

# Personalization of Student Support Services using Chatbot

Srimathi H, Krishnamoorthy A

**Abstract** – In multi varsity and large campuses student may need variety of particulars, support, counseling and special assistance. At present, the campuses manage that through exhaustive information in websites email notifications, messaging and help desks to cater the student's needs. However, the students who need quick and personalized services find difficulty in receiving information. One of the solutions is engaging Artificial Intelligence as a Service (AlaaS) using chatbot to offer intelligent personalized services to address the queries of the students. The paper reviews the need and benefits of chatbot in Student Support Services (SSS).

**Index Terms**— Student Support Services, Chatbot, ERP, CRM, NLP, AI

## 1 INTRODUCTION

The main aim of higher education institutions is to provide the best ambience for learning and wide opportunities for the students to excel in their career. The student support services comprise of a cluster of services and activities that are intended to make the learning atmosphere friendlier. The support services are classified into administration, academics, special assistance and ICT enabled services as shown in Fig 1.

<p>Administration</p> <p>Admission Flexible office hours Handbooks &amp; News Letters Campus code of ethics Campus map</p>	<p>Special Assistance</p> <p>Educational loan assistance Scholarship scheme Pre &amp; post arrival services, orientation Mentoring – Career and personal guidance Interpersonal, Inter cultural development Residential, health and stress issues Senior &amp; alumni interaction Employer request on certificate verification</p>
<p>Academic</p> <p>Pre academic counseling - Academic plan Academic counseling Monitor academic progress Course selection Study strategy improvement Bridge courses / Personal tutoring Value addition &amp; skill development courses Industry institute interaction / projects Project / product development opportunity Conference / Journal publications Recognitions, awards and medals Semester abroad programs Student mobility</p>	<p>ICT enabled Services</p> <p>Website Webmail Webinars Virtual campus tour Online admission tracking system Student administration Examination management Learning management resources Call centre services Mobile application support</p>

Fig 1. Student Support Services

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From entry to graduation, the institutions extend the support by promoting academic success and degree attainment. Most of the institutions provide support services through technology for fast and consistent response (Deosthale, 2016). The premium services are ERP which covers the student information and administration services, Customer Relationship Management (CRM) which records & automates all information related to customer interactions, Content Management System (CMS) for updated Web information and Learning Management System (LMS) for managing learning resources as shown in Fig. 2. All are interlinked with each other on sharing data and services. The usage of chatbot that is enriched with the knowledge of education domain which ensures better chances of personalized service larger target audience at just-in-time (Morgan et al., 2017).

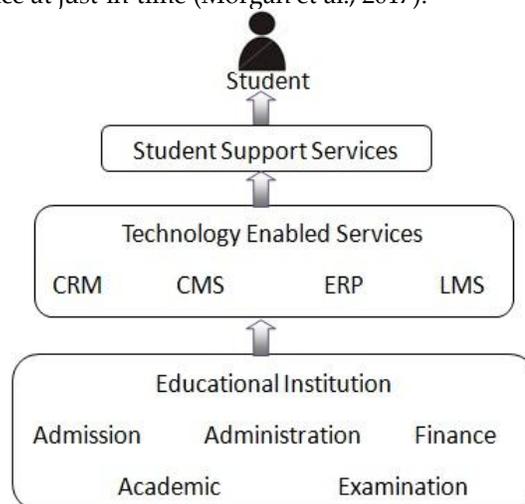


Fig. 2. Technology Enabled Services

## 2 CHATBOT

The messaging applications are becoming popular compared to websites and other social networking tools, as they allow users to interact instantly. Chatbot is a kind of conversational webservice developed using AI and machine learning algorithms (Mc Tear et al., 2016). The simplified architecture of chatbot is given in Fig 3.

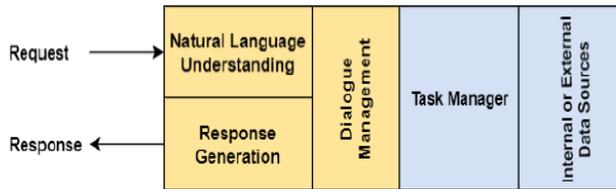


Fig. 3. Architecture of Chatbot (Bapat, 2017)

It is easy to communicate with single message window rather than installing different applications for different purposes. However, the conversation framework is segregated and classified as shown in Fig 4. Though the chatbot has limitations to handle other than Rule based, they are able to answer routine works and with the help of AI, new learning is possible. The natural language processing (NLP) is important to make the chatbot applications user friendly and understand the customer queries in real time (Loper et al., 2002).

