innovate achieve lead

BITS Pilani
Pilani Campus

Conversational Systems Design

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26/05/2024

Session Content

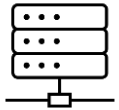
- Objective of course
- Evaluation Plan
- Introduction to Conversational AI
  - Introduction to conversational chatbots
  - Conversational Agents
  - Core technologies in conversational agents
  - Evolution of conversational agents and role of AI
  - Overview of chatbot deployment & flow based chatbots

Introduction

- This course offers a deep dive into the mechanics of chatbots and voice assistants, focusing on their design, functionality, and impact

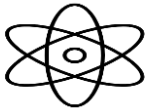
- As digital assistants become more prevalent, understanding how to design effective conversational systems is crucial for the next generation of tech professionals.

What Will You Learn

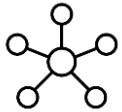


Foundations And Advanced NLU

NLG And Dialogue Systems



Deep Learning in AI



Conversational AI Architecture

AI Ethics and UX

ChatBot Implementation

explainable AI & context-aware chatbots

AI Research and Development

Optimization Techniques

Capstone Project

Potential of Conversational AI

Career Opportunities: Skilled professionals are in high demand in fields like AI, machine learning, and user experience design.

Hands-On Experience: Gain practical experience with the tools and technologies that drive conversational AI, including NLP and multimodal interactions.

Innovative Learning: Participate in projects that mirror real-world applications and challenges, enhancing your problem-solving and technical skills.

Pedagogy and Evaluation Scheme

Pre-requisites:

- Basic Python
- Machine Learning Fundamentals
- Familiarity with JavaScript and Web APIs
- Deep learning
- Open Mind to learn new things

Exam Type	Date	Time	Total Marks (across exam type)
Quizzes (2 quizzes total)	1 quiz before mid sem and 1 after mid sem	NA	10 Marks
Mid Sem Exam	19th July	9 am to 11 am	20 Marks
Assignments (2 group assignments)	Both assignments post mid sem exam	NA	40 Marks
End Sem/Final Exam	27th September	9 am to 11:30 am	30 Marks

Introduction to Conversational AI

- What is Conversational AI?
  - Explain that Conversational AI involves technologies that enable computers to understand, process, and respond to human language in a natural way.
- Purpose:
  - To automate communication and create personalised customer experiences at scale.

Types of Conversational Agents

- Rule-Based vs. AI-Driven Systems:
  - **Rule-Based Systems:** Operate based on predefined responses.
  - **AI-Driven Systems:** Use machine learning to understand context and improve responses.

- Application Examples:
  - Customer support bots, virtual personal assistants, interactive voice response systems.

Core Tech in Conversational AI

- **Natural Language Processing (NLP):**
  - Techniques to understand human language, like tokenisation, stemming, and parsing.
- **Machine Learning:**
  - How AI learns from data to improve its language understanding and responses.
- **Key Components:**
  - Intent recognition, entity extraction, dialogue management.

Evolution of Conversational Systems

Initial Systems

- script-based
- limited to specific rules
- could not handle unexpected user inputs.

Example: Simple customer service FAQs where each question has a pre-defined response.

Development of Machine Learning Models

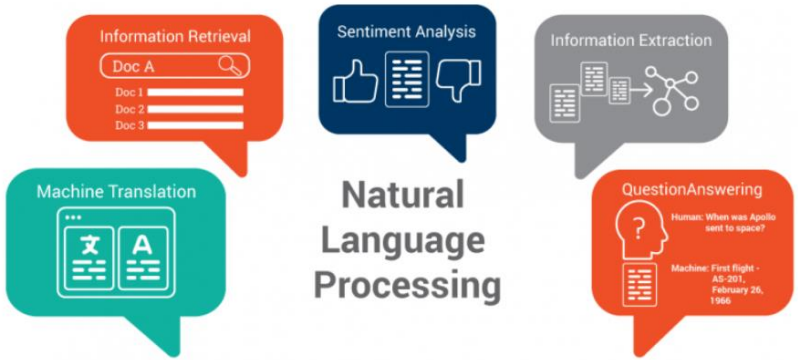
- systems learnt from vast datasets improving their ability to understand context and ambiguity in language.

