Generative AI@HCLTech

Kalyan Kumar (KK)
Global CTO and Head, Ecosystems, HCLTech
Twitter: @kklive
(https://www.hcltech.com/ai)
Topics

• Understanding Generative AI

• Value Streams around Generative AI

• Generative AI@HCLTech Services

• Generative AI@HCLSoftware

• Q&A
Understanding Generative AI

How it Works?

Sources for LLM Model Training:
- Image / Pictures
- Code / Script
- Text / Documents

LLM - Large Language Model Training and/or Refinement

Generative AI Service

Event/Triggers

Query/Prompt

Feedback Loop

Output:
- Code
- Test Cases
- Document Text
- Image
- SOP
- Language Translation
- Design
- Search Results etc.

Verify/Modify/Use

NLP (Natural Language Processing) (NLU and NLG)

Machine Translation

Synthetic Voice

Speech Recognition

Source: Adapted from Gartner (786698_C)
Value Stream for Business Process Operations

Front Office (Customer Care / Service)
Middle Office (Supply Chain / Risk etc.)
Back Office (Finance / Procurement etc.)

Business Process Observability / Cases (Issues / Request)

Process Analysis
Gen AI Synergy:
- Search and Retrieval
- Intent Extraction and Response

Process Execution
Gen AI Synergy:
- Prompt Automation
- SOP generation
- Faster text generation & improved productivity

Process Improvement
Gen AI Synergy:
- Knowledge Summarization
- Language Translation
- Assisted process re-engineering

Customer Value = Customer Experience

Value Feedback & Input
Value Stream for Application Development and Support

Customer Requirements / Features / Bugs

Analysis & Process Mining

Experiment & Pilot

Build, Operate & govern

Adopt and Change

Customer Value = Intelligent Apps

Gen AI Synergy:
• AI Transformation Roadmap Development

Gen AI Synergy:
• Model Development
• Use/Test Case Generation

Gen AI Synergy:
• Automation Workflows
• Automated Code / Test / UI / UX Generation

Gen AI Synergy:
• Translation
• Knowledge Mining, Triaging and Search

Value Feedback & Input
Value Stream for Infrastructure & Operations

Hybrid Infrastructure (Cloud / Networks / Edge / DC)
End User and Devices
Cyber-Security

Tech Observability & Ticket
(Incident / Request / Changes)
Projects

- System / Root Cause Analysis (RCA)
- Troubleshooting and Remediation
- Restoration and Support
- Customer Value = Service Assurance

Gen AI Synergy:
- Analysis and potential RCA extraction
- Intent Extraction and Response

Gen AI Synergy:
- Remedial Script and SOP generation
- Assisted Threat modelling
- Enhance employee performance

Gen AI Synergy:
- Knowledge Summarization
- Language Translation

Value Feedback & Input
Value Stream for Systems and Product Engineering

Customer Need / System Requirements

Plan & Feasibility

Design & Engineer

Build & Test

Support & Maintenance

Customer Value = AI Enabled Devices & Systems

Software Product Engineering
Silicon and Mechatronics
Operational Technologies

Gen AI Synergy:
• Improved efficiency for feasibility analysis
• Assisted plan & Specification generation

Gen AI Synergy:
• Smart Factory Automation
• Software Engineering, Hardware & VLSI Design workflows
• UX Design & Content generation

Gen AI Synergy:
• Automated Code Generation & Review
• DevSecOps
• Code Testing & Optimization

Gen AI Synergy:
• System simulation & Monitoring
• Automated L1 Support
• AI enabled QC & Inspection

Value Feedback & Input
Anticipated Applicability across various IT Service activities

<table>
<thead>
<tr>
<th>Domain Area</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Process Operations</td>
<td></td>
</tr>
<tr>
<td>App Ops &amp; Support</td>
<td></td>
</tr>
<tr>
<td>SaaS and Pkg. Apps Support</td>
<td></td>
</tr>
<tr>
<td>Digital Apps Development</td>
<td></td>
</tr>
<tr>
<td>Testing</td>
<td></td>
</tr>
<tr>
<td>Systems Engineering</td>
<td></td>
</tr>
<tr>
<td>Data Management</td>
<td></td>
</tr>
<tr>
<td>Infra Ops</td>
<td></td>
</tr>
<tr>
<td>Service Desk &amp; Workplace Mgmt.</td>
<td></td>
</tr>
<tr>
<td>Cyber Security</td>
<td></td>
</tr>
</tbody>
</table>

Legend: AI ML | Generative AI

Dependencies

- Experience in using LLM models / GenAI skills
- Functional or Operational Complexity
- LLM Model Maturity
- Quality of Model training data
- Output Veracity and Changes required for use

 Risks

- Data privacy & copyright issues
- Uncertainty and explainability bias
- Costly production outages
- Usage of Deepfakes
- Accidental usage of sensitive data
- Data explosion and costs

Adoption in Enterprises will mirror Cloud Journey and the FinOps discipline to govern consumption will become extremely crucial.
AI Philosophy @HCLTech

