

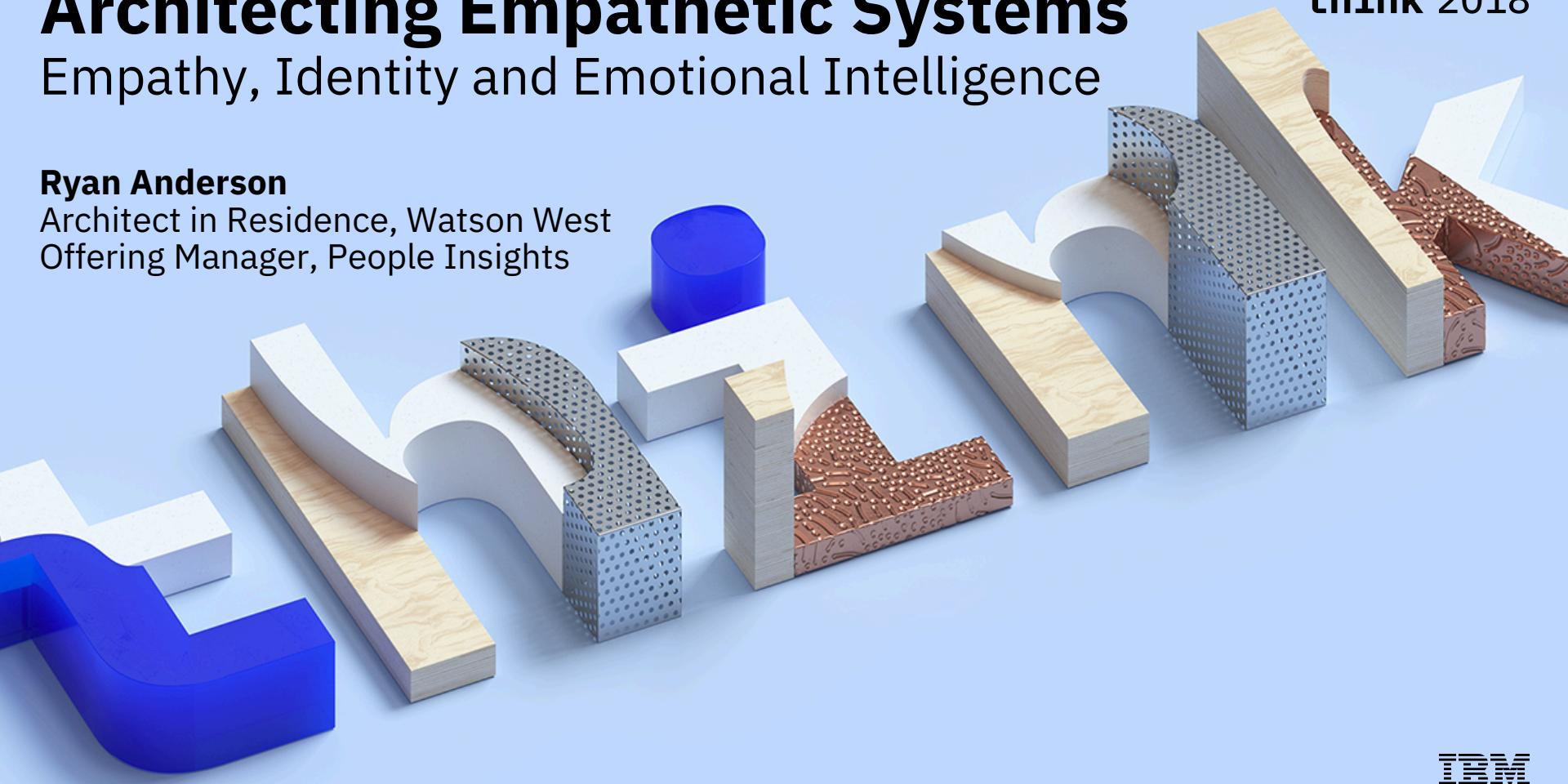
# Architecting Empathetic Systems

think 2018

## Empathy, Identity and Emotional Intelligence

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IBM

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# Powerful Catalysts

## Enhance user experience

Empathy

Identity

Emotional Intelligence

# Success Metrics

What matters?

