Amazon's Alexa Prize Socialbot Grand Challenge 4

team Viola (USC)

Basel Shbita, Justin Cho

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Overview

- Global competition for conversational AI
- socialbot = engages in a conversation about popular topics
  - i.e., entertainment, sports, politics, technology, and fashion
- Areas of work:
  - knowledge acquisition
  - NLU / NLG
  - context modeling
  - commonsense reasoning
  - dialog planning
- Research grants, Alexa-enabled devices, Amazon Web Services

Overview

- Goal (Grand Prize):
  - Build a social bot that users talk to for 20+ minutes for ⅔ conversations and get an average rating of 4.0+/5

- Last competition's winner: Emory's Emora
  - Average conversation time: about 7+ minutes
  - Average rating: about 3.8

- Where we are:
  - Median conversation time: about 1:51
  - Last 7 days average rating: 3.21 (production) / 3.24 (A/B testing)
  - Ranging from 5th to 8th place out of 9 teams (5 teams are returning teams)

Overview

PHASES	STARTS ON:	ENDS ON:
PHASE 1: Participant Application Period	September 9, 2020	October 23, 2020 at 11:59 PM PT
PHASE 2: Sponsor Application Review Period	October 24, 2020	October 30, 2020
PHASE 3: Participant Notification Period/Onboarding	Between October 31 and November 6, 2020	
PHASE 4: Initial Skills Development Period	November 9, 2020	December 18, 2020 at 11:59 PM PT
PHASE 5: Skill Certification Period	December 21, 2020	December 30, 2020
PHASE 6: Internal Amazon Beta Period	January 4, 2021	January 15, 2021
PHASE 7: Initial Feedback Period	January 18, 2021	February 26, 2021
PHASE 8: Quarterfinals Interaction Period	March 2, 2021	April 30, 2021
PHASE 9: Semifinals Interaction Period	May 4, 2021	June 25, 2021
PHASE 10: Additional Feedback Phase	July 5, 2021	July 23, 2021
PHASE 11: Finals Event	July 2021	
WINNERS ANNOUNCED	August 2021	

Overview

Pros
- System that will be deployed to real customers
- Large volume of real customer conversations and also real customer feedback/ratings
- Support and resources from Amazon for getting started

Cons
- Primary focus is on engineering & software development for the earlier phases of the competition
- Strict rules
  - e.g. sensitive response generation
- Limits on using the dialogue data collected from the Alexa Prize outside of the competition
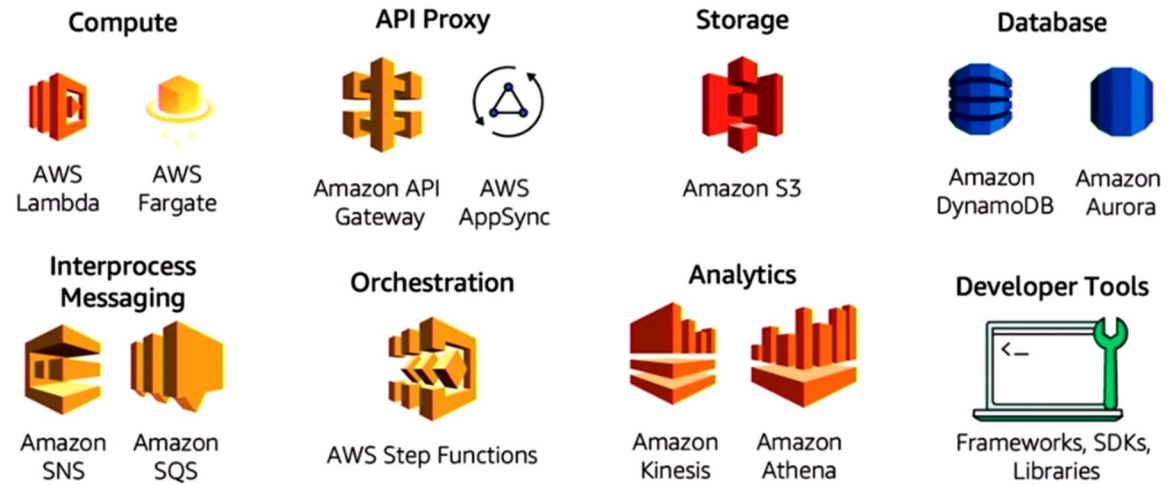
Overview