Create
Infuse
Embed
Integrate

From
Silicon
to
Infrastructure,
Apps, Data &
Business Processes

To
supercharge
customers journey to
a Generative
Enterprise
## AI @HCLTech Services

<table>
<thead>
<tr>
<th>AI Services Span</th>
<th>AI Ecosystems Span</th>
<th>Ecosystem Tenants &amp; Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AI Services</strong></td>
<td><strong>AI Ecosystems</strong></td>
<td><strong>Tenants &amp; Impact</strong></td>
</tr>
<tr>
<td><strong>Span</strong></td>
<td><strong>Span</strong></td>
<td><strong>350+ Startup Partners</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AI Services</strong></td>
<td><strong>AI Ecosystems</strong></td>
<td><strong>AI Champs</strong></td>
</tr>
<tr>
<td><strong>Span</strong></td>
<td><strong>Span</strong></td>
<td><strong>50+ Incubation Solutions</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(including Startup partners)</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>20+ VC &amp; Trade Mission Partners</strong></td>
</tr>
<tr>
<td><strong>AI Model as a Service</strong></td>
<td><strong>Open Innovation Ecosystem</strong></td>
<td><strong>20+ VC &amp; Trade Mission Partners</strong></td>
</tr>
<tr>
<td><strong>AI Foundation Modeling</strong></td>
<td><strong>Upstream Modeling</strong></td>
<td><strong>Google ML</strong></td>
</tr>
<tr>
<td><strong>AI Open Innovation</strong></td>
<td><strong>Downstream Fine tuning</strong></td>
<td><strong>Google BERT</strong></td>
</tr>
<tr>
<td><strong>Data Analytics and Engineering Services</strong></td>
<td><strong>OpenAI</strong></td>
<td><strong>Google LaMDA</strong></td>
</tr>
<tr>
<td><strong>AI Edge Innovation</strong></td>
<td><strong>AI Model as a Service</strong></td>
<td><strong>H2O.ai</strong></td>
</tr>
<tr>
<td><strong>AI Professional Services</strong></td>
<td><strong>Data Analytics and Engineering Services</strong></td>
<td><strong>AI Edge Innovation</strong></td>
</tr>
<tr>
<td><strong>AI Edge Innovation</strong></td>
<td><strong>AI Professional Services</strong></td>
<td><strong>AI Edge Innovation</strong></td>
</tr>
</tbody>
</table>

### Hardware / Chip Accelerators
- AWS
- Microsoft
- NVIDIA
- Intel

### Cloud HyperScalers
- Google Cloud
- Microsoft Azure
- AWS

### Upstream Modeling
- Google ML
- MS Azure Labs
- AWS ML
- IBM Watson

### Downstream Fine tuning
- OpenAI
- Google BERT
- Google LaMDA
- H2O.ai

### Open Innovation Ecosystem
- 20+ VC & Trade Mission Partners
- AI Champs
- 50+ Incubation Solutions (including Startup partners)
- 350+ Startup Partners
Potential Services Opportunities in GenAI

**Prompt Engineering**
Testing and refining prompts to optimize them for specific tasks, using techniques such as prompt tuning, blending, and synthesis.

**Data Engineering**
- Creation and Capture
- Gen AI driven Engineering
- Gen AI driven Insights

**Integration and Orchestration of Intelligent Apps**
Orchestration across NLP, Generative AI Systems, knowledge Systems for Text, Image, Video, Audio

**Responsible AI**
An AI system that enables:
- Privacy and Security
  - Inclusion
  - Fairness
  - Traceability
  - Accountability
  - Trustability Of Results
- Reliability
- Change Management
GenAI Ecosystem @HCLTech

GenAI Services
- Ops (Business Processes & IT)
- Dev & Support
- System & Product Engg.
- GenAI Lab

GenAI Products
- Products
- Cloud / XaaS

Generative Enterprises

GenAI SW & HW Licensing & Cloud Subscription

Platform & HW Access & Support

Consult / Create / Infuse / Integrate

HCLTech Services & HCLSoftware

Microsoft, AWS, Google Cloud, NVIDIA, Intel, IBM, OpenAI etc.

Key Ecosystem Partnerships

Create / Embed / Plugin

GenAI Software / Cloud Platforms / GenAI Hardware

Engineering Services / ISV / OEM and PSO
GenAI Lab

What GenAI Lab does

1. Offering
2. Incubation Engine
3. Ecosystem Innovation
4. Skill Engineering

GenAI Lab supports teams in building solutions and services

- GenAI for Developers, System Engg., Process Ops, Support, BizDev etc.

| GenAI Technology | Tech Research | Use Case Exploration | Partner Tech | Showcase | Platform Services API |

Edge Innovation

- Supported by Startups, Academia & Partner Labs

Innovation at Core

- Prompt Engineering
- Integration & Orchestration
- Data Engineering

GEN- AI Skill Academy

- Skill Pod
- AI Silicon To Software
- AI Edge
- AI Cloud Infrastructure
- AI Modeling
- AI Deployment

Copyright © 2023 HCLTech | Confidential
GenAI Case Study 1 - Patient Query Understanding

Human Like Conversation Agent

Business Objective
To develop a LLM powered Medical Conversational Agent to generate tailored response for patient’s query, save healthcare worker times and prepare a condensed summary for physician to facilitate swift and efficient treatment.