Better User Experiences

Improve Understanding

Create Shareholder Value

# Contents

## **Part One – Design Patterns**

Meta Use Cases

Common Traits seen at Intersections

## **Part Two – Pulling it Together**

Innovation Workspace Considerations

Blending Ingredients

## **Part Three – Foundation Services**

Where do we start?

Cognitive Arc of Destiny

# Design Patterns

## Part 1

# 9 Cognitive Patterns Delivering Shareholder Value

## Sensemaking

Cognitive sensemaking systems can see, hear, and begin to engage in “Sensemaking” – moving systems towards understanding. Can augment Business Intelligence ERP, call centers, operations groups, robotics, automotive and IOT, etc.. Understand, Reason, Learn and Interact

## Predictive & ML

Dozens of great tools exist today to equip organizations with machine learning and predictive models. ML models help understand if data contains signal, and what data features are meaningful to outcomes. Data science has been democratized and ML can be leveraged at scale to deliver ROI.

## Conversations/Bots

Leveraging automation to develop automated bots that don't suck. Conversational applications that actually work. Deliver faster and better automated outcomes. Systems that self monitor and adapt to different customers and different flows.

## Cracking Carbon

Cognitive Services enable Signal Extraction from Unstructured Data; Dark Data / Data Exhaust; Information contains signals that are analyzed, produce actionable intelligence. Organizations build tools to crack the carbon and release signal/insights

## Policy & Compliance

Cognitive NLP enables streamlining obligations and controls required to address ever-changing regulations. Orgs can proactively assess, manage regulatory requirements or other legal, regulatory or compliance environments. Reduce time and costs to understand regulatory requirements and controls.

## Verbal Interfaces

For a natural human interface - just ask! Speak the thing you want to know or want to have happen. Verbal command and control. Have the “tell me” and “help me” needs satisfied. Verbal interfaces to BI, SQL databases, Augmented Reality, personal bots & cognitive wingman. Jarvis.

## Data Discovery

With new data, new tools and new signal - a new generation of tools for data discovery is emerging. Visualizations that move beyond eye candy to actionable intelligence, and are more accessible and intuitive for more stakeholders in the org. Data Discovery enables Decision Support.

## Segment & Personalize

New methods of understanding how to segment customers – based on traditional information (demo, geo) and new information (psychometric, tone, ML features) results in new, dynamic and more powerful ways to think about and engage with customers personally. Mass customization & personalization.

## Capacity Building

Fortune 500 seeking to create and cultivate skills within organization. Strategic investments in employees for a very uncertain future. Multiple benefits: strategic: understand opportunities from cognitive in future. Innovate internally. Evaluate projects and proposals. Knowledge backbones.

# Design Patterns – Enterprise AR/VR Solutions



## Decision Support

Help humans summon and engage data to help with decisions. Consumer: high-value feature rich options (home decorating, automobile) helps **buyers compare & understand (see)** options. **ERP / Strategic:** Executives with data-on-demand, **verbal command & control** BI ERP integrations. Shared visualizations

## Cognitive Extenders

Help executives and innovators **reduce cognitive load and extend cognitive range**. Better reasoning, recall, decision support, social navigation & connection making. Context aware information augmentation. **Instant context-aware data recall** and visualization for decision support. Collaboration catalyst.

