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# EXAM GEEKS: AN INTERACTIVE AGENT

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**Abstract –** *Many people adopting Smart Assistant Devices such as Google Home, now a days of solely engaging with a service through a keyboard are over. The new modes of user interaction are aided in part by this research will investigate how advancements in Artificial Intelligence and Machine Learning technology are being used to improve many services. In particular, it will look at the development of google assistants as a channel for information distribution. The Exam Geeks Interactive Agent is grounded in the optimistic view that emerging low-cost technology combined with the increased necessary of an online-tutoring agent, will create opportunities to add immense value to the youth aspiring for educational exams. The current online agents fail to produce an all-in-one roof to unleash constraints such as knowing the rank of the user, a generalized time table to assess the performance time-to-time. From the economic point of view, the existing systems are infeasible by charging the users high cost for accessing study materials. This paper proposes an organized way of dealing with the complications involved in preparing for a competitive exam by integrating various aspects of learning in one platform. The project works on building an online beneficiary conglomerated system which provides necessary preparation tools and guidance for the student under a single roof without wasting time in order to probe into different sites by using machine learning techniques. We will use Dialogflow as key part to develop Google assistant.*

***Key Words***: **interactive agent, virtual assistant, students, exams, timetable, reminder**

## 1. INTRODUCTION

This Google assistant helps users to interact with our product and services in any organization using in form of text-based and conversational interfaces such as voice by using the Dialogflow tool, that have the inbuilt machine learning algorithms to understand the users prompt and based on the users query our agent will understand the training phrases and generates the dynamic response to user. This application is aimed in providing a concise area for a student to rely on effective communication with the interactive agent. One can use this artificial conversation entity to access the previous year papers, check eligibility criteria and resolve their exam related queries. Users can also communicate with the agent to channelize a time table. The objective is to build an interactive agent, which aims to provide greater facilities to students in order for them to pursue their career in a well-organized manner. The application predicts the rank of the user based on the percentile scored. The agent will be able to provide all the necessary resources under one roof by unleashing constraints of time spent in surfing over various sites. The focus of this project is to implement these new technologies to create an intelligent interactive agent Google assistant to enable organizations to appeal to millennial and potentially gain a lifelong user.

## 2. LITERATURE SURVEY

David Graus and Paul N Benett [1] studied how people specify and use reminders. The focus was on time-based reminders, where a data driven analysis was performed to identify common categories of tasks that give rise to these reminders across a large number of users, and these tasks were arranged into a taxonomy. Temporal patterns linked to the type of task, time of creation, and terms in the reminder text.

| Turn | Who | Text |
|---|---|---|
| 1 | User | Remind me to do th e laundry. |
| 2 | System | When wou ld you like to be re minded? |
| 3 | User | Sunda y at noon. |
| 4 | System | Alright, remind you to do the laundry at 12:00PM on Sunday , is that right? |
| 5 | User | Yes. |
| 6 | System | Great, I'll remind you! {success chime} |

Table 1 Types of Reminder Dialogs

Table 1 presents an example of the types of reminder dialogs recorded in the dataset. These logs offer insights about the reminder generation process, including the types of tasks for which people formulate reminders, task descriptions, the times that reminders of different types are created, and the periods of time between the creation of reminders and notifications. Beyond analysis of the nature and timing of reminders, we demonstrate how information about patterns of reminder usage and general trends seen across users can be harnessed to assist people with setting reminders. We focus primarily on reminders for tasks planned for a future time.

The main contributions of paper [1] are:

• Develop a taxonomy of task types for these common reminders.

• Study temporal patterns in reminder setting and notification, demonstrating noteworthy patterns.

• Build models that predict the desired timing of reminders, demonstrating a direction in harnessing the patterns.

The findings provide insights about the tasks and goals of users in the real world and about the behaviors and needs of people with regards to memory and reminding. They also support efforts on modeling the tasks and goals of users.

