons anyone?). Standard NLP algorithms fail to adapt and are stuck in the past conventions.

Deep Learning is here to make a difference for how NLP is efficiently deployed and is in fact re-branding of the much older (and for a long period taunted) Neural Network (NN) algorithm class. Without going into much details, NN algorithms builds on the same notion a human brain neural network work and that one can teach/train a brain (and an AI) to learn new capabilities.

As an example, instead of the “old way” of building the geometry of a rectangle into computer code that in turn will decide if a presented image is indeed a rectangle according to a predefined set of rules, using DNN (Deep Neural Network) you train the computer by showing a set of rectangles until it learns to deduce that the image is indeed a rectangle. Sounds simple, however, there are still gaps and issues which prevent a general AI from emerging to rule us all ;-)

Still, with every day that passes new DNN functionalities are being built and we encounter them on a growing number of services: “OK Google” voice services understand better the most complex requests, Facebook automatically recognize faces on images uploaded by users and Microsoft’s Skype translate video chat audio in real time.

The application of DNN into a TV service can have many facets - Comigo currently focuses on metadata enhancement and creation - so we train our AI to understand context, program types, different languages, entities, bookmarks, scenes and more. By this and other related methods, we are in effect creating TV that understands - linking the wealth of programming, live, non-linear, online, into a tightly coupled experience that allows the end-user to intuitively access and interact with non-stop content...

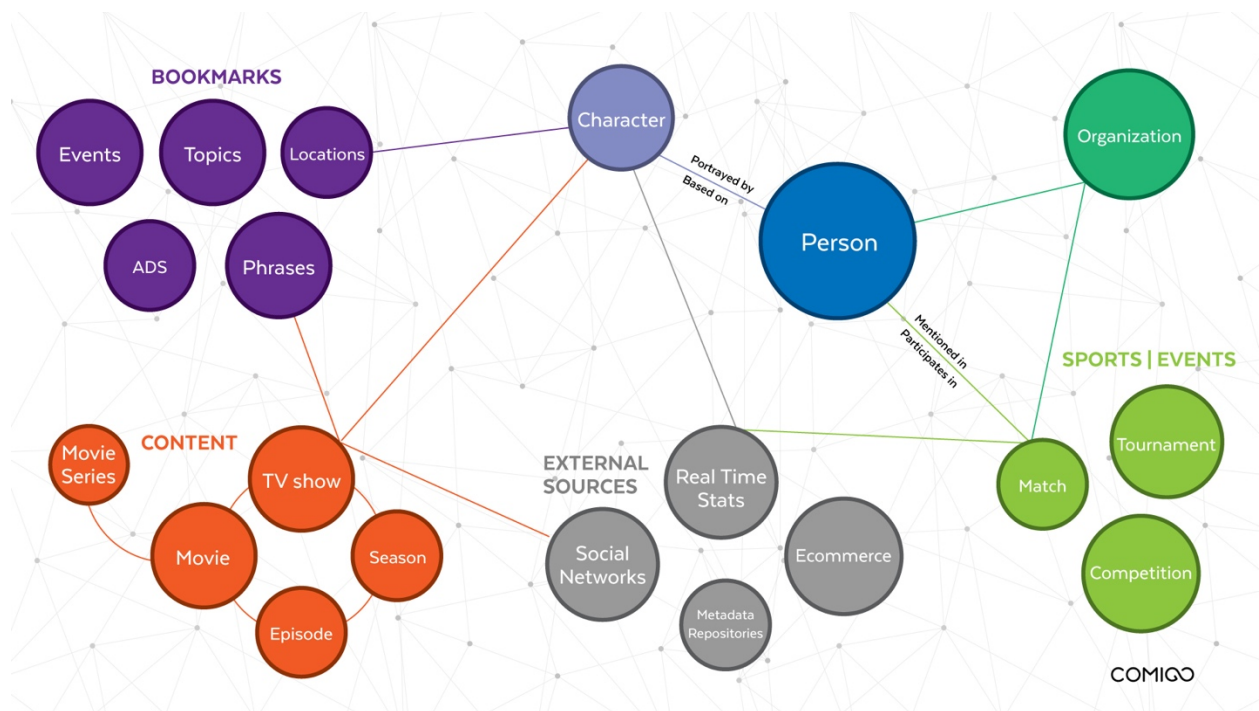
A mention of the “cold war” in a political debate could lead to a movie or a TV show that takes place in that era. “Oscar winner for best actress” will unveil any content with that actress on the spot and every related content she has created or posted on the Internet. “A news headline” would allow us to jump to that topic from various angles - on other channels, historical mentioning, online materials etc. “Filming location” could be our next vacation destination.

Welcome then, to the world of TV AI.

TV AI

In the heart of the transition to the next generation of metadata is the evolution from a very sequential and (in essence) static information, into a world of dynamic metadata. One that never stops being updated, whether it’s from the Internet or from the content itself. Furthermore, the flat and limited relationships such as movie and its actors are replaced with a 3D formation where all are interlinked.