## Cognitive Wingman

Jarvis, KITT, HAL. **Sensemaking systems understand context, to help.** Use cases include **autism, eldercare, Alzheimer's & PTSD**. Cognitive Wingman is a **human assistive AI buddy** embedded inside AR headset – microphones & camera enable sensemaking & AR projection & audio **to guide - or to guard**

## Expertise Projection

**Amplify and project scarce expertise.** Highly skilled medical specialists projecting expertise 2000 miles away to nurse practitioners who touch patients. Industrial – **leverage expert engineers at distance to help** low skilled workers repair or deploy complex assets. Hands free. **Information overlay.**

## Knowledge Map & Recall

Dark Data / Data Exhaust. Enterprises are drowning in data. Knowledge & expertise fuels continuing innovation and digital transformation. Workers retiring, taking key knowledge. AR enables knowledge capture & recall across time/space. **Verbal command/control, visual delivery.** Leverage spatial memory.

## Unified Communications

The final destination for UC? As close to being present, without actually being present. **Project remote attendee into an empty seat** at a board meeting 3000 miles away. Re-watch 2 year old meetings. Look into the eyes & face of job applicant. AR for UC3.0 enables **human communications at distance**

## Digital Twin / Industrial

Digital Twin is virtual/digital representation of a physical entity or system, living model that evolves over time, includes structured and unstructured data. IOT and predictive analytics. AR allows a field worker to **see and engage various data layers** projected atop asset. Oil & gas; aviation; high value assets.

## Neural Adaptive

(Speculative) NLU powered context gathering / sensemaking. Emotion and eye tracking. **Neural network & deep learning** powered systems to recognize patterns from biometric signals (EEG/FMRI). **Education optimization.** AR content & agents serving as baseline reference for neural adaptive AR systems.

## Healthcare & Pharma

Research & Drug Discovery is a high-dimensional data space. AR helps understand texture and shape of data; **fosters collaboration; and assists with visualization.** Specialist doctors don't scale well, AR helps scarce doctors **project expertise** to more places; and can help with teaching

## Infrastructure

AR enables engineers to see into, and project onto, complex and/or aging **infrastructure assets** to make best use of data, in field, real time. Touches Digital Twin; Decision Support; Knowledge Mapping and recall, to enable **AR equipped user** to see best available data to leverage actionable intelligence

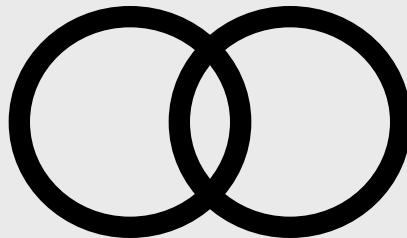
## Education

AR opens up new ways for children and adults to interact with and **consume and retain knowledge**, in the most efficient and effective way – for each person. Customization; interactivity; flexibility and leverage spatial and visual components of AR for learners most benefitting from methods.

## Gaming & Fantasy

Escape & entertainment. Sophisticated VR allows users to make-believe. Multiplayer, massive communities, realistic, exciting, and immersive. Value drivers of modern cinema, plus **player immersion** inside plots – which will include **adult entertainment.** Bend physics, time & space in a **Holodeck**

# Common Traits Observed in Patterns



**Sensemaking** systems  
need to ‘sense’ key signals

Relationships and  
Conversations are  
**Dynamic** (in the moment)

Memory and context  
**enhance believability**  
(lake test)