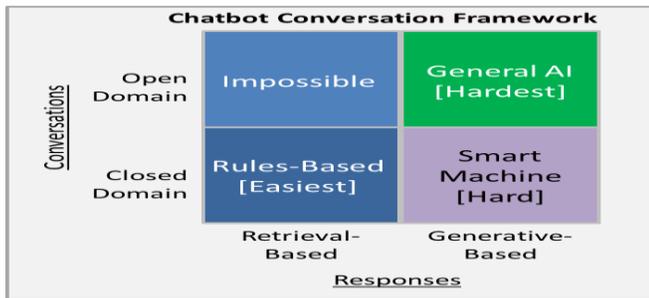


Fig. 4. Classification of Chatbot Conversation (Source : Chatbotfile magazine)

## 3 LITERATURE REVIEW

Some of the institutions offering higher education have begun looking for the best practices to adopt and adapt from the other sectors of the society such as banking, retail marketing, health care etc., which have been focusing on the customer experience over a period of time. A few of the prior works in higher education Chatbot are listed as follows (Winkler et al., 2018):

- AdmitHub, (2015) developed by Harvard Lab and utilized by Georgia State University explains how educators and marketers can improve enrollment cycle through text messaging, This is mainly used to register for massive online courses.

- The study by Winkler, R. & Söllner, M. addresses the utilization of Chatbot in learning process in higher education
- The OMSCS program of Georgia Institute of Technology is promoted by Chatbot to engage the candidate. (Gregori, 2017).
- The ANA Chatbot is developed to assist admission enquiry about 250 universities in USA

There are several Chatbots designed at small scales, however they served as proof of concepts and serve for answering frequently asked questions. The present invention aim for integration with CRM for communication and ERP for knowledge resources.

## 4 CHATBOT DESIGN FOR SUPPORT SERVICES

The simplified chatbot design of student support services is shown in Fig. 5, where the services include pre-, post-educational assistance, campus life and personal guidance.

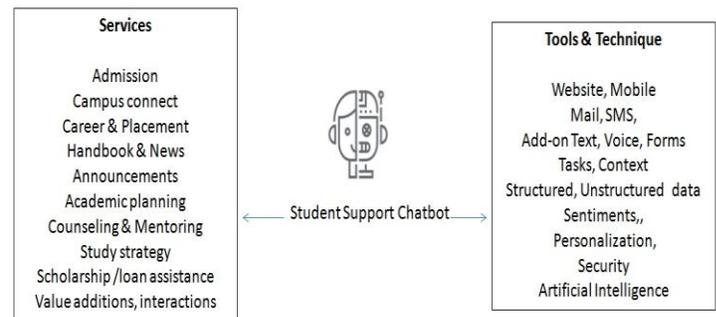


Fig. 5. Simplified Student Support Chatbot Design

The chatbot is designed with the help of AI to handle complex queries and open domain question through new learning. The query handling through various level as shown in Fig. 6 (Uliyar, 2017).

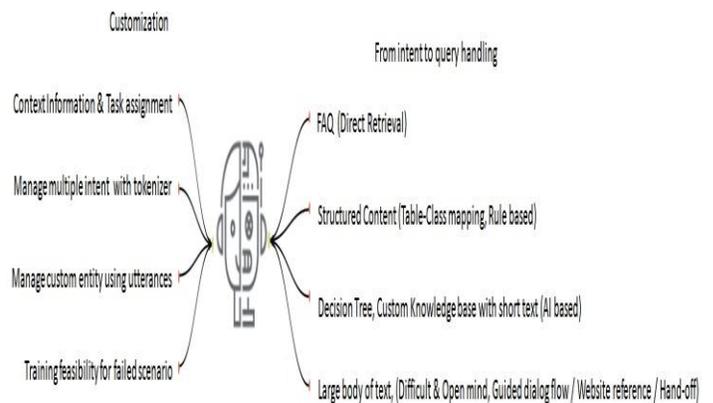


Fig. 6. Knowledge empowering in Bot

The example of decision tree formation in answering student queries is shown in Fig. 7. The answer is mix-up of referring frequently asked questions (FAQ) in retrieving pre-requisite

chart, referring database of students for finding his eligibility and suggest other courses based on his studied subjects if he is not eligible. The natural language understanding is used as a base to find pattern matching and find utterances to form decision tree.