However, the main drawback of paper [1] is the research is performed only on a subset of reminders.

Gursimran Singh, Shashank Srikant and Varun Aggarwal [2] present a method to grade computer programs which requires no manually assigned labeled samples for grading responses to a new, unseen question. This involves learning of one supervised model, across questions for a given language, which can then be applied to an ungraded response to an unseen question. The system's value is demonstrated by deploying it to grade programs in a high stakes assessment.

For each specific question, responses from different test-takers are used to build models that can predict the quality of new, unseen responses. For example, an essay describing a field trip to New York might include terms such as 'Statue of Liberty', 'Niagara', and 'Times Square' which would qualify the response to be rated highly; on the other hand, a good essay describing a visit to California might include such terms as 'Silicon Valley', 'Napa valley', or 'Golden Gate Bridge'. For each question, one has to identify such discriminating features and build models using labeled responses, making them specific to the subject matter of the question. The inherent design of such an approach impedes scaling these systems to newer content. Each new question requires a significant number of expert-graded responses to train models. The availability, cost, and time required by the subject matter experts (SMEs) govern the rate at which new questions could be added to the system.

Specifically, this paper [2] makes the following contributions:

• A machine learning approach is presented to learn question independent models for grading computer programs (or for any domain, to our knowledge) which requires zero human-graded samples for a new question.

• A new machine learning workflow is proposed to grade open-response problems, which includes automatic creation of structurally invariant features, normalization, a joint learning across questions with these features, and using them to predict labels for responses to an unseen question.

• This approach produces a model for which the accuracy rivals the consensus among human experts and we demonstrate its utility in a real world setting to predict grades in high-stakes assessments.

However, the main drawback of paper [2] is more work on relationship between accuracy and the number of train problems.

Mercedes T. Rodrigo, Ryan Baker, Jenilyn Agapito and Julieta Nabos [3] studied the affective states exhibited by students using an intelligent tutoring system for Scatterplots with and without an interactive software agent, Scooter the Tutor. Scooter the Tutor had been previously shown to lead to improved learning outcomes as compared to the same tutoring system without Scooter.

It was found that affective states and transitions between affective states were very similar among students in both conditions. With the exception of the "neutral state", no affective state occurred significantly more in one condition over the other.

When applied to educational software such as intelligent tutoring systems, agents frequently track student cognition, behavior, or affect in order to provide students with specific support based on individual differences along these dimensions. As such, agent behavior and responses can be considered a type of formative feedback to students, and agents often implement a variety of formative feedback strategies. Some of the behaviors which agents manifest in response to student individual differences include the use of emotional expressions, non-verbal gestures and communication, pedagogical messages, requests to stop undesired behavior, offering alternate learning experiences, and attributional, meta-cognitive, or motivational messages. Interactive software agents have been shown in several studies to positively influence student learning, attitudes, and engagement.

The main contribution of this paper [3] is to examine the state of students while using an interactive intelligent tutoring system and also to determine the attitude, behaviour, stress level of a student pre-examination.

However, the main drawback in paper [3] is the NP Complete Problem.

Pierrick Milhorat, Stephan Schogl and Gerald [4] highlighted some of the challenges in building personalized speech-operated assistive technology and proposed a number of research and development directions undertaken in order to solve them. The focus was on natural language understanding and dialog management aspects as these parts of the technology pipeline require the biggest amount of augmentation.

Continuous progress happened from a technological perspective as well as with respect to supported application domains. While the first systems that used natural language as an interaction.

Modality were predominantly focusing on the travel domain, possible application scenarios have progressively been extended and now include areas such as weather forecast, navigation, translation infotainment, tutoring and even healthcare.

Despite the overall advancements the use of natural language driven assistive technologies is, however, still cautious. One reason for resistance may be found in the fact that Siri & Co., for all their efforts, are not really personal. More focus on personal adaptation is necessary so as to better integrate systems into users' daily routines. While the technology is at a point where it may be called robust, the integration of context and personalized behavior is still at its starting point. Significant improvements are needed in order to move from pure digital assistants to truly personal ones.

