Team 11

Architectural Thinking Assignment 6

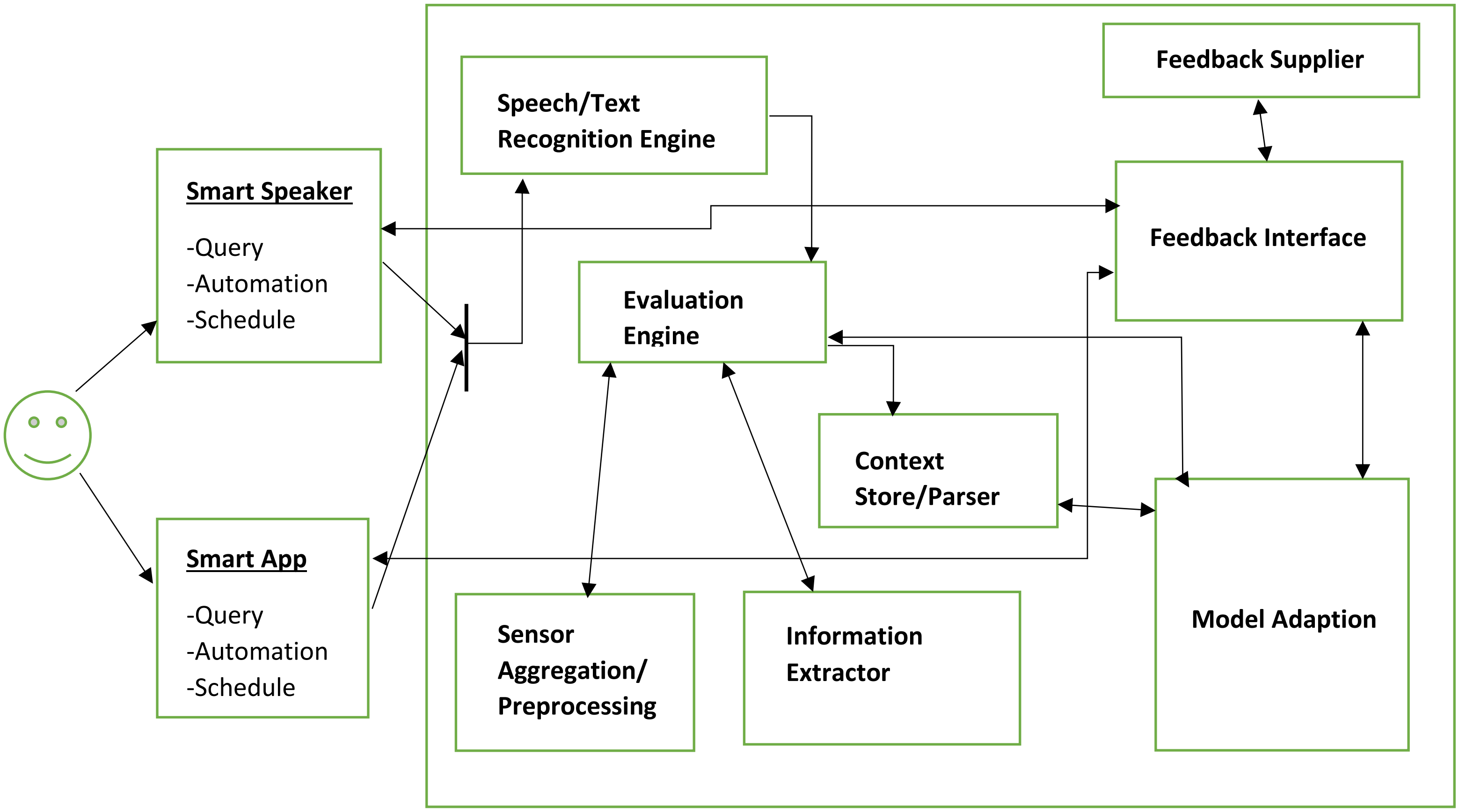
1. **Develop a vision for the system to be developed. Write the vision according to the structure of the Vision Statement presented in lecture 7?**

   Vision Statement of Context Sensitive Intelligent Assistant:

