down, so an ability to summarize the data while keeping the meaning intact is highly required. This is important not just allowing us the ability to recognize the understand the important information for a large set of data, it is used to understand the deeper emotional meanings; For example, a company determines the general sentiment on social media and uses it on their latest product offering. This application is useful as a valuable marketing asset.

The types of text summarization depends on the basis of the number of documents and the two important categories are single document summarization and multi document summarization (Zajic et al. 2008 [159]; Fattah and Ren 2009 [43]).Summaries can also be of two types: generic or query-focused (Gong and Liu 2001 [50]; Dunlavy et al. 2007 [37]; Wan 2008 [144]; Ouyang et al. 2011 [99]).Summarization task can be either supervised or unsupervised (Mani and Maybury 1999 [74]; Fattah and Ren 2009 [43]; Riedhammer et al. 2010 [110]). Training data is required in a supervised system for selecting relevant material from the documents. Large amount of annotated data is needed for learning techniques. Few techniques are as follows–

- *Bayesian Sentence based Topic Model (BSTM)* uses both term-sentences and term document associations for summarizing multiple documents. (Wang et al. 2009 [146])
- *Factorization with Given Bases (FGB)* is a language model where sentence bases are the given bases and it utilizes document-term and sentence term matrices. This approach groups and summarizes the documents simultaneously. (Wang et al. 2011) [147])
- *Topic Aspect-Oriented Summarization (TAOS)* is based on topic factors. These topic factors are various features that describe topics such as capital words are used to represent entity. Various topics can have various aspects and various preferences of features are used to represent various aspects. (Fang et al. 2015 [42])

f) Dialogue System

Dialogue systems are very prominent in real world applications ranging from providing support to performing a particular action. In case of support dialogue systems, context awareness is required whereas in case to perform an action, it doesn't require much context awareness. Earlier dialogue systems were focused on small applications such as home theater systems. These dialogue systems utilize phonemic and lexical levels of language. Habitable dialogue systems offer potential for fully automated dialog systems by utilizing all levels of a language. (Liddy, 2001) [68].This leads to producing systems that can enable robots to interact with humans in natural languages such as Google's assistant, Windows Cortana, Apple's Siri and Amazon's Alexa etc.

g) Medicine

NLP is applied in the field as well. The Linguistic String Project-Medical Language Processor is one the large scale projects of NLP in the field of medicine [21, 53, 57, 71, 114]. The LSP-MLP helps enabling physicians to extract and summarize information of any signs or symptoms, drug dosage and response data with the aim of identifying possible side effects of any medicine while highlighting or flagging data items [114]. The National Library of Medicine is developing The Specialist System [78–80, 82, 84]. It is expected to function as an Information Extraction tool for Biomedical Knowledge Bases, particularly Medline abstracts.