The main contribution of this paper [4] is to make a constrained human-machine dialogue more flexible and adaptable to the user's requirements, bypassing the limitations of the current technological capabilities.

The main drawback [4] is challenge of meeting real world dialogue requirements.

Michiel Hildebrand,AntoEli¨ens, Zhisheng Huang, and Cees Visser [5] describes the implementation of interactive agents capable of gathering and extending their knowledge. Interactive agents are designed to perform tasks requested by a user in natural language.

Using simple sentences, the agent can answer questions and in case a task cannot be fulfilled the agent must communicate with the user. In particular, an interactive agent can tell when necessary information for a task is missing, giving the user a chance to supply this information, which may result in teaching the agent.

The interactive agent platform is implemented in DLP, a tool for the implementation of 3D web agents. In this paper we discuss the motivation for interactive agents, the learning mechanisms and its realization in the DLP platform.

The main drawback [5] is punctuation marks are compulsory to indicate the type of statement.

Mukesh Kumar, Prof A.J.Singh, Wehenkel and Dr. Disha Handa [6] presents a case study on predicting performance of students at the end of a university degree at an early stage of the degree program, in order to help universities not only to focus more on bright students but also to initially identify students with low academic achievement and find ways to support them.

Predicting students' performance using data mining methods has been performed at various levels: at a tutoring system level to predict whether some specific knowledge or skills are mastered, at a course level or degree level to predict whether a student will pass a course or a degree, or to predict her/his mark. At a tutoring system level predicts whether a student is likely to get the next training exercise right, and if yes, the tutoring system should skip it. For the course level, perceived ease of use of e-learning tools, perceived usefulness of e-learning tools and the ability to work independently were statistically significant contributors to the final course grade.

To predict students' performance at an early stage of the degree program helps universities not only to focus more on bright students but also to initially identify students with low academic achievement and find ways to support them.

The main drawback [6] is performance of student based on few attributes cannot always be the most optimal way.

Aniruddha Nanda and Manisha P. Pai [7] proposed a general solution for the School timetabling problem. This solution, works from the teachers' point of view i.e. teacher availability for a given time slot. While all the hard constraints (e.g. the availability of teachers, etc.) are resolved rigorously, the scheduling solution presented in this paper is an adaptive one, with a primary aim to solve the issue of clashes of lectures and subjects, pertaining to teachers.

While setting a timetable, importance is given to effective utilization of resources such as the classroom, the teacher, etc. This becomes a very tedious task which needs to be addressed at least once a year by every academic institute. Most institutes deal with this problem manually, i.e. a trial and error method are used to set a timetable.

Timetabling is known to be a non-polynomial complete problem i.e., there is no known efficient way

to locate a solution. Also, the most striking characteristic of NP-complete problems is that, no best solution to them is known. Hence, in order to find a solution to a timetabling problem, a heuristic approach is chosen. This heuristic approach, therein, leads to a set of good solutions.

The main drawback [7] is that it is an NP complete problem, hence there is no such "efficient" algorithm.

Anna Sun and Xiufang Chen [8] provide practical suggestions for those who are planning to develop online courses so that they can make informed decisions in the implementation process. Based on the findings, the authors argued that effective online instruction is dependent upon:

1)well-designed course content, motivated interaction between the instructor and learners, well-prepared and fully-supported instructors.

2)creation of a sense of online learning community.

3)rapid advancement of technology

The fast development of the Internet and the World Wide Web (WWW) has produced numerous benefits to education. Online education provides potential opportunities to open up new markets for higher education institutions. Many adult learners may enjoy the flexibility when they have to balance work, study, and family responsibilities. The wide range of various technology advancement used by universities' online programs may enhance the interaction between students and instructors, and among students at large. In addition, the nature of the anonymity in the online environment may allow more students, who otherwise do not want to attend face-to-face classes because of their shy personality, to participate in online education where they do not physically see each other. Finally, the upgraded technology and software may allow instructors, students, and university administrators to collect data, feedback, and evaluation regarding their online experiences.

