

Dialog system

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A **dialog system** is a computer system intended to converse with a human, with a coherent structure. Dialog systems have employed text, speech, graphics, haptics, gestures and other modes for communication on both the input and output channel.

What does and does not constitute a dialog system may be debatable. The typical [GUI wizard](#) does engage in some sort of dialog, but it includes very few of the common dialog system components, and dialog state is trivial.

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[\[edit\]](#) Components

There are many different architectures for dialog systems. What sets of components are included in a dialog system, and how those components divide up responsibilities differs from system to system. Principal to any dialog system is the [dialog manager](#), which is a component that manages the state of the dialog, and dialog strategy.

- [Natural language understanding](#)
 - Proper Name identification
 - [part of speech](#) tagging
 - [parser](#)
- [dialog manager](#)
- output generator
 - [natural language generator](#)

- [gesture generator](#)
 - [layout engine](#)
- input recognizer/decoder
 - [automatic speech recognizer](#)
 - [gesture recognizer](#)
 - [handwriting recognizer](#)
- output renderer
 - [text-to-speech](#) engine
 - [talking head](#)
 - [robot](#) or [avatar](#)
- [multi-modal fusion](#)

[[edit](#)] Types of systems

Dialog systems fall into the following categories, which are listed here along a few dimensions. Many of the categories overlap and the distinctions may not be well established.

- by [modality](#)
 - [text-based](#)
 - [spoken dialog system](#)
 - [graphical user interface](#)
 - [multi-modal](#)
- by device
 - telephone-based systems
 - [PDA](#) systems
 - in-car systems
 - [robot](#) systems
 - [desktop/laptop](#) systems
 - native
 - in-[browser](#) systems
 - in-[virtual machine](#)
 - in-[virtual environment](#)
 - robots
- by style
 - command-based
 - [menu](#)-driven
 - [natural language](#)
 - [speech graffiti](#)
- by initiative ^[1]
 - system initiative
 - user initiative
 - mixed initiative
- by application
 - [information service](#)
 - command-and-control
 - entertainment
 - education/tutorial
 - [edutainment](#)
 - reminder systems
 - companion systems

- healthcare
- [eldercare](#)
- assistive/access systems

[\[edit\]](#) Implementations

[\[edit\]](#) Toolkits and architectures

- [TRINDIKIT](#) dialogue modeling architecture
- [Olympus](#) open-source dialog system toolkit
- [Ariadne](#) Open-source dialog manager
- [ATOM Spoken Dialogue SDK](#) SDK for embedded spoken dialogue systems
- [DIPPER](#): dialogue prototyping equipment and resources
- [Midiki](#) dialogue toolkit
- [Galaxy](#) (*not active; developed at [MIT](#)*) dialog systems infrastructure
- The [Universal Speech Interface](#) an artificial language that simplifies automatic recognition (with toolkit)
- [VXML](#) "Voice XML", dialog markup language (primarily for telephony) developed initially by [AT&T](#) then administered by an industry consortium and finally a [W3C](#) specification. Commercial systems include:
 - [BeVocal Café](#) free developer environment [company bought by [Nuance Communications](#)]
 - [Tellme Studio](#) free developer environment [company bought by [Microsoft](#)]
 - [Quack.com](#) QXML Development Environment [company bought by [AOL](#)]
- [AIML](#) NLP system
- [SALT](#): multimodal dialog markup language developed by [Microsoft](#)
- [Suede](#) a minimalist Wizard of Oz prototyper for speech interfaces
- [CSLU Toolkit](#) a state-based speech interface prototyping environment
- VoiceBrowse: architecture enabling the dynamic production of dialogue driven by unstructured online (Internet) sources

[\[edit\]](#) Notable systems

See <http://www.cs.cmu.edu/~dbohus/SDS/>, http://www.ling.gu.se/~sl/dialogue_links.html

[\[edit\]](#) Academic context

The study of dialog systems is commonly considered a branch of [human-computer interaction](#), although its origins are generally rooted in the [automatic speech recognition](#) community. Current trends are putting more research emphasis on aspects of [psychology](#) and [linguistics](#).