# Practical Applications at Think2018

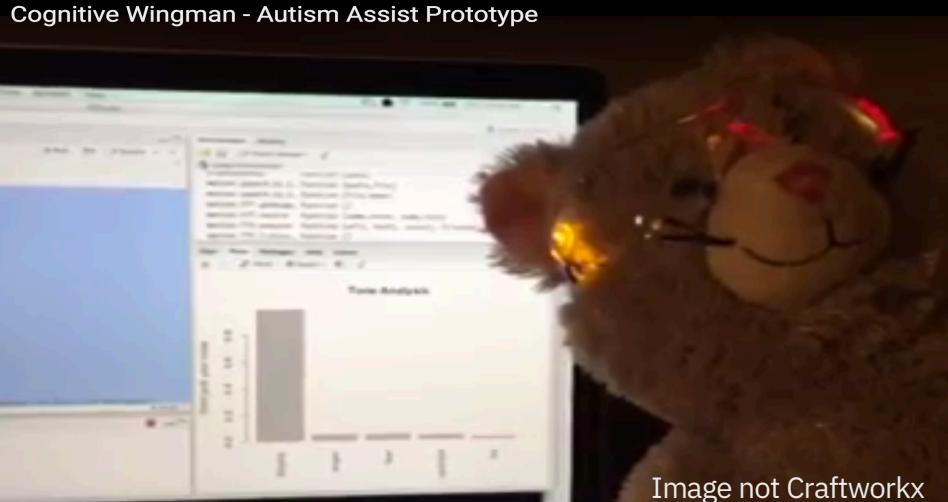


Image not Craftworkx

Autodesk Virtual Agent (AVA)

Soul Machines  
(Digital Humans)

A Watson-Powered Teddy Bear for Autistic Children (Craftworkx)

# Pulling it Together

## Part 2

# Preparing the test kitchens

## Technology Tooling and Techniques



# Pulling it Together

## Design Patterns & Use Cases

Clarify value. Frames of reference on shape of solution. Know the how and why of KPIs and value proposition for user.

