Kendra:

Enterprise search engine

2 big challenges

1.Low search accuracy- 80% unstructures(but search engones were build based on structured)

i want to talk to you about how we

**transform the way you search**

**and interact with enterprise data**

how we can improve employee productivity

and help our customers

find what they are looking for so kenroy

is a **highly accurate enterprise search**

**service**

powered by **machine learning** so before i

begin

i want to tell you why we built amazon

camera in the first place

over the years customers have come to us

telling us

they have two big challenges with

enterprise search

no matter what applications they use

**first one being very low search accuracy**

meaning when people search for

information they simply **cannot find**

**what they need to do their jobs leading**

to all sorts of problems

when we looked at low accuracy we have

discovered that

most keyword search engines have been

developed at a time where

most enterprise content **was actually**

**structured content**

mainly databases data warehouses

basically it's all business intelligence

but since then for years now content is

predominantly **unstructured**

**across the enterprise anything from**

**websites**

**research papers corporate documents**

**policies**

**project documentation** and so on so these

documents contain

a **lot of context and concepts** that can

be understood

and **keyword search engines** have

introduced some level of ai

like natural language processing to

extract

entities map them onto flat indexes

and use the same algorithms to help

users search for information

but users often find either **too little**

**or too much information** and in many

cases it's not relevant

so let's understand the and so let's

understand the impact of

low accuracy so when people cannot find

what they're looking for it reduces

employee productivity

so they're spending a lot of time

searching for information

rather than doing their jobs so it

increases the risk

and liability of non-compliance and it

can create

a lot of repeat work

the **second challenge is is the**

**complexity of implementing enterprise**

**search**

the big problems of complexity turns out

to be mostly uh

focused on the fact that information

**scattered**

**across a lot of different data sources**

across the enterprise

and pulling all of this together into an

**index that is searchable**

is a challenge by itself and then if

customers are able to do that

they end up with the **same keyword search**

**capabilities** that keyword search engines

offer and making it

very difficult to actually find what

they're looking for

and then as content shifts and user

preferences change over time

making sure that such information or

such answers do not become stale

is also a challenge so let's understand

the **impact of complexity**

so when people are searching through

websites

or using like customer support

self-service

first of all **if people cannot find what**

**they're looking for**

**they're not going to buy it and they're**

**not going to access it**

and secondly if people cannot find

answer to the questions

that directly increases **support costs**

**and people end up**

**talking to the support agents** who

themselves are challenged by finding the

right information right answers so

deploying a search engine

that can learn and improve its models

based **on customer**

**specific data is a difficult and it**

**results**

**in costly application development**

so those two big challenges related to

low accuracy and complexity

what customers have been focused on and

we decided to deep dive into these

challenges

and try to figure out whether we can

help and reinvent

those experiences so our mission at **aws**

**is to take our rich experience and**

**expertise with machine learning** across

amazon

and put it in the hands of all

organizations every developer

data scientist researcher we want to

simplify machine learning and we want to

make it easy for all developers

to easily build intelligent applications

so as support explained we have these

three layers of stack i'll just quickly

go through it

so that you will get uh you know it will

just stick in your brains firmly

so we see that machine learning stack

**having three key layers**

in the bottom layer are the **frameworks**

**and infrastructure for**

**expert practitioners** in the **middle layer**

**are the machine learning services that**

**make it easy for machine learning**

**developers**

**and data scientists to build train**

**and deploy machine learning models** in a

single click with amazon sagebanker

and in the **top layer are the ai services**

**that allow all developers to use**

**pre-trained and auto trained models**

**to add intelligence to any application**

**without machine learning expertise**

so we have taken machine learning

approach to addressing

and reinventing the enterprise search

problem

so that's why **amazon camera ended up at**

**the top of the machine learning stack**

**rather than as part of the data and**

**analytics technology stack we have at**

**aws such as amazon elasticsearch**

**service**

okay let's see how we have actually

reinvented the search experience with

amazon camera

so i'll break it down into two main

areas first one thing is **addressing the**

**enterprise such accuracy**

and helping people what they're really

actually looking for

and the second is addressing the

**complexity issue** making the

implementation and ongoing support of

enterprise search

much simpler and quick to implement and

of course

security at aws is of paramount

importance

the first category is the use **of natural**

**language queries**

so kendra uses natural language queries

as a way of addressing the **world of**

**unstructured content**

so see unstructured content contains a

lot of concepts

and context within the text that can be

used to hone in

and improve accuracy when searching for

specific information when you read a

narrative

you are able to ask questions about that

narrative like

who was this person or where is the

thing or when did that happen

same thing can draw applies to

unstructured enterprise content for

example

you can ask a **question like what are**

**less common cobit 19 symptoms**

you will receive an immediate and

accurate answers as shown here

so we understand that people are not

going to change overnight

and stop using the keyword queries but

natural language queries are a better

option

for finding what you are looking for

another thing in the world of

unstructured content

is that we also realize there is **no**

**single machine learning model**

**that would be able to always provide the**

**best answers to any inquiry**

so we put several of them under the hood

first one being **reading comprehension**

**model**

so that's the model that returns an

answer to your question

it understands concepts like **people**

**places**

**daytime location organization** and so on

and is able to search for specific or

identify specific

answers the most likely answers to the

query that was presented

**faq matching is another model** that deals

with **curated content**

we have a lot of curated content across

the enterprise

and we have a lot of **frequently asked**

**questions** that have been prepared by

experts in their respective fields

the third one is **document ranking**

provides

similar results like keyword search

engines which is a list of links to

various documents but unlike traditional

algorithms

**document ranking model** with camera

actually provides a **list of documents**