[\[edit\]](#) Topics

- [human-computer interaction](#)
- [linguistics](#)
- [computational linguistics](#)
- [discourse analysis](#)
- [pragmatics](#)

- [semantics](#)
- [parsing](#)
- [Symbol grounding](#)
- [language modeling](#)
- [multi-modal fusion](#)
- [multi-modal fission](#)
- [spoken language understanding](#)
- [psychology](#)
- [psycholinguistics](#)
- [human communication](#)
- [automatic speech recognition](#)
- [text-to-speech](#)
- [error handling](#)
- [dialog management](#)
- [affective dialog](#)
- [user modeling](#)
- [dialog engineering](#)
- [embodied communication](#)

[\[edit\]](#) **Conferences**

- [SEMDIAL](#), the annual workshops on the semantics and pragmatics of dialogue
- [SIGdial](#), annual workshops of the ACL/ISCA special interest group on discourse and dialogue
- The [Young Researchers Roundtable on Spoken Dialog Systems](#)

[\[edit\]](#) **Related conferences**

- [Interspeech](#) / ICSLP
- The [International Conference on Multi-modal Interaction](#) (ICMI)
- The [Association for Computational Linguistics](#) (ACL)
- The [Association for the Advancement of Artificial Intelligence](#) (AAAI)
- [Intelligent User Interfaces](#) (IUI)
- [Computer Human Interaction](#) (CHI)
- The [North American Association for Computational Linguistics](#) (NAACL)
- The [International Workshop on Robot and Human Interaction](#) (ROMAN)
- [Human robot interaction](#) (HRI)
- [Interact](#)
- [Spoken Language Technology, SLT](#)
- [Text, Speech, and Discourse](#) (TSD)
- [Empirical Methods in Natural Language Processing](#) (EMNLP)
- [Human Language Technology](#) (HLT)
- The [International Joint Conference on Artificial Intelligence](#) (IJCAI)
- The [International Conference on Computational Linguistics](#) (COLING)
- [Automatic Speech Recognition and Understanding](#) (ASRU)

[\[edit\]](#) **Related journals**

Historically, there were no journals devoted specifically to dialog systems. To address this need the Journal of Dialog Systems has been launched: the first journal dedicated particularly to dialog systems, with the goal of becoming the premiere international journal in the field.

- [Journal of Dialog Systems](#)

There are also a number of related journals that often have dialog systems articles.

- [ACM Transactions on Speech and Language Processing](#)
- [Computers, Speech, and Language](#)
- [Journal of Cognitive Systems Research](#)
- [IEEE Transactions on Systems, Man, and Cybernetics](#)
- [Computational Linguistics](#)
- [Cognitive Science](#)
- [International Journal of Speech Technology](#)
- [User Modeling and User-Adapted Interaction](#)
- [Natural Language Engineering](#)
- [Computers in Human Behavior](#)
- [ACM Transactions on Computer Human Interaction](#)

[\[edit\]](#) Industrial context

Main article: [Interactive voice response](#)

Simple dialog systems are widely used to decrease human workload in [call centres](#). In this and other industrial telephony applications, the functionality provided by dialog systems is known as [interactive voice response](#) or IVR.

[\[edit\]](#) Books

- Will, Thomas (2007). *Creating a Dynamic Speech Dialogue*. [VDM Verlag Dr. Müller](#). ISBN 978-3836449908.
- [Dialogue Processing in Spoken Language Systems](#)
- [Voice User Interface Design](#)
- [Spoken Dialogue Technology: Towards the Conversational Interface](#)
- [Machine Conversations](#)

[\[edit\]](#) References

1. [^] Will, Thomas (2007). *Creating a Dynamic Speech Dialogue*. [VDM Verlag Dr. Müller](#). ISBN 978-3836449908.

[\[edit\]](#) External links

- [The CLASSiC project](#): machine learning in spoken dialogue systems
- [The TALK project](#): on multimodal dialogue systems