The main drawback [8] is developing a sense of community in the online environment.

Salman Khan, Riaz Ali and Waheed Ahmad [9] developed an android application for android operating system (OS) platform that automatically sends the current address location of the user to the server database and can also be sent periodically through SMS (short message services) to store mobile numbers by the user.

Location of mobile device is in the form of latitude and longitude which is converted into full address by this application that includes country/state, city, and street number. In case of emergency the user can simply press the emergency button and the application will automatically send SMS alert including location address to the store mobile numbers that might be a police station or close relative.

Another way to trace the user is the web server database which keeps updating the location address as long as the application is connected or last location address. The design shows how to implement and develop this app and has been tested on few mobile devices it well be tested on huge number of mobile devices later.

The main drawback [9] is compatibility with Java and C# applications.

Pararth Shah, Abhinav Rastogi and Dilek H [10] proposed Machines Talking To Machines(M2M), a framework combining automation and crowdsourcing to rapidly bootstrap end-to-end dialogue agents for goal-oriented dialogues in arbitrary domains.

M2M scales to new tasks with just a task schema and an API client from the dialogue system developer, but it is also customizable to cater to task-specific interactions. M2M achieves greater diversity and coverage of salient dialogue flows while maintaining the naturalness of individual utterances.

In the first phase, a simulated user bot and a domain-agnostic system bot converse to exhaustively generate dialogue "outlines", i.e. sequences of template utterances and their semantic parses. In the second phase, crowd workers provide contextual rewrites of the dialogues to make the utterances more natural while preserving their meaning. The entire process can finish within a few hours.

The main drawback [10] is that it might contain dialogues unfit for use as training data.

George Gartner and Huang [11] introduced the key research areas within the scientific field of Location Based Services (LBS), which consist of positioning, modelling, communication, applications, evaluation, analysis of LBS data, and privacy and ethical issues.

Location-based services (LBS) are computer applications (specifically, mobile computing applications) that provide information depending on the location of the device and the user, mostly through mobile portable devices (e.g., smartphones) and mobile networks. Recent years witnessed rapid advances in LBS with the continuous evolution of mobile devices and telecommunication technologies. LBS became more and more popular not only in citywide outdoor environments, but also in shopping malls, museums, airports, big transport hubs, and many other indoor

environments. They were applied in emergency services, tourism services, navigation guidance, intelligent transport services, entertainment (gaming), assistive services, healthcare/fitness, social networking, etc.

The main drawback [11] is connection to the internet is mandatory.

Niraj Sunil Bharambe and Sanjana Ramesh Bhangale [12] proposed an online examination portal to efficiently evaluate the candidate thoroughly through a fully automated system that not only saves lot of time but also gives fast results. For students they give papers according to their convenience and time and there is no need of using extra thing like paper, pen etc.

This can be used in educational institutions as well as in corporate world. It can be used anywhere any time as it is a web-based application (user location doesn't matter). No restriction that examiner has to be present when the candidate takes the test.

This Web Application provides facility to conduct online examination worldwide. It saves time as it allows number of students to give the exam at a time and displays the results as the test gets over, so no need to wait for the result. It is automatically generated by the server. Administrator has a privilege to create, modify and delete the test.

The main drawback [12] is impersonation and cheating.

Shweta Gajbhiye, Diksha Gondane and Nisha S [13] used the Graph colouring technology to help resolve the problem of time table generation and introduced a practical timetabling algorithm capable of taking care of both hard and soft constraints effectively, used in an automated timetabling system for educational institutions.