**that are relevant because they answer**

**your question**

okay so now in order for kendra to be

able to understand

all these queries and find the most

relevant information

as a search answer **kendra is trained on**

**a broad base of domains**

that means that camera is not only

suitable for such within multiple

industries or verticals like

financial services pharma healthcare

travel and hospitality but it's also

able to identify the **right concepts and**

**terminology when people within**

**any organization** asked about like health

benefits

or travel policies or legal

documentation like nds

so this is really important in order to

understand

and identify concepts correctly and find

the

**best and most relevant answers**

as far as the accuracy is concerned

using machine learning model under the

hood gives us a huge

advantage because we can improve such

accuracy over the time

amazon camera also includes **continuous**

**improvement features**

that ensure such results are accurate

and relevant over the time

**incremental learning comes built into**

**camera**

and **learns from user interactions and**

**feedback**

it **uses these inputs to re-prioritize**

**content in the list of**

**search results** so that over time the

information that provides to be the most

valuable

is positioned at the top of the list

as far as addressing **the complexity**

**issue we have taken two main approaches**

here

the first one thing is that you do not

**need to invest so much**

**time in integration with all the data**

**sources across the**

**organization in order to make enterprise**

search works

**using connectors** is a quick and easy so

you just add data sources to your camera

index

and select the connector type so

connectors will maintain document access

rights

and can be scheduled to automatically

sync your index with your data source

so you are always securely searching

through the most up-to-date content

camera delivers highly secure enterprise

search for your search application

your search results reflect the security

model of your organization

with **amazon camera data is encrypted in**

**transit**

**using https tls and also encrypted at**

**rest**

**using amazon kms** also camera supports

**token based user access control**

so many people ask how does camera

compare to elasticsearch

when do we offer which so now we can

kind of

think how we differentiate between

**amazon sagemaker as a machine learning**

stack

and our ai services like amazon poly

amazon translate or amazon camera

amazon **elasticsearch service is a lower**

**level service**

**or search engine that developers can use**

**to build custom**

**keyword search applications** amazon

camera on the other hand

is a fully managed search solution it

provides capabilities such as

**relevancy tuning and filtering most com**

**importantly it comes with machine**

**learning models pre-trained for semantic**

**search**

**right out of the box amazon**

elasticsearch service used

mostly for keywords such as things like

highly performance log analytics while

amazon camera

can be used for natural language queries

asking

factoid questions like varies vanish

how to as well as faqs amazon

elasticsearch service is used mostly for

structured content it is created with

structured content because

it maps those structured elements like

specific entities

into an index for search amazon camera

is designed specifically for

unstructured content

so that you can ask questions and hone

in on to an answer so when you compare

the two

i would say as a rule of thumb if most

of your content is unstructured

and your biggest problem is such

accuracy and you don't have a real need

for

developing a custom search application

your best choice would be using amazon

camera

so you can experience the power of

camera by accessing this leak

called 19.aws so it's a public website

and you can just type in card 19. aws

and you can type the questions there so

that you it will demonstrate

how the camera can be useful

in searching all this kobit 19

related information

cod stands for kovit 19 open research

data set

aws launched called 19 search a new

search website powered by machine

learning that can help researchers

quickly and easily search items

like tens of thousands of research

papers and documents

using natural language questions code 19

search includes data which has been

processed using

amazon comprehend medical

so let's look at how some of our

customers have

reimagined their enterprise search using

amazon camera

woodside energy is the pioneer of

liquefied natural gas in australia

with 65 years of experience including 35

years

in designing building and operating lng

plants they have millions of documents

capturing collective intelligence

woodside uses amazon camera to help its

employees

working on projects in the space of

natural gas drilling

being able to find the information that

they need quickly and efficiently

is very important for their operations

for example

they're able to go out in the field to a

drill site

with the right equipment because they

were able to ask a question and get a

straight answer

so for example what is the length of the

pipeline at pluto

provides them with the direct answer

like you know 167 meters

which allows them to know how many

valves they need to take

that day to implement on the job

material science research being able to

find information about prior research

and know

when to start where to start and

utilizing r d for the next research

is critical for accelerating the pace of

innovation

so kendra lets 3m scientists find the

information they need by handling

natural language queries quickly and

accurately

word grid is a liberty mutual insurance

company that developed a chatbot

framework for builders it does not

require any programming or

act as a cognitive assistant to help

employees

find information they need and carry

other tasks around the organization

we have also implemented this uh similar

approach which amazon lacks

where amazon lex has the ability to

identify

fallback intents and call amazon camera

to fill in those gaps so this is a very

common

use case for both internal cognitive

assistant type of

application as well as external

self-service channel

assisted with cognitive search is

another example

where camera can be quite handy the

customer connects to the agent either

directly from ivr

or an escalation from another channel

such as a chat

transcribe then automatically converts

the speech to text

the transcription can be provided to

both amazon comprehend

and to amazon camera amazon comprehend

will extract out the sentiment entities

key phrases

that can be stored along with the

transcription and displayed in a

dashboard

amazon camera can then be used for

natural language search

to find the next best action

so with that i hope this has been useful

in understanding how amazon camera

provides highly accurate enterprise

search service powered by

machine learning so with amazon camera

you can improve

employee productivity you can improve

customer experiences

and you can develop all sorts of cool

applications that are knowledge driven

and to provide accurate answers without

investing in non-code development we

have solution architects and a great

machine learning

solutions lab that can help you on your

journey in implementing

machine learning power search and we

have great aws partner ecosystem

specifically search experts that can

help you develop connectors

run proof of concepts and walking

through the implementation process

hand in hand