Technical Solution
- Identify the pre-medical questions to be asked
- Use ChatGPT to build the conversational agent
- Generating text based on given context or condition (Conditional prompting) the agent determine the patient’s answers and fill up the relevant fields in a form
- Summarize the conversation for better look up by health associates

GenAI Case Study 2 - Sales Bot

Retrieval Augmented Generation (RAG)

Business Objective
To develop a LLM powered Question Answering system that ingests sales data from different verticals and answers to user specific questions to help understand sales related activities

Technical Solution
- Data Ingestion pipeline to extract data from sources into vector DB.
- Creating Q&A agent which have access to custom tools
- Retrieves semantically similar documents based on the question.
- Similar documents are stuffed to LLM along with the question to ask for extracting the answer.
Key Take Aways

HCLTech with its engineering heritage has been involved in co-creating AI Technology stack for last 2 decades

We have deployed at scale AIOps in our operations and engineering business for over a decade and have carved those IPs to fuel the intelligent automation (DRYiCE) product line in HCLSoftware

We have been implementing AI solutions with over 150+ use cases across our clients in our Digital Services

We are an early adopter of GenAI technologies as a customer (Microsoft / OpenAI Co-Pilot at HCLTech and Google DuetAI & GITHUB Co-Pilot at HCLSoftware)

We are in the launch partner program for all the major hyperscalers on their GenAI stack

We have a GenAI labs which is leading all our efforts in this space
Generative AI@HCLSoftware

Kalyan Kumar (KK)
CPO, HCLSoftware
Twitter: @kklive
HCL Software Cloud Strategy
Move to Industry Oriented Clouds

- Market place
- Common Connector and Gateways for integrations
- Common Data pipeline, service and extensibility

Unified Access Layer

- Business Cloud
- Hybrid Data Cloud
- Unified AppDev Cloud
- Intelligent Automation Cloud

Generative AI Play

AI/ML/NLP/Cognitive Services/GenAI

Ubiquitous Distributed Cloud Ecosystem (Public/Sovereign/Edge/Telco/Private)
AI Philosophy @HCLSoftware

Create Embed Plugin

AI

From Products to Cloud / XaaS

To fuel the Digital+ Economy for our ecosystem
Create: Generative AI in partnerships with Hyperscalers

HyperScaler Integration

HCL AI Workbench (Auto ML Platform)

Pair Programmer:
- Code generations
- Test case generation
- Multi programming language and IDE support
- GenAI driving Product Velocity

ChatGPT Like experience:
- Chat interface for Developers for Interaction
- Code explanations and Doc generation
- Unit test and code generation
- Bug Fixes
Embed: Generative AI

External Channel Execution - MAPs, SMS, Ads etc.
- Adaptive omni-channel program orchestration and execution
- Probabilistic Segmentation
- NLP/NLG content optimization
- Messaging content, creative assets
- Customer Data Platform (single view of customer and predictive analytics)

Reinforcement Learning of the partner platform

1. Predict
   - Model behavior and campaign variations from available data
2. Execute
   - Activate experiments at scale, simultaneously
   - Listen for what works and what doesn’t, for whom and when
3. Adapt
   - Adapt campaign incrementally
   - Measure and improve over time
   - Feedback

HCL Unica

HCL Software

Powered By

Partner Ecosystem
Plugin: Infuse and Leverage Generative AI

Digital Transformation
- HCL Commerce, HCL Unica, HCL DX, HCL VoltMX etc.

AI and Intelligent Automation
- HCL AIOps / IntelliOps
- HCL AEX
- HCL BigFix

Data, Analytics and Insights
- HCL Actian Avalanche CDP
- HCL Actian Vector
- HCL Actian Zen

HCL PromptO
- (Generative AI Engine) – Automated Prompt Engineering
- (Generative AI Engine) – Model Chaining
- (Generative AI Engine) – Document Summarization
- (Generative AI Engine) – Code Generation
- (Generative AI Engine) – LLMs Optimization

- Business Cloud
- AppDev Cloud
- Automation Cloud
- Data Cloud

- Integration with HCL VoltMX
- Co-pilot - Reduce development effort
- Prototype Generation

- Enabling Emotional Intelligence
- Responding to natural language queries and commands

- Enhanced Predictive modeling, business forecast, sentiment analysis and strategic decisions
Infusing GenAI into Intelligent Automation Cloud

Value creation via XaaS / MSP

Workload Automations
To drive the effort and cost matrix.

Operational Intelligence
To drive the reliability of the infrastructure, Network and software stack across data centers.

Self-healing of Operational Disruptions
To drive the stability of products and drive customer satisfaction level.

Self-service Workflows
To provide a quick and simple catalog, for clients and level 1.

AUTOMATION LED AND HUMAN ASSISTED.

Outcome based Subscription Licensing
Thank You