## Technical Backbone

Power. Platform. Privacy. Nuts and bolts that are technical foundation on which technology runs. Cloud? Edge?

## Monetization Methods & KPIs

Ultimately KPIs make projects viable. Plan shareholder value creation? Articulate a clear business case & value.

## Scriptwriting and User Experience

Solid “character development”, content and storytelling is a pre-requisite for creating authentic connections. E.g. if creating digital humans.

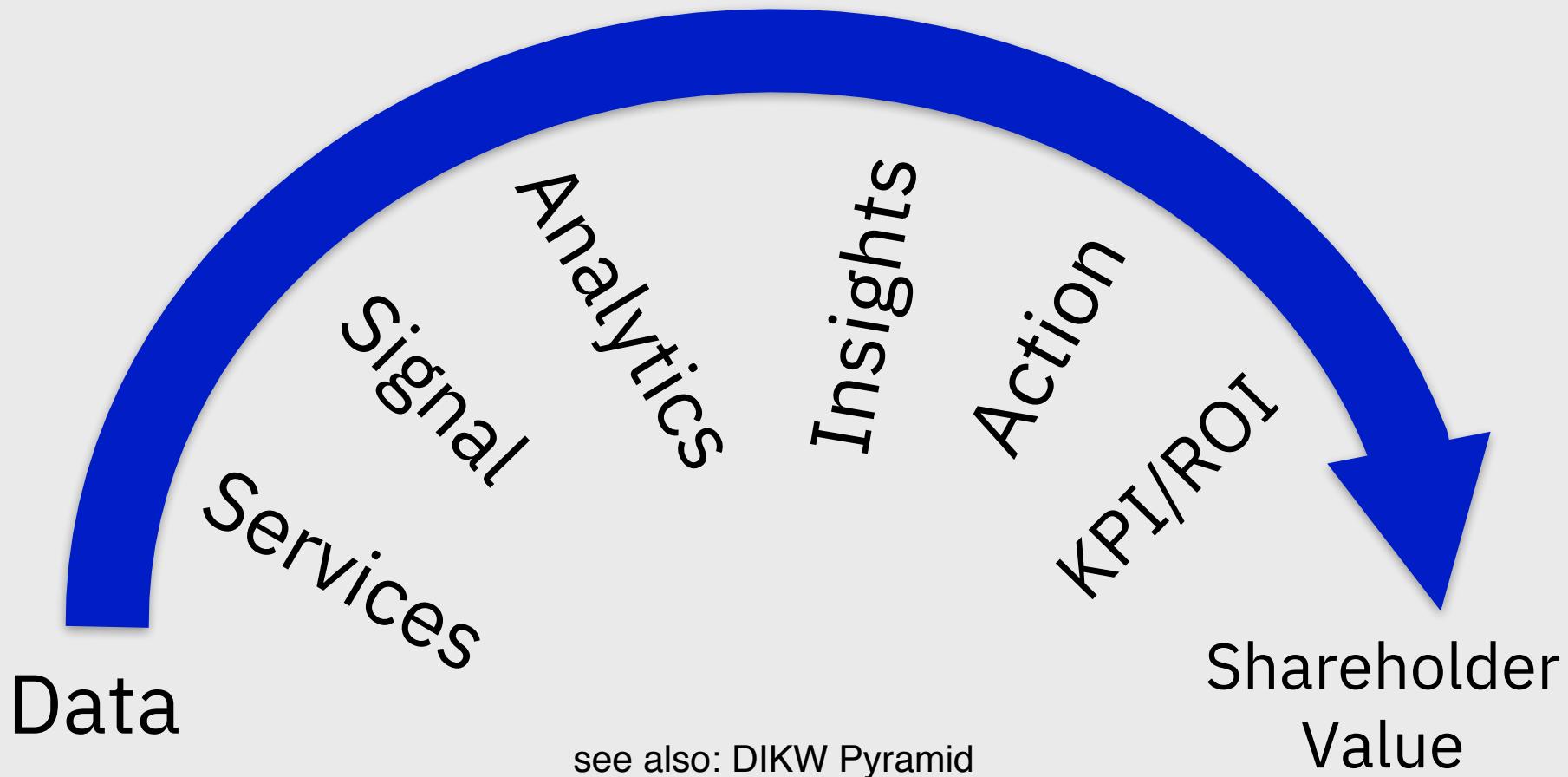
## Vision, Knowledge, & Organizational Talent