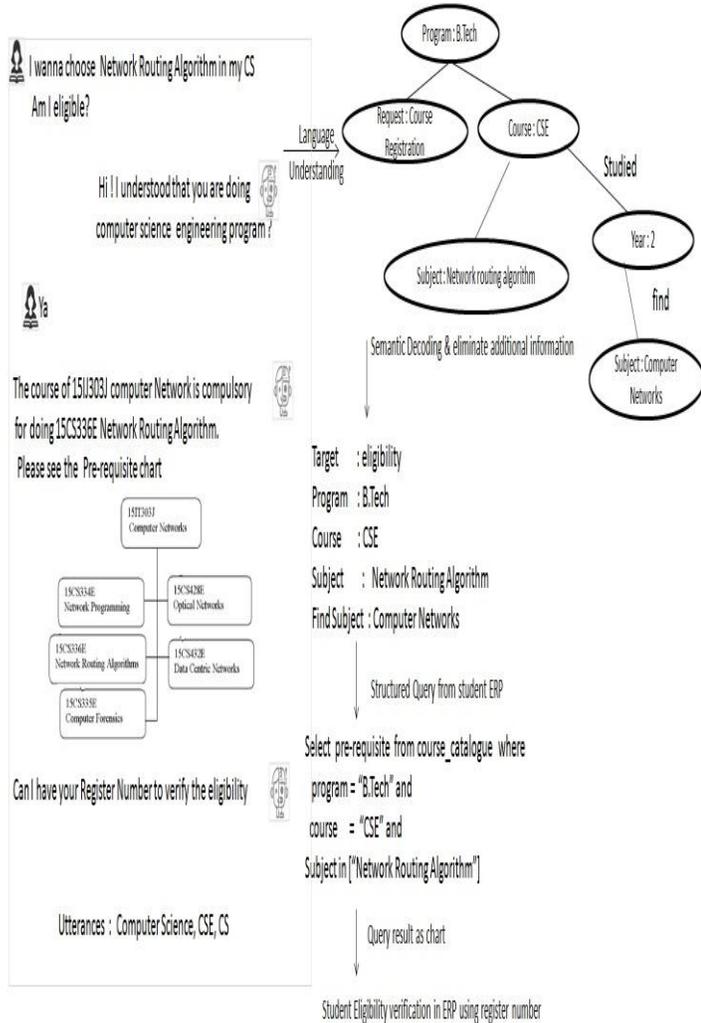


Fig. 7. Decision tree formation of Academic advising

The chatbot has interaction with ERP databases through class representations and table-class mapping as shown in Fig. 8 for finding students eligibility on course registration (Setiaji et al., 2015).. The voice powered chatbot especially on student counseling is given in Fig. 9. This will help the students to discuss their issues, where the design is done as counselor to listen students with empathetic way. It is useful to the students who are away from home and need someone to listen their voice. However, the challenge is on understanding student context, as there is no specific domain (Sameera et al., 2015). The NLP algorithms will try to locate the student issues, or otherwise raise the tokens to human assistance for further guidance.

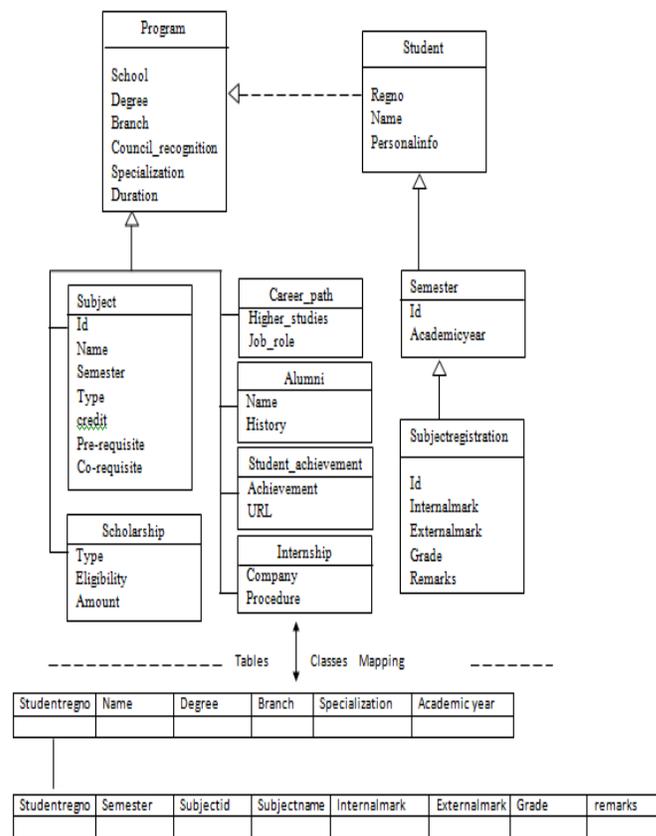


Fig. 8. Knowledge retrieval in ERP using Table-Class map

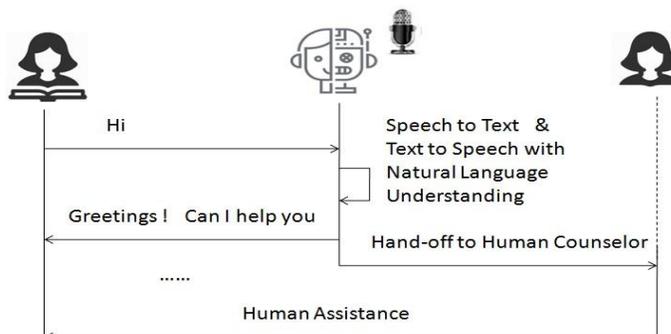


Fig. 9. Hand-off to human assistance on difficult situation

The various levels of metrics derived in chatbot analyses the satisfaction of user, quality of messaging and time response. The frequent review of metrics helps to improve the chatbot and its knowledge base.

### 5 CONCLUSION

As per the Gartner study, it has been recorded that by 2021, more than 30 % of higher educational institutions will be forced to execute a personalization strategy to sustain the student services through chatbot..The design of SSS chatbot is viewed as 24/7 automated self-support service in campus, where the students are able to get connected with different applications through a single interface. As it is flexible to use

both in desktop and mobile, the chatbot helps students in all campus services, assistance in filling various forms, learning and advice services.

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