Our team:

- Faculty advisor:
  - Prof. Jonathan May
- PhD students
  - Justin Cho
  - Basel Shbita
  - Kushal Chawla
- Master's students
  - Suji Kim
  - Wonhyuk Jang
  - Kartik Shenoy
  - Shuai Liu
- Undergraduate students
 - Jennifer Lee
  - Ryan Wei

Resources

Compute

AWS Lambda · AWS Fargate

API Proxy

Amazon API Gateway · AWS AppSync

Storage

Amazon S3

Database

Amazon DynamoDB · Amazon Aurora

Interprocess Messaging

Amazon SNS · Amazon SQS

Orchestration

AWS Step Functions

Analytics

Amazon Kinesis · Amazon Athena

Developer Tools

Frameworks, SDKs, Libraries

- AWS
- Cobot (Conversational Bot) SDK
  - Set of tools, libraries and components designed to make developing, training and deploying open-domain or multi-domain conversational agents
- Custom ASR for dialogue + BERT-based punctuation model
- CAPC (Common Alexa Prize Chats) dataset:
  - anonymized common chats (individual dialog turns), aggregated across all Alexa Prize interactions to capture frequently discussed topics
- Topical Chat dataset
  - dialog dataset grounded in topical knowledge with baseline response generator models (state-of-the-art performance on the dataset)
- Other annotations
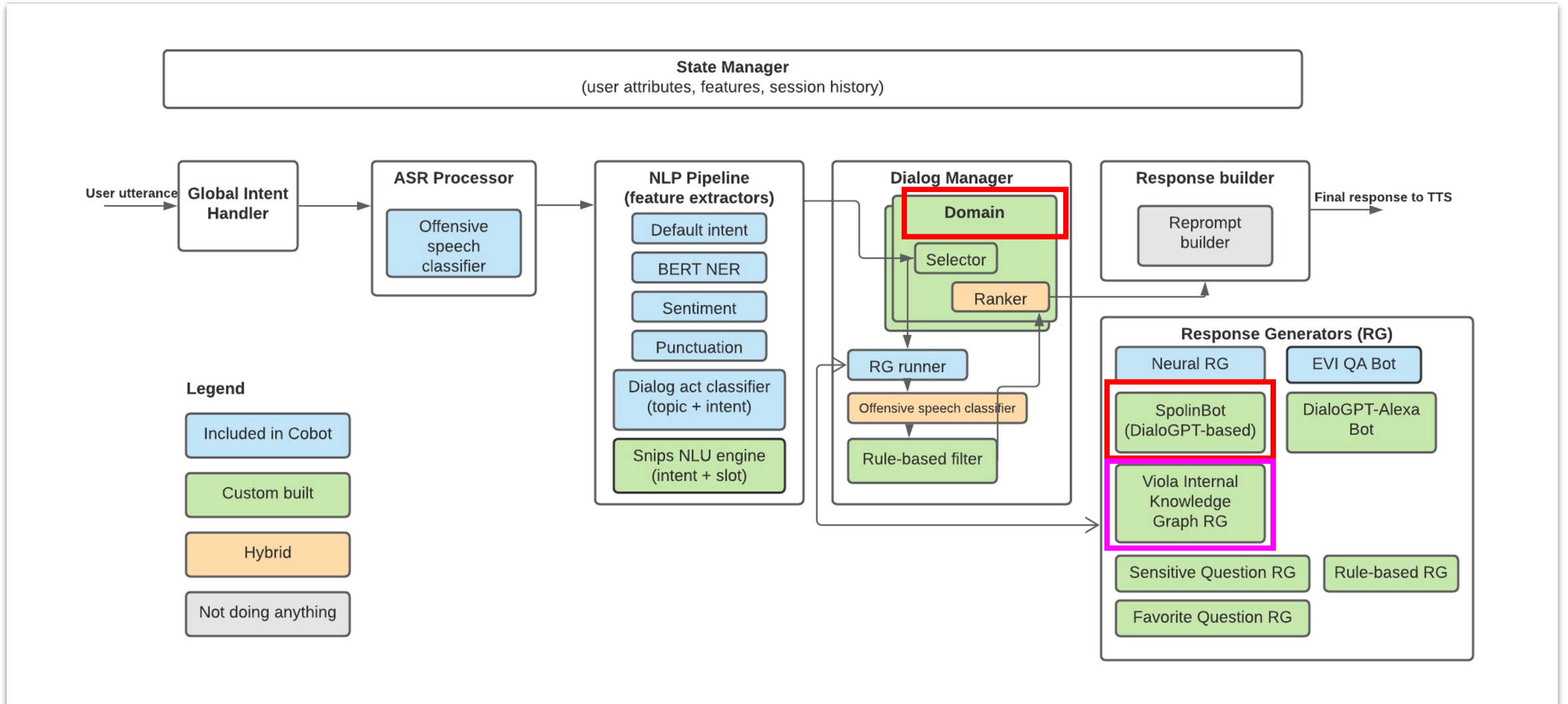 - transcriptions of freeform user feedback at the end of conversations with the team's socialbot