Technical PLUS creative skills; Development of positive innovation cultures. Nurture talent. Support curiosity & play.

## Production and Programming

Many media “productions” can start to look a bit like CGI movies. Blending many pieces. Technical and Creative Skills; Culture; Social; Artistic.

# Cognitive Arc of Destiny



# Preparing the Workspace

Well defined use case or success metrics

Cognitive Arc of Destiny – line of sight? data to value

Tools, Talent and Tech

Explore. Create. Play!

# Foundation Services

## Part 3

# So where do we start?

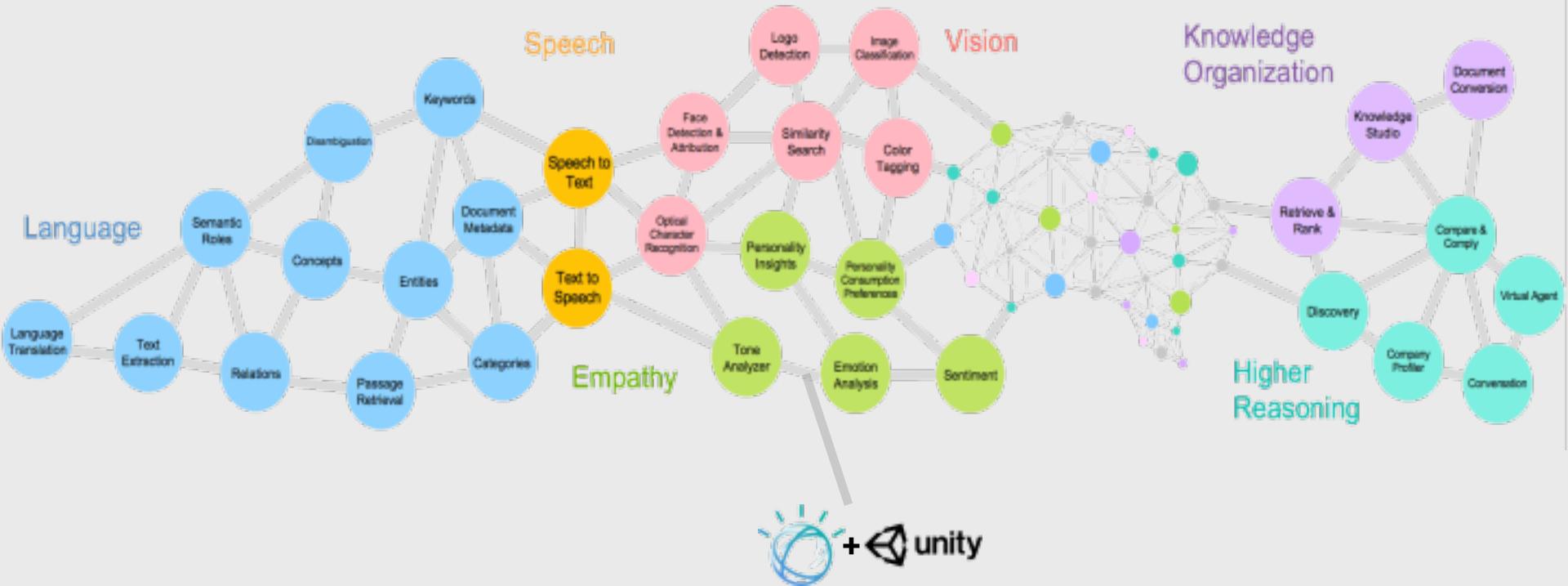
Little steps with Signal Services

Voice, Tone and Context

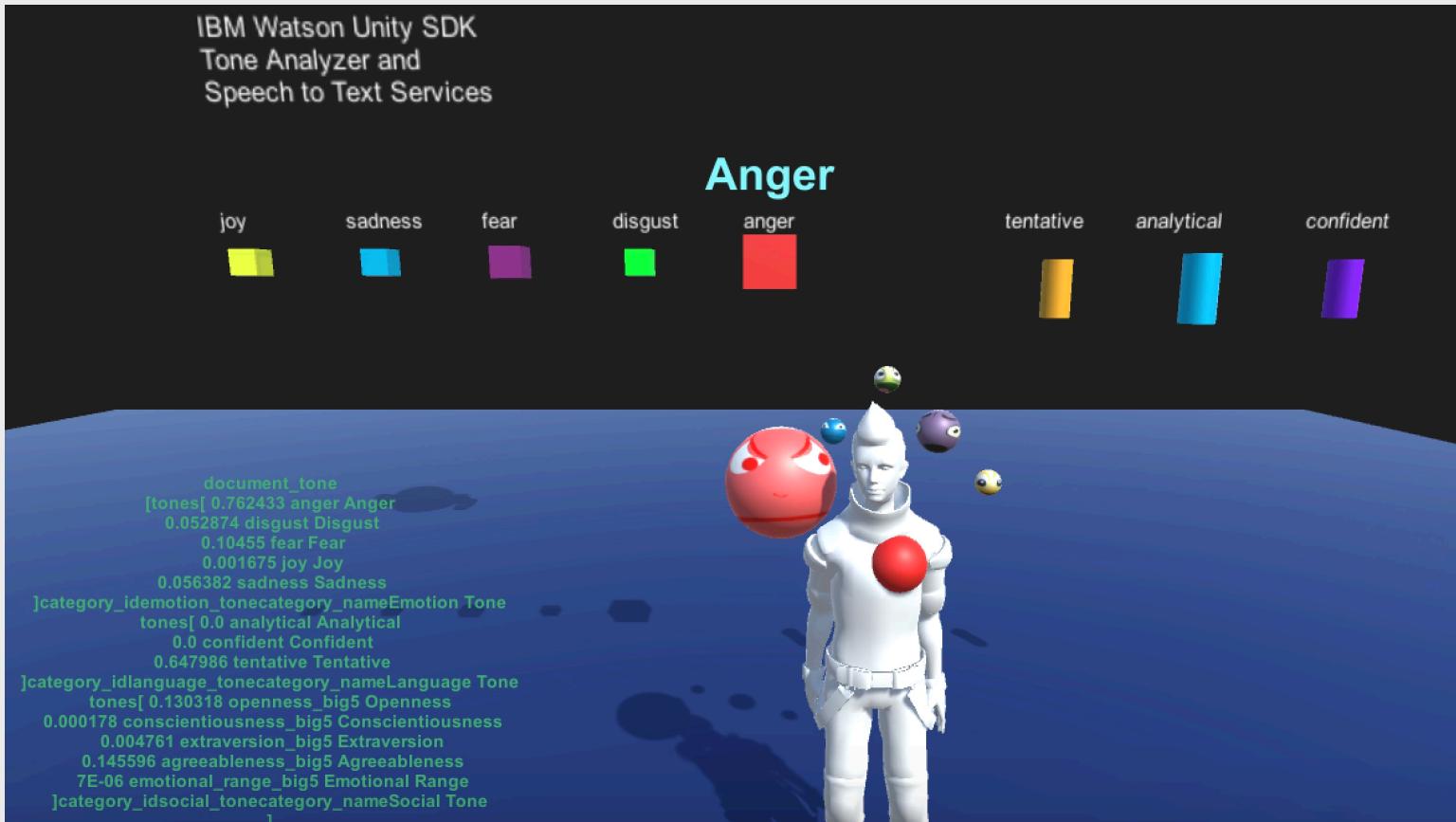
Instrument humans (to begin)

