Using big data to unlock the delivery of personalized, multi-lingual real-time chat services for global financial service organizations

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Cognitive Architect
About the Speaker

Passionate about designing and delivering complex IT solutions

Head of Mobile Cognitive Architect

30 years working as a IT consultant
About BJSS

THE UK’S LARGEST PRIVATELY-OWNED I.T. & BUSINESS CONSULTANCY

>1000 staff in the UK and USA

Culture of service and quality
Todays Deck - Who, What and Why?

Who
Cognitive architects
Chatbot developers
Conversational designers

What
Cloud Native, vendor agnostic, global chatbot architectures
Conversational design concepts
How to deliver personalized, real time content

And now
A vision of what's possible..
Consumers are demanding
- Increased Personalisation
- Real-Time Insight-Based Decisions
- Multi Channel Access (Including Voice)

Businesses need to
- Become more Efficient & Reduce Costs
- Improve Customer Engagement and Loyalty to Drive Revenue
- Decrease the risk of Incidents / Compliance Violation
  - By using the power of Machine Learning

Why should I invest today?
“By 2020, 85% of customer interactions will be managed without a human”

IT Hires
“By 2019, more than 10% of IT hires in customer service will be writing scripts for conversational bots”

Production chatbots
“By 2020, over 50% of medium to large enterprises will have deployed production chatbots”

Bots will take over
By 2021, more than 50% of enterprises will spend more per annum on bots and chatbot creation than traditional mobile app development.
Why Chatbots - Summary

1. Deliver 24/7 customer service
2. Reduce the cost to serve
3. Enable personalization
4. Improve customer satisfaction and retention
5. Lead to revenue growth
Mizuho Bank uses Big Data and Machine Learning to process consumer loan applications in 30 minutes.

Conversational robot workers such as Pepper are being introduced to free up human stuff.
“What will my balance be at the end of the month?”

Example of a User Story

Understand the question

Invoke predictive algorithms

Find relevant data

Present back in meaningful forms.

Process data and produce result

AI & NLP

Machine Learning

Big Data
Chatbot Framework Components
Why should I use an extensible framework?

Business Requirements

Vendor Agnostic Tooling
Built in Approval & Signoff Processes
Role based Security

Automated CI / CD & Assurance
Testable Locally
Blue / Green Deployments
A / B Testing

Rich Analytics & Visualisation Tools
Linked to Change control process for content

AI Maturity
It’s rapidly changing market

There is a need to evolve as AI services mature.

Small providers are either being bought out, pivot or stop trading!

Technologies are evolving rapidly

No one provider does it all perfectly

Most do some things well, but not everything well.

Data Security / Compliance
GDPR / Personal Data Requirements
BJSS has developed
An enterprise grade
Reference architecture
+ Conversational CMS
+ Accelerator Platform

Key Features
- Low cost Cloud Native architecture
- Available on AWS with Azure to follow
- Infrastructure as Code deployment
- Using best of breed AI / ML Services
- Extensible and future proofed

To be open sourced later this year
Example Implementations

A Virtual Assistant for a large financial provider

- Unauthenticated FAQ’s
- Authenticated Account Access
- Planning for Worldwide Deployment

A USA Educational Assistant to help students

- Find the most appropriate college & course
- Start, and compete their chosen course
- Place them in an appropriate Job.
Reference Architecture (AWS)
Client Connection - iOT

Data Persistence (Encrypted)

Session Context Storage

Regional AI Services

Orchestration Step Functions

Data Persistence (Encrypted)
Why IoT and MQTT
MQ Telemetry Transport

Lightweight Message Transport Protocol

Low power & Low Bandwidth

Bi-Directional Machine 2 Machine Communication

Guaranteed Delivery (QOS)

Standard protocol for Internet of Things Transport

Available at very low cost on most cloud providers
The hardest part of implementing a good Chatbot is the conversation design

Our toolchain provides

A Conversation Design Methodology

A vendor agnostic Conversation Design tool

To help you design and document complex chatbot conversations

Tone of Voice
Smalltalk
FAQ’s
Fulfilment
Personalization

Conversation Flows
Multi Language
Quick Replies
Handling Failure
Delegation
The Conversation Design Process

I want a Pizza

What type of Crust
What toppings

To confirm, you want a thin pizza with tomato and cheese

Delegate to Billing Intent

Eventually...
Thanks for ordering, your pizza is on its way
Intent Fulfilment (Personalization)

- Detect Intent(s)
- Sentiment Analytics
- User & Session Context
- Conversation CMS
- Personalized Response
- Live Agent Handoff

- Dialogflow
- Snips.ai
- AWS LEX
- Microsoft Luis
Which NLP Engine?

Language Detection

Privacy

Chatbot Accelerator
NLP Minimum Requirements

Intent Detection & Slot Filling

Programmatic API’s for
Intent selection
Slot filling

Dialogflow
Snips.ai
AWS LEX
Microsoft Luis
...

Cost

Intent selection
Slot filling
Intent Fulfilment
How does Big Data Help?

Machine learning is helping computers spot arguments online before they happen.

Conversations Gone Awry
Sentiment Analysis can be used to detect early Signs of Conversational Failure.

Implement a ‘toxicity’ filter
Cornell, Google, and Wikimedia researchers train AI to predict when we’ll get angry on the internet.

Personalization
Big Data can be used to provide personalized, real time responses.
Example - A 'toxicity' filter

What if technology could help improve conversations online?

I hate steve  ◆ 85% likely to be perceived as "toxic"
I hate alex  ◆ 80% likely to be perceived as "toxic"
I hate marty  ◆ 86% likely to be perceived as "toxic"

◆ 98% similar to comments people said were "toxic"  SEEM WRONG?

You're a stupid idiot!

https://www.perspectiveapi.com
What do I do next..

- Focus on a **low risk** part of your business to understand what works and what doesn’t.

- AI is immature and still developing; the best way to make progress is to **rapidly prototype**.

- Start with a slim, but full stack solution: **UI, NLP, Machine Learning & Big Data** running on public cloud.

- Take an Agile approach to deliver new products and services: Prototype, Alpha and then Beta.
Script-Writing is one of the Biggest Challenges

Make sure you consider the ethics of running your chatbot
The BJSS Chatbot Accelerator
Rapidly delivering AI enabled, enterprise scale, strategic chatbots.

Any questions

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