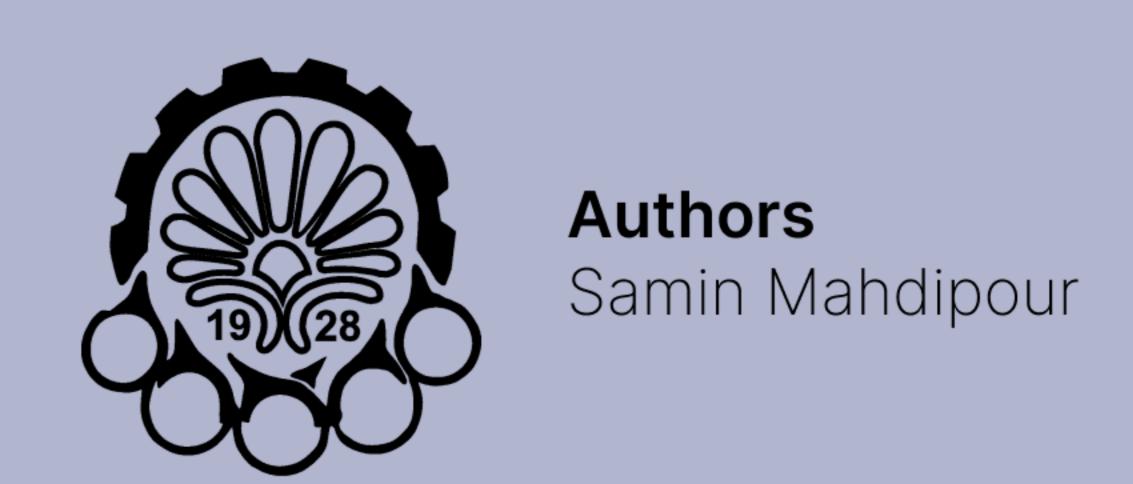# DAI Day AI Event

Persian Chitchat System

This paper discusses the development of an open-domain Persian chitchat system using deep neural networks. A dataset based on Persian dialogues was curated to train BERT and RoBERTa models for domain classification, intent detection and slot recognition. A deep learning based dialogue state tracker was integrated to improve response relevance through slot confirmation and context inclusion. The system provides coherent dialogues in Persian by detecting intents, filling slots, and tracking conversation state.

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① Introduction

Building chatbots capable of smooth, unstructured conversations poses challenges for languages like Persian including linguistic complexities and limited data/computational resources. This work presents an open-domain chitchat system overcoming these limitations through innovations in data curation, deep learning model integration, and dialogue management. Specifically, a large corpus of many intent domains with slot annotations was produced to train neural classifiers and slot fillers. A customized tracker then refines responses by confirming slots and incorporating personal context. Together these components enable natural conversational interactions in Persian across a breadth of casual topics.

② Objective

The core goal is an open-domain chitchat system able to conduct human-like Persian dialogues spanning greetings, causal talk, and discussions about daily activities. Key objectives include:
1. Classifying dialog intents across domains with high accuracy
2. Detecting and filling slots associated with classified intents
3. Tracking dialogue state to refine responses based on previous context
4. Producing grammatically correct and culturally relevant Persian responses
5. Evaluating system coherence and engagement through metrics and user feedback

③ Methodology

The system architecture comprises neural models for intent classification, slot filling, and dialogue state tracking integrated to produce responses. Models were trained on a dataset of Persian dialogues manually labeled for domains and slots. The core classification and slot filling modules use BERT and RoBERTa architectures fine-tuned on this data. The custom dialogue tracker confirms slots and incorporates context with personalized questions to improve accuracy. Ongoing training enhances human-judged metrics like appropriateness, coherence and engagement.

④ Results

Evaluation on an unseen test set shows accurate classification performance across intents with high accuracy. Detected slots for queries achieved a remarkable accuracy rate too. Dialogue tracker integration demonstrated improved response relevance through context and confirmation strategies. During simulated conversations, the system exhibited coherent alternating dialogue flows across multiple turns. Subjective human rating indicate the appropriateness and correctness of system responses based on the dialogue history. Limitations exist in managing some complex dialog states and slot combinations.

⑤ Analysis

Results validate the hybrid architecture combining neural models with a context-aware tracker for high-quality Persian chitchat. Precision of the intent classifier and slot filler modules enables reliable extraction of key user request details. The specialized dialogue tracker significantly improved response continuity and relevance given previous states. Subjective evaluations by native Persian speakers highlight appropriate grammar, cultural awareness and coherent dialog flows. The approach advances the capability of casual conversational agents in languages with limited resources. However, enhancements are still needed for long term dialog management and incorporation of external knowledge sources.

⑥ Conclusion

This research presented a Persian open-domain chitchat system combining neural classifiers, slot fillers and a dialogue tracker to enable context-aware responses across various everyday conversation topics. Innovations in curating a large-scale labeled Persian dialogue dataset and integrating deep learning models pre-trained on this data yielded high performance for intent and slot predictions.

A customized tracker further improved response quality by confirming slots and incorporating personalized context. The system produces culturally relevant, coherent and grammatically correct dialogue exchanges in Persian, validated through automatic metrics and human evaluations. Future work includes expanding supported topics with broader knowledge source integration and advancing strategies for long-term conversational modeling.