Example: Chatbots in retail websites providing product recommendations based on customer interactions.

Evolution of Conversational Systems

Incorporation of NLP Advances

Virtual assistants like Google Assistant and Alexa, which understand and execute complex commands across various domains.



Evolution of Conversational Systems

Integration with Omni-channel Services

- Integration across multiple channels (web, mobile, voice)
- Maintaining context across sessions and platforms.

Example: Seamless customer support that continues conversations from text to voice calls without losing context.

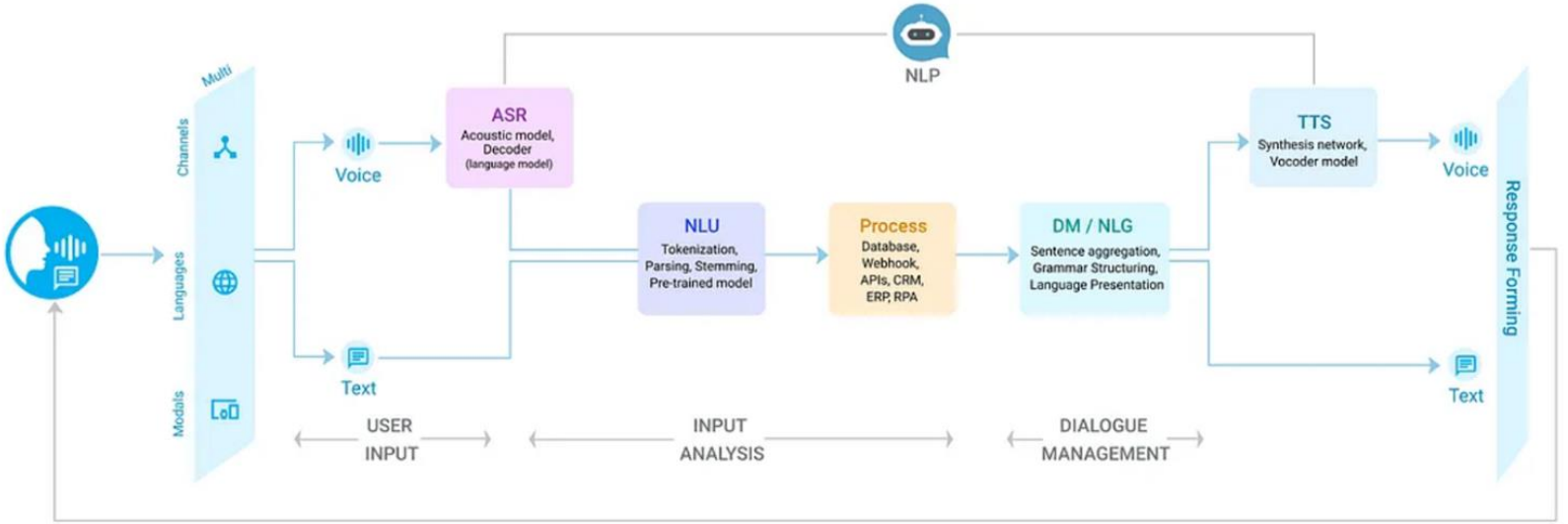
Impact on User Experience:

- Enhanced Accessibility
- Increased Personalisation
- Improved efficiency and satisfaction
- Consistency across channels

Role of AI Conversational Systems

- Adaptive Learning
- Enhancing Understanding and Interactions

Building a Conversational System



Building a Conversational System

Design Considerations:

- **Goals:** purpose (customer support, sales, etc.).
- **User Experience:** Plan the conversational flows to mimic natural dialogues.
- **Integration:** Ensure compatibility with existing technology platforms.

Development Tools and Platforms:

- **Tools:** Highlight tools like Google Dialogflow, IBM Watson, and Microsoft Bot Framework.
- **Capabilities:** platform specialises in (e.g., voice recognition, text processing).