Test archetype / develop a  
basic character (identity)

# IBM Watson Services



# Little Steps



# IBM Watson Services



# Personality Insights

# 52 Signals

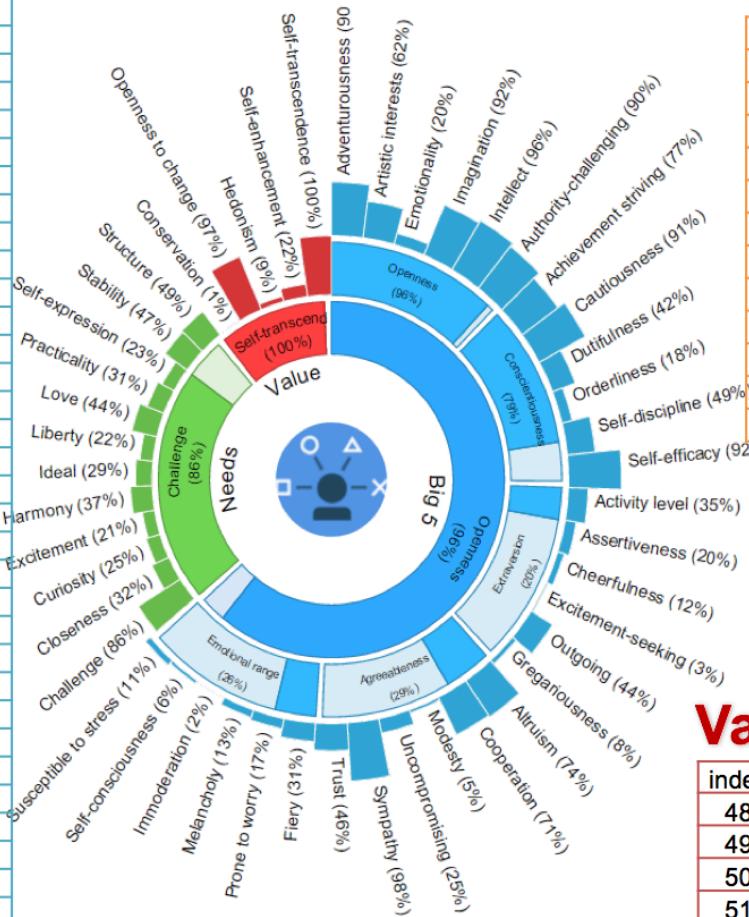
## BIG 5/FFM: engagement with world

# NEEDS: hopes to fulfill

# VALUES: evaluate principles

# Big Five

index	model	trait
1	Big 5	Achievement striving
2	Big 5	Activity level
3	Big 5	Adventurousness
4	Big 5	Agreeableness
5	Big 5	Altruism
6	Big 5	Anger
7	Big 5	Anxiety
8	Big 5	Artistic interests
9	Big 5	Assertiveness
10	Big 5	Cautiousness
11	Big 5	Cheerfulness
12	Big 5	Conscientiousness
13	Big 5	Cooperation
14	Big 5	Depression
15	Big 5	Dutifulness
16	Big 5	Emotionality
17	Big 5	Excitement-seeking
18	Big 5	Extraversion
19	Big 5	Friendliness
20	Big 5	Gregariousness
21	Big 5	Imagination
22	Big 5	Imm Moderation
23	Big 5	Intellect
24	Big 5	Liberalism
25	Big 5	Modesty
26	Big 5	Morality
27	Big 5	Neuroticism
28	Big 5	Openness
29	Big 5	Orderliness
30	Big 5	Self-consciousness
31	Big 5	Self-discipline
32	Big 5	Self-efficacy
33	Big 5	Sympathy
34	Big 5	Trust
35	Big 5	Vulnerability



# Needs

index	model	trait
36	Needs	Challenge
37	Needs	Closeness
38	Needs	Curiosity
39	Needs	Excitement
40	Needs	Harmony
41	Needs	Ideal
42	Needs	Liberty
43	Needs	Love
44	Needs	Practicality
45	Needs	Self-expression
46	Needs	Stability
47	Needs	Structure

## Values

index	model	trait
48	values	Conservation
49	values	Hedonism
50	values	Openness to change
51	values	Self-enhancement
52	values	Self-transcendence

# User-1

sa... excited

polite

anxious

impol... sad

# Agent-1

sympathetic

excited

polite

# User-2

satisfied

excited

polite

anxious → sympathetic → satisfied  
(0.9%)

# Agent-2

sympathetic

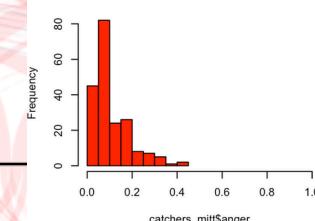
excited

polite

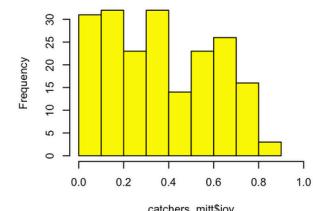
Tone Flow Visualization for Customer -Care Conversation Analysis - Liu



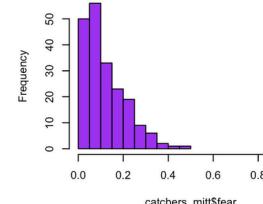
Anger



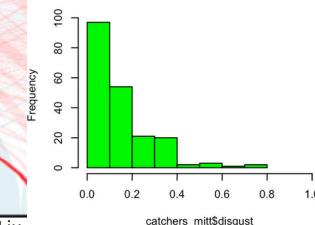
Joy



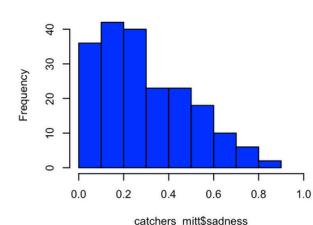
Fear



Disgust



Sadness



# Summary

1. Understanding PATTERNS helps
2. WORK SPACE preparation
3. Empathy (both ways) creates meaningful **connections**
4. Conveying identity & EI helps anthropomorphize
5. Memory, relationships & **context** matter
6. Storytelling in media and entertainment changing fast
7. Gaming sector is informative for enterprise

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# Thank you

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