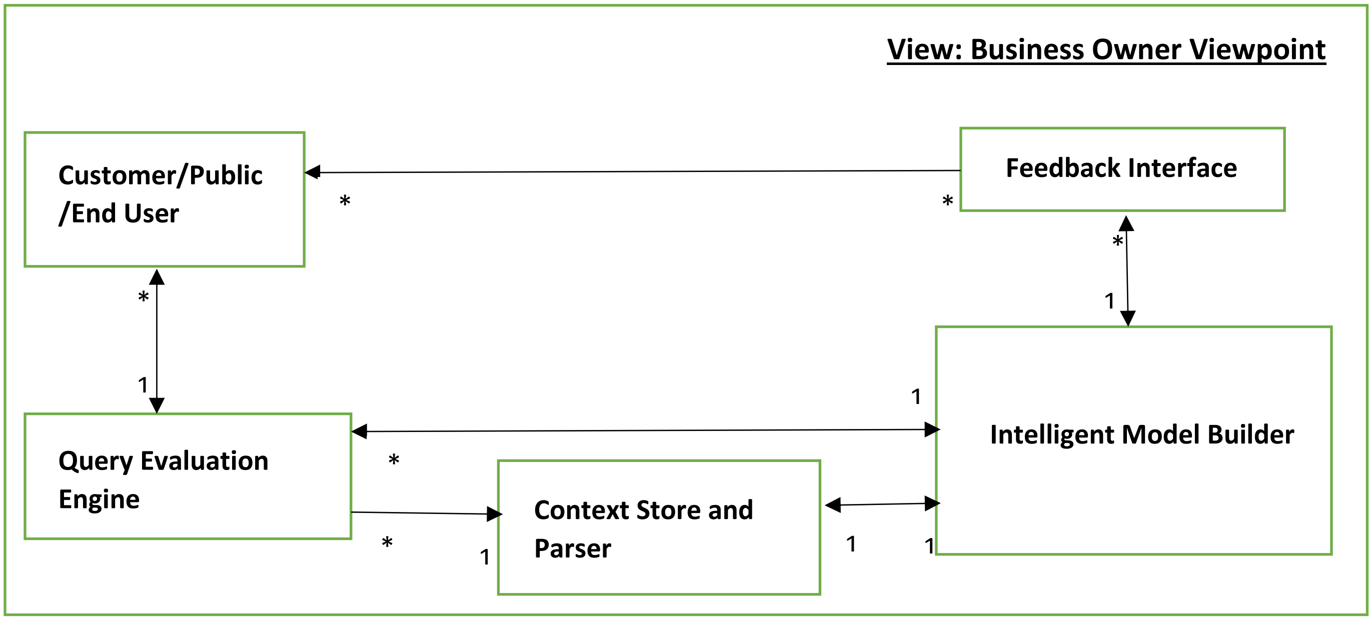
   For End Users, Public and IT Organization Employees
   Who wants to ask queries, perform home automation & inventory management
   The Context Sensitive Intelligent Assistant
   Is a Virtual/Smart Assistant
   That can answer to user queries like the current weather forecast, task scheduling, entertainment, house automation & inventory management
   Unlike Amazon Alexa which is an alternative to our system
   Our Product handles user queries by considering the context of the conversation and then provide highly appropriate results with an estimated accuracy of >90%

2. **Sketch an initial system idea and create an architecture overview diagram. Work out two different views of this overview diagram for the viewpoint of the business owner and the viewpoint of the developer team. Show relevant system components in these views?**

   Architecture Overview Diagram of Context Sensitive Intelligent Assistant:



View for Business Owner's Viewpoint:


