: What is conversational, general-purpose decision support?

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The phrase conversational, general-purpose decision support refers to a knowledge-driven software application with a voice interface that engages a person, a decision maker, in a question and answer dialog about a specific decision situation. The decision structuring assistance system becomes more focused, and specific, as a decision maker responds to questions. Think of a voice input computerized system that captures decision relevant information and helps a decision maker organize and process the information, make judgments and assessments.

A conversational decision support bot mimics or imitates an informal talk or chat where one shares ideas or information. The conversation should be a "back and forth", the bot can ask and answer questions and so can the decision maker. Imagine a conversation with a decision adviser or assistant (DA):

DM: Wakeup DA.

DA: *How can I help? Are you making an organizational or a personal decision?*

DM: Help me with an org decision, I need to choose from three job prospects?

DA: *What job are you trying to fill?*

DM: We need a data analyst?

DA: Are you using the standard requirements for an entry level data analyst?

DM: Yes, we want someone with strong qualifications in SQL, statistics, and written communication.

DA: Would you like to use a a multi-criteria decision tool?

DM: Yes, please use it to structure my choice situation.

DA: OK, let's use the 3 standard criteria for the ratings. Now who are the three job prospects?

DM: OK, the three are Bill Anderson, Jen Olsen, and Fred White.

DA: Are their resumes on file?

DM: Yes, please access that data.

DA: What importance weight on a 10 point scale do you want to give to SQL skills?

DM: 9

and so on ...

DM: Save the data matrix.

DA: Done. See you next time.

A person writing dialog for AI bots needs to understand the purpose of the bot and then create a branching, contingent script that can be programmed. There are many websites with tips on writing good dialog for screenplays. Some tips derived from Rabin (2014) include: 1) make sure your dialogue fits the character, the persona, 2) a bot character should have a distinctive, recognizable speaking style, 3) arguing with the user is OK, but keep the dialog constructive, 4) actions determine intent, but we must focus on what the bot says to establish trust and good intent, 5) Never tell a user things he/she already knows, 6) don't be boring, some subtlety or nuance in the dialog may be good, 7) If the bot is the "star", have a strong concluding statement for the bot in the standard dialog.

My current plan is to develop a conversational bot for weighted multi-criteria decision analysis (MCDA). Multi-criteria decision analysis (MCDA) is a general framework with wide applicability for supporting complex decision-making situations with multiple and often conflicting objectives. Multiple criteria decision-making (MCDM) is considered as a complex decision-making (DM) tool involving both quantitative and qualitative factors. My initial plan is to develop a complete decision process dialog from decision question formulation to finalizing a choice. The dialog would ask about criteria, weights, draw alternatives from brainstorming and the the bot would help a person rate the alternatives on the criteria. The bot would provide help with sensitivity analysis and identify a dominant alternative if one existed. Another qualitative choice model I have worked with is Pro and

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Con comparisons for the two "best" alternatives.

My overall research goal is to develop and test a general purpose, conversational decision structuring voice bot. The bot would be a person specific, decision bot, a decision adviser and assistant. Over time and multiple decisions, the bot would learn the context and patterns of a person's decision making tasks. The decision support bot will be a guide to help a person make better, more effective decisions.

For almost 40 years, my research has focused on developing decision and planning assistants and aids for managers. My focus is moving from text to voice Q&A dialog decision support. My initial project from 1975-1988 to develop a computerized decision aid (DECAID) is described in some detail (cf., Power, 1976; 1977; 1998). In 1986, I designed a package called The Management Decision Assistant. More recently, my design and development research focused on developing a Planning DSS application (Power, 2006).

User experience (UX) testing is required to improve the conversational dialog and capabilities. A decision adviser bot can not be static, rather it must evolve its persona and abilities and learn about each individual person who uses it. A decision adviser should be a person specific decision adviser. Perhaps a voice interface will help managers be more rigorous in semi-structured and ill-structured decision situations and improve decision quality (Aldag & Power, 1986; Power, Meyeraan, & Aldag, 1994).

What is the best current development environment for a decision assistant voice bot? I am currently exploring the Google Assistant Developer Community Program with Dialogflow and the Amazon Lexx development environment. Walker (2019) provides an overview of the chatbot initiatives of Facebook, Microsoft, Google, and Amazon.

Some have referred to developing conversational AI, which is a broader term than conversational decision support. Brenier (2018) explains this term refers to using machine capabilities to understand and generate human language. Also, he identified decision support as a use case. He notes "adopt conversational AI to walk users through a decision or task that might feel overwhelming."

The vision for the Decision Adviser Voice Interface Development project is challenging, complex, and still far from realization. Perhaps managers are not psychologically ready to talk with a computer decision adviser. Perhaps the development environment is still too primitive to capture the needed expertise from a human developer and then learn from interacting with users. Successfully

demonstrating proof of concept and creating a useful prototype will require a team. There is currently no funding for this project, but if you are interested in volunteering with the Decision Adviser Voice Interface Development project, please contact me, djpower1950@gmail.com.

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Last update: 2019-02-24 03:58