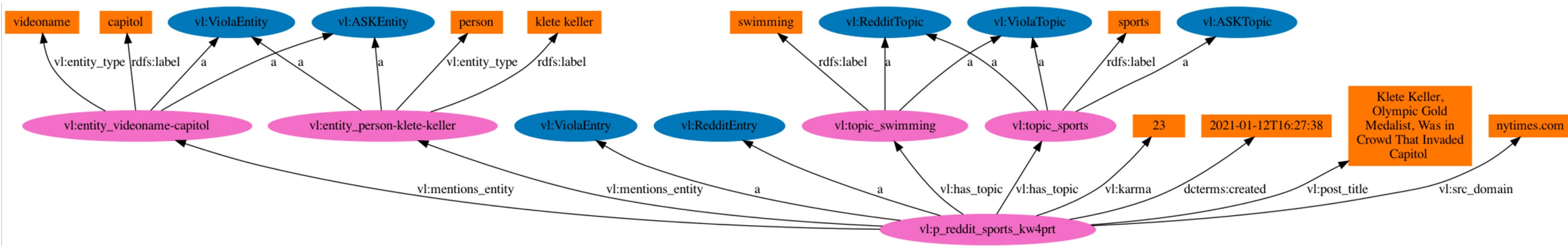# Viola bot – overview
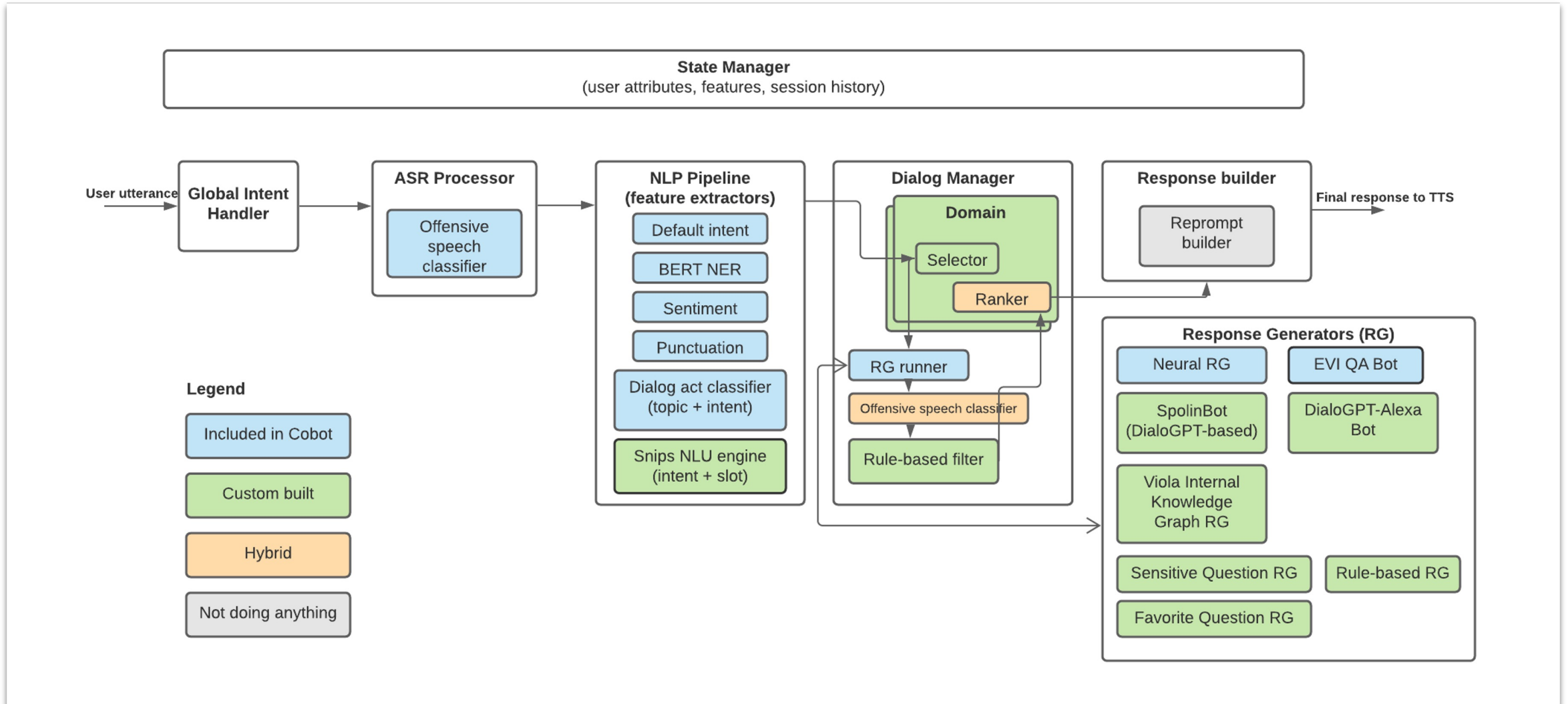
Viola bot – overview