Building a Conversational System

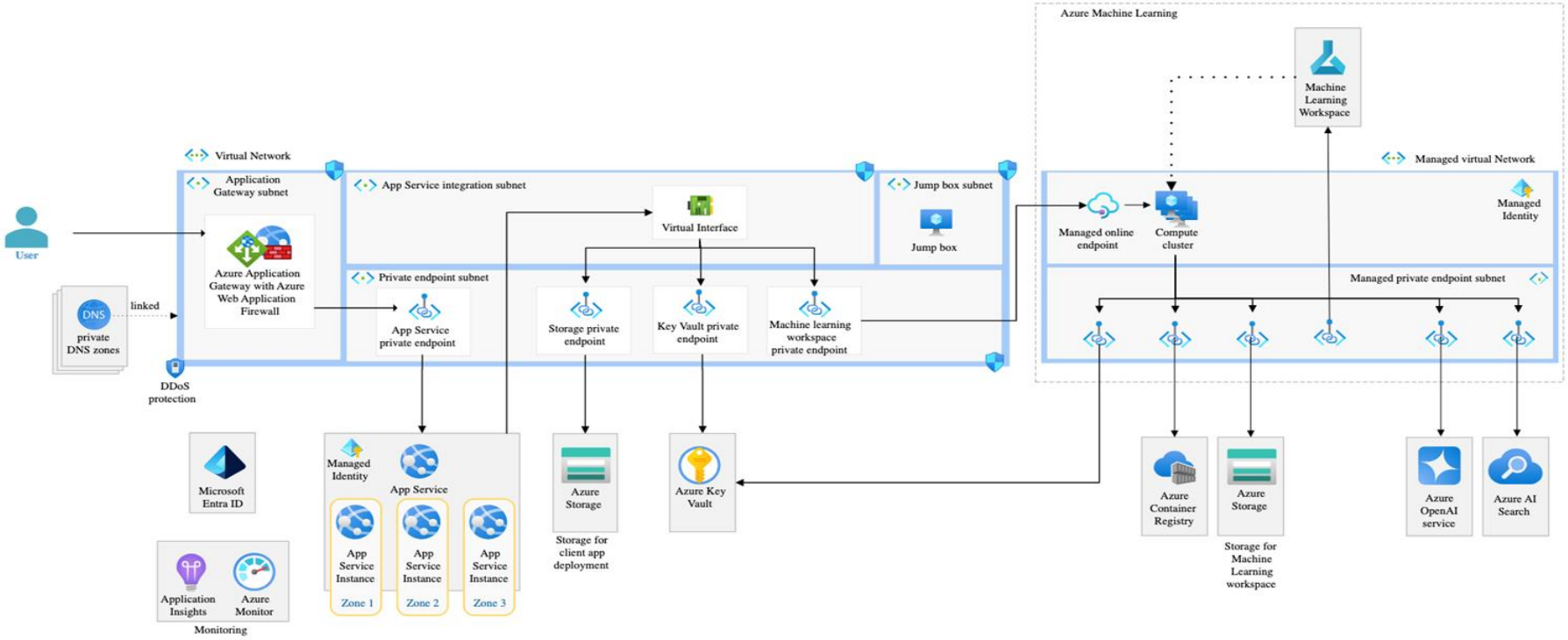
Implementation Steps:

- **Training:** Use relevant data to train the AI model on language and context.
- **Testing:** Continuously test and refine for understanding accuracy and user satisfaction.
- **Deployment:** Launch the system for real-world interaction, with ongoing monitoring.

Maintenance and Optimisation:

- **Updates:** Regular updates based on user feedback and evolving data.
- **Scaling:** Expand the system's capabilities as usage grows and needs change.

Deploying a Conversational System



Examples of a Conversational System

- Banks chatbots
- Website help chatbots which have flows in them
- Context based chatbots (Amazon)

Challenges / Future Direction

Challenges:

- Handling diverse languages, understanding nuances, maintaining privacy.

Future Trends:

- Predictions about conversational AI's role in more sectors and becoming more context-aware.

Q/A