To resolve the complexity and to reduce the efforts of generating timetable manually, there are some other technologies like backtracking algorithm, Ant Colony Optimization, Bee Colony Optimization; Genetic Algorithm etc. are also available. Though these technologies provide the solution for timetable generation, these are slower and sometimes to provide the optimal solution there is a risk of losing the data when applied on large spaces. Graph coloring provides the exact solution for generating a conflicts-free timetable that too in optimal time.

The main drawback [13] is the cost of multiple function calls in program implementation.

Mohamed-El Mohadab [14] described one of the automatic classification methods applied to scientific research as a supervised learning task. Throughout the process, the main features that are used as keys to play a significant role in terms of predicting the new rank under the supervised learning setup were identified.

First, an overview of the work that has been realized in ranking scientific research papers was proposed. Second, evaluation and comparison was done for some of state-of-the-art for the classification by supervised learning, semi-supervised learning and non-supervised learning. During the preliminary tests, good results were obtained for performance on realistic corpus then we have compared performance metrics, such as NDCG, MAP, GMAP, F-Measure, Precision and Recall in order to define the influential features in our work.

The main drawback [14] is that vector space model used has poor similarity values for large data sets.

Chinnapa Reddy and Sabitha R. [15] implemented an android based agent to assist with Organization basic processes, using google tools such as Dialogflow that uses Natural language processing NLP, Actions on Google and Google Cloud Platform that expose artificial intelligence and Machine Learning methods such as natural language understanding.

Allowing users to interact with the google assistant using natural language as input and to train the agent i.e. google assistant using Dialogflow Machine learning tool and some appropriate methods so it will be able to generate a dynamic response. The agent will allow users to view all their personal academic information, schedule meetings with higher officials, automating the organization process and organization resources information all from within the agent i.e. Google Assistant. This project uses the OAuth authentication for security purpose. The Dialogflow helps to understand the users query by using machine learning algorithms.

The main drawback [15] is language compatibility and also it works only when device is connected to the internet. Whenever a user does not have an active internet connection, the user will not be able to interact with the chatbot as this chatbot uses Google assistant in order to converse with the user.

## 3. System Architecture

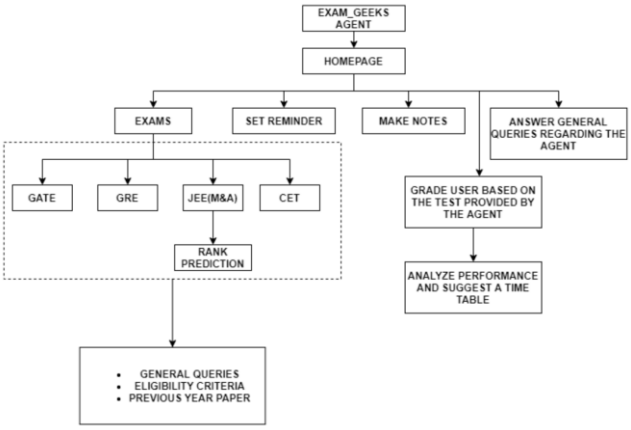


Figure 1 System Architecture

The figure 1 depicts the system architecture. The flow of working is as user can query either on the general question which can be answered by the agent or can select the examination. It can currently provide information for examination such as JEE, GATE, GRE and KCET.

In this section, users can ask many questions related to their selected examination and can also set reminder for their examination as well as get previous year question. Also based on examination, selected users can give test whose pattern will be similar to actual examination and based on the score generated a time table will be generated and different courses will be suggested using the same score.

## 4. METHODOLOGY

This proposed system is used to create a google assistant to simulate a human conversation to assist users with not only educational needs it can be applied to any organization, and to provide a more personal experience. In today's world there are so many advancements in artificial Intelligence, machine learning techniques, improved aptitude for decision making, larger availability of domains and corpus, have increased the practicality of integrating an agent into applications we can integrate the agent. Users will be able to ask any exam related queries in natural language that they are comfortable, using the assistant. The agent will identify and understand what the user is asking and generate an appropriate response based on the conversational context. Immediate responses will be provided by the agent to redeem the need for the user.

