



## Chatbot Challenges

- Relevance
  - Context
  - Complexity
- Accuracy
  - Errors
  - Hallucinations
- Ambiguity
- Temporality
- Humanness
  - Bias
  - Sentiment
  - Emotion

## Chatbot Solutions

- Rules
  - Human written
  - Hybrid
- LMs
  - Domain /Task specific
  - RAG
  - Fine tuning
    - RLHF
    - SFT
  - Hybrid / Custom
- Chatbot design
- DSS Chatbots

## Our Research: *Improving Human-Chatbot Interactions*

- Relevance
  - Context
    - **Custom RAG – flexible, adaptive**
  - Complexity
    - **Query classification**
    - **Query quality improvement**
    - **Simplification before response**
- Accuracy
  - **Domain specific**
- Ambiguity
  - **AICMA**
- Temporality
  - **Realtime data pipeline via RAG**
- Humanness
  - Bias
    - **Transparency**
  - Sentiment & Emotion
    - **RICT-EMERTA**

**RAISE: *Rethinking AI for Shared Empowerment***

Working papers, Conference → Journal articles underway

Collaborators welcome!

- ESHRO: An Innovative Evaluation Framework for AI-Driven Mental Health Chatbots
- Tackling the Ambiguity Challenge with Generative Artificial Intelligence: AICMA, A Framework for Identification, Classification and Mitigation of Ambiguity
- FEEG AS A TAXONOMICAL QUERY CLASSIFIER (TQC) Framework for LLMs, with RAG application
- Riding AI to Utopia or Dystopia? An NLP, LLM and News Informatics based View of Artificial Intelligence Accelerated Changes that Shape the Future of Human Society.
- Happy Chatbots and Frustrated Humans? Emojis, Memes, Emoticons, Rich Text and Avatars (EMERTA) as Critical Linguistic Features in AI, NLP and LLMs

- **Collaborators welcome for above + more!**      [jim.samuel@rutgers.edu](mailto:jim.samuel@rutgers.edu)
- **Available for collaboration on all NLP projects AND select Drone, RL, CV, Robotics and AI in agriculture projects / efforts**

**RAISE: *Rethinking AI for Shared Empowerment***