Viola bot – Viola Internal KG (VIKG)

- Updated daily
  - Reddit, IMDB, Washington Post
- Cleanup & filtering
  - sensitive comments
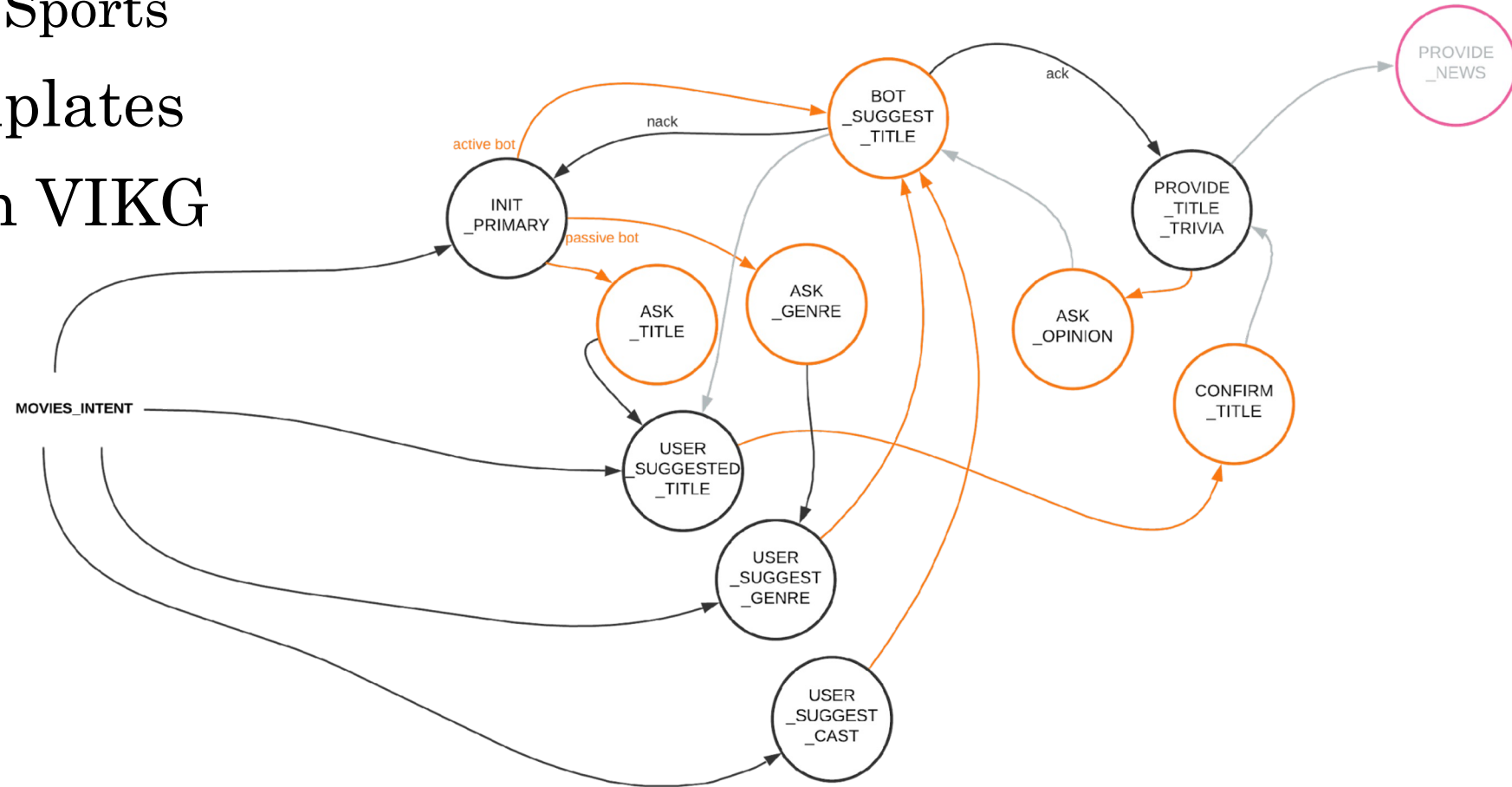 - sensitive topics
- NER (BERT)
- Topic classification

Viola bot – domain specific FSMs

- Currently tackle the domains:
  - Movies, Music, Sports
- Pre-defined templates
- Integration with VIKG

Viola bot – Spolin bot

- Models improvisational dialogue between two actors

- Fine-tuned DialoGPT model
  - with corpus of "yes, and" dialogue pairs

The fight is gruesome! That women is twisting that guy's neck like a doll!

She's turning her opponent into ground link sausage!
Why was she allowed to bring the sausage grinder on stage?

Challenges

- Speech-based conversation different from text-based conversations
- FSMs don't scale well
- Knowledge-grounded response generation
- Consistency
- Frequent topic-switching
  - e.g. "what movie do you like?" → "harry potter" → "cool! I like that movie too. do you like going outdoors?"

Plans and Ideas

- Continuous learning
  - Retrain DialoGPT-Alexa bot with 4.0+ rated conversations (already 5,000+ conversations)
- Approach by Korean chatbot Iruda
- Task-oriented dialogue approach for personalization by slot filling of user information
- Knowledge graph traversals
  - stay on topic/in context
- Commonsense
  - ConceptNet