

The background is a light gray gradient. It features several realistic water droplets of various sizes, some with highlights and shadows, scattered across the frame. A faint, concentric circular pattern is visible in the upper center, resembling a ripple in water.

# INNOVATION

The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and scattered. They have highlights and shadows, giving them a three-dimensional appearance.


# **DATA COLLECTION AND ANNOTATION**

START BY COLLECTING A DIVERSE DATASET OF USER QUERIES OR MESSAGES. ANNOTATE THESE DATASETS WITH LABELS THAT INDICATE THE USER'S INTENT AND OTHER RELEVANT INFORMATION, SUCH AS ENTITIES (SPECIFIC PIECES OF INFORMATION LIKE DATES, NAMES, OR LOCATIONS).



# **PREPROCESSING AND TOKENIZATION**

PREPROCESS THE TEXT DATA, INCLUDING TASKS SUCH AS TEXT NORMALIZATION, STEMMING, AND TOKENIZATION. TOKENIZATION BREAKS DOWN THE TEXT INTO INDIVIDUAL WORDS OR TOKENS FOR ANALYSIS.



# FEATURE EXTRACTION

- EXTRACT RELEVANT FEATURES FROM THE TEXT DATA. THIS CAN INCLUDE WORD EMBEDDINGS (WORD VECTORS), PART-OF-SPEECH TAGGING, AND NAMED ENTITY RECOGNITION. WORD EMBEDDINGS, LIKE WORD2VEC OR GLOVE, CAN HELP THE SYSTEM UNDERSTAND WORD SIMILARITIES AND RELATIONSHIPS.

The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and scattered. They are positioned around the text, with some appearing to be on the surface and others slightly above it, creating a sense of depth and texture.

# INTENT CLASSIFICATION

USE MACHINE LEARNING MODELS, SUCH AS DEEP LEARNING MODELS LIKE RECURRENT NEURAL NETWORKS (RNNS), CONVOLUTIONAL NEURAL NETWORKS (CNNS), OR TRANSFORMER-BASED MODELS LIKE BERT OR GPT, TO CLASSIFY USER INTENT BASED ON THE EXTRACTED FEATURES. THIS INVOLVES TRAINING THE MODEL ON THE ANNOTATED DATASET TO PREDICT THE INTENT LABEL.

# ENTITY RECOGNITION

IMPLEMENT ENTITY RECOGNITION TO IDENTIFY SPECIFIC PIECES OF INFORMATION (ENTITIES) WITHIN USER INPUT. THIS IS PARTICULARLY IMPORTANT FOR TASKS INVOLVING STRUCTURED DATA, LIKE BOOKING A FLIGHT OR MAKING A RESERVATION.

# CONTEXT MANAGEMENT

- IMPLEMENT CONTEXT MANAGEMENT TO MAINTAIN THE CONVERSATION CONTEXT. THIS ENSURES THAT THE SYSTEM UNDERSTANDS REFERENCES TO PREVIOUS MESSAGES AND MAINTAINS CONTEXT THROUGHOUT THE CONVERSATION.

The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and subtle. They are scattered across the slide, with a higher concentration in the top-left and bottom-right corners, creating a clean, modern, and fresh aesthetic.

# **SLOT FILLING**

IN THE CONTEXT OF TASK-ORIENTED CONVERSATIONS (E.G., BOOKING A HOTEL ROOM), USE SLOT FILLING TECHNIQUES TO IDENTIFY AND FILL SPECIFIC SLOTS OR PARAMETERS REQUIRED FOR THE TASK.





# **DIALOG MANAGEMENT**

DESIGN A DIALOG MANAGEMENT SYSTEM TO GUIDE THE  
CONVERSATION AND DECIDE WHEN TO TAKE SPECIFIC ACTIONS OR ASK  
CLARIFYING QUESTIONS.




The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are large and prominent, while others are small and scattered. They are rendered with soft shadows and highlights, giving them a three-dimensional appearance. The droplets are distributed across the entire slide, with a higher concentration in the top and bottom areas, framing the central text.

# ERROR HANDLING

IMPLEMENT ERROR HANDLING MECHANISMS TO GRACEFULLY HANDLE USER INPUT THAT THE SYSTEM CANNOT UNDERSTAND OR THAT FALLS OUTSIDE THE EXPECTED USE CASES. IMPLEMENT ERROR HANDLING MECHANISMS TO GRACEFULLY HANDLE USER INPUT THAT THE SYSTEM CANNOT UNDERSTAND OR THAT FALLS OUTSIDE THE EXPECTED USE CASES.



# FEEDBACK LOOP

- CONTINUOUSLY IMPROVE YOUR NLU SYSTEM BY COLLECTING USER FEEDBACK AND USING IT TO REFINE YOUR MODELS AND TRAINING DATA. IMPLEMENT MECHANISMS FOR LEARNING FROM USER INTERACTIONS TO ADAPT TO CHANGING LANGUAGE PATTERNS AND USER PREFERENCES.
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# TESTING AND EVALUATION

- REGULARLY EVALUATE YOUR NLU SYSTEM'S PERFORMANCE USING METRICS SUCH AS INTENT RECOGNITION ACCURACY AND ENTITY RECOGNITION ACCURACY. CONDUCT USER TESTING TO GATHER QUALITATIVE FEEDBACK

# DOCUMENTATION AND USER TRAINING

- PROVIDE CLEAR DOCUMENTATION FOR DEVELOPERS AND TRAIN END-USERS ON HOW TO INTERACT WITH THE SYSTEM EFFECTIVELY.