This system also uses the advanced technologies like Google Cloud Platform, Dialog flow and Actions on Google. The system is linked with Google Assistant to provide wonderful experience to user, this project is available to every user where ever the google is there. The users of this project are no need to install app in their device. Only users need to call the project by using the invocations like "Talk to Exam Geeks Interactive Agent"

## 5. RESULTS AND DISCUSSION

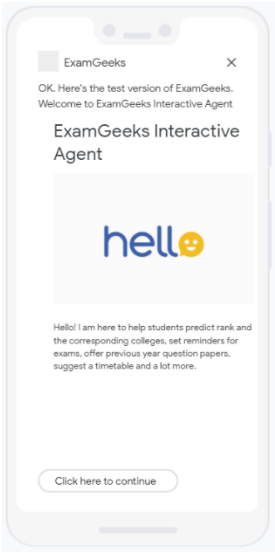


Figure 2 Welcome Message

The user can start the conversation with our agent, through Google Assistant by mentioning "Talk to Exam Geeks Interactive Agent". The opening page itself gives the user a brief overview of all the functionalities of the system which is shown above. On continuing the conversation, the user is landed to the homepage.

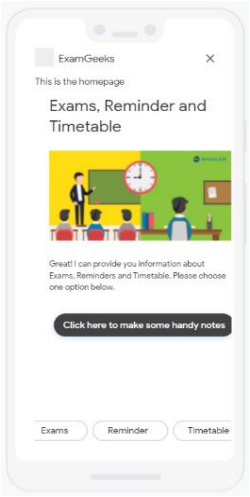


Figure 3 Homepage

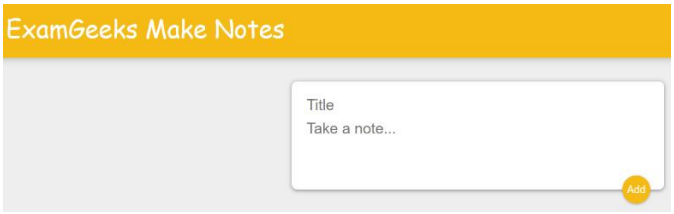


Figure 4 Make Notes

The homepage is divided in order to make the user land to three different functionalities as shown in the previous page in Figure 3. Along with this, the user can also type in some easy handy notes for their reference by clicking on the above shown button.

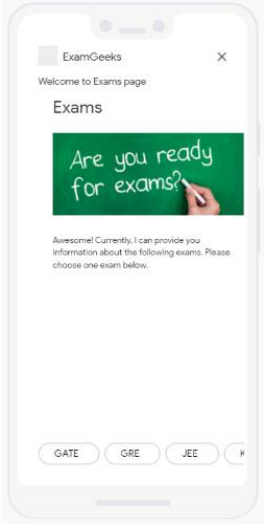


Figure 5 Exams

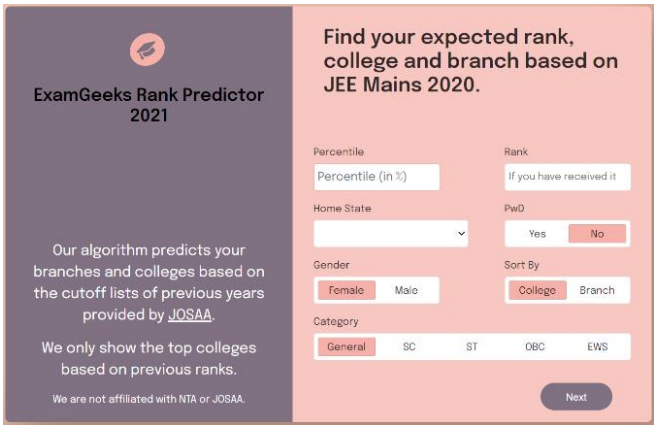


Figure 6