View: Business Owner Viewpoint
Customer/Public /End User
Feedback Interface
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*
*
1
1
Query Evaluation Engine
Intelligent Model Builder
1
*
Context Store and Parser
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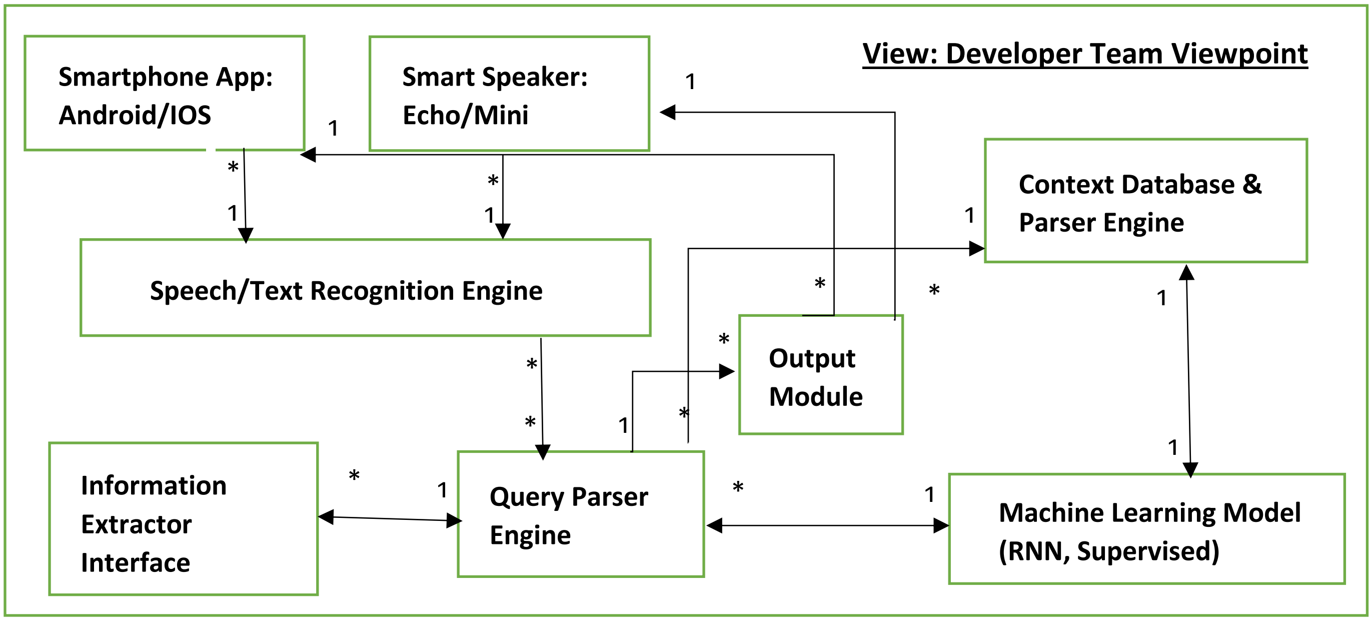
1
1
1

View for Developer Team's Viewpoint:


Smartphone App: Android/IOS
Smart Speaker: Echo/Mini
View: Developer Team Viewpoint
1
1
Context Database & Parser Engine
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1
Speech/Text Recognition Engine
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*
1
*
*
Output Module
*
*
1
*
Information Extractor Interface
*
1
Query Parser Engine
*
1
1
Machine Learning Model (RNN, Supervised)

6. **Which of your architectural decisions influence the operating costs? Where are the largest cost drivers for development and maintenance?**

The architectural decisions which influence the operating costs are:

- Selection of Learning Algorithm
- Storing of Context/Knowledge generated

Learning Algorithm Class	Operating Cost
Offline – Batch	+
Offline – Incremental	-
Completely Online	- - (Least of all)
Online – Part Storage	-
Meta + Batch	+ +
Meta + Incremental	+

The largest cost drivers for development and maintenance are located in:

- Machine learning model development
- Query Evaluation engine
- Context Store & Parser
- Information Extractor component

5. **How will your system be used and deployed in everyday life? Create a runtime and distribution view that explains your operational model?**

The overall Intelligent System is deployed in a public cloud infrastructure (preferably GCP/AWS) i.e. the Machine Learning model as well as the Speech Recognition system components are set-up in the cloud (online). This service can be used by the Public/End User through an Android or IOS smartphone app or via a smart speaker (such as Echo Dot/Home Mini). The corresponding tasks (skills) can be developed/trained directly in the cloud environment by the developer/owner. Later, the user can invoke these skills from his smart device directly. The responses of the system gets better and better after repeated interactions with the user.

(Please turn page over)

4. **Which interfaces will require the biggest project effort? Where are critical dependencies to environmental systems? In which dependencies to external systems do you locate the biggest risks?**

   The interfaces between Evaluation Engine, Information Extractor & Sensor Aggregation/Preprocessing components require higher efforts to implement in our project.

   The environmental systems in our architecture is the Sensor aggregation component & the Cloud platform on which our system is built on. Firstly, before the actual system begins to operate we need to calibrate the required sensors and preprocesses their data and then pass it to the Query Evaluation engine. The results from query evaluation is then used for Model adaption. Also, we have envisioned our system to work on AWS cloud platform, i.e. the skills/queries and models are developed using Amazon Lambda function. If these support for lambda function is modified, our system stops working. Thus, these are the critical dependencies on environmental systems.

   Lastly, we find the dependency of Evaluation engine on 'Information Extractor' (external system) to be of the highest risk.

3. **Develop the context view for your system. Are all actors and users represented? Have you captured the system environment completely and specified all interfaces to surrounding systems? Annotate the interfaces with all events and information objects that flow across the system boundaries. Split the context view into several views at different levels of abstraction.**

(Please see next page!)