To achieve that we would need a Knowledge Graph (KG) in place that would elevate from the standard CMS table metadata formation, this would allow us to map the metadata particles and interconnect them intuitively into DNN topography.

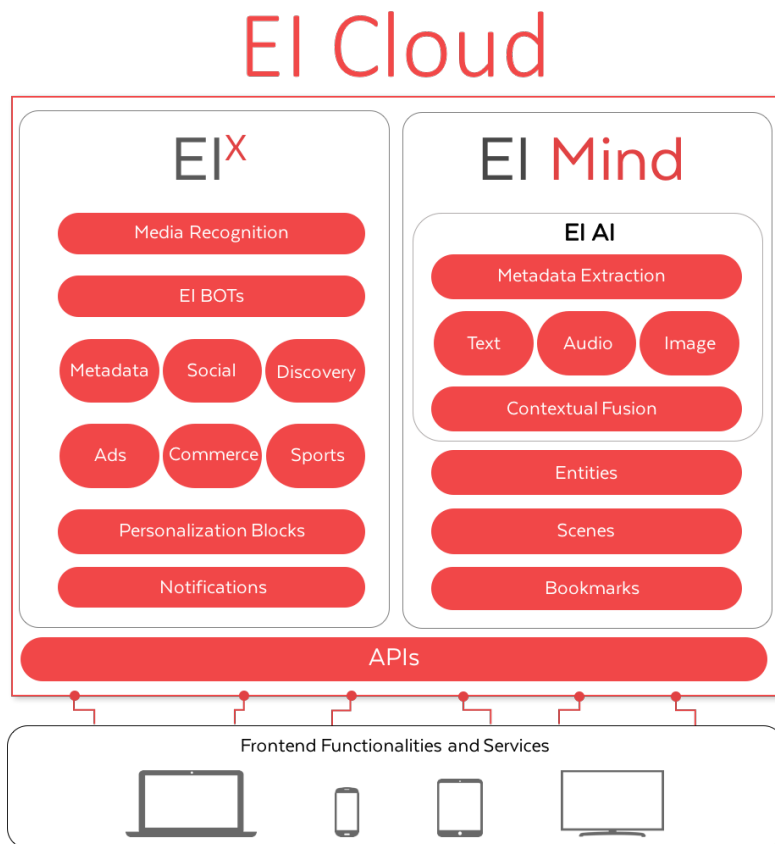


Next is the ability to identify the data points that are meaningful as metadata - Name Entity Recognition (NER), these entities are placed into the knowledge graph by the DNN implementation, consequently growing our KG resulting in an ever-growing AI- all TV knowledgeable.

Ready-To-Deploy

At the heart of the EI Cloud is the overall NN architecture that empowers the very essence of Experience Intelligence. EI Cloud true to its Platform as a Service (PaaS) nature, exposes all its services with a comprehensive set of APIs. In addition, a clear implementation path that packages these capabilities into a set of services was created.

The diagram below describes the different modules that are included:



EI Cloud’s main functionality:

- Ingesting content metadata from the CMS. The metadata includes linear channels list, EPG and VOD catalog.
- Analyzing the data retrieved from the CMS.
- Accessing and curating internet data sources, social networks and digital services in order to contextually enrich the content and the viewing experience.
- Analyzing the video content – both live and VOD.

- Processing streams’ data and metadata: video, audio, subtitles, etc. Analyzing what the viewer is watching and what sound/voice is played as well.
- Providing APIs for client apps that can enhance the viewing experience of their users.

The EI Cloud Modules

- **Metadata** – manages content metadata by harvesting internet data sources and enriching the content with relevant information.
- **Social** – manages social data retrieved from social networks, as well as social interactions and engagement.
- **Discovery** – all new metadata is linked across the KG for intelligent search, while, bookmarks are automatically created across all content types to allow for fast access including scene creations.
- **Ads** – creating innovation around advertising by uncovering innovative idea that would attract users to continue interacting with and around the advertising.
- **Commerce** – creates a contextual “shopping list” based on the viewer’s profile and consumed content.
- **Sports** – handles Sports events and Sport videos by enriching them with statistics, team and players’ information and more.

In addition, we have created a layer of **Personalization Blocks** - actions and Info that drive the interaction between the end-users and the EI Cloud. Actions - follow, greet, invite, cheer/boo, bet, answer, post, buy. Info - poll, trivia, badge, rank, bookmark. These bring value to the end-user and differentiate each user contributing to a personalized DNN model.

Creating TV That Understands

In the below OTT end-to-end blueprint, we have added the Comigo EI Cloud. This would elevate any OTT service to the next level by adding **TV AI** without displacing any existing components. Accomplished by simple metadata ingest, and by adding new API calls to any device (without changing previous operations), truly, making your OTT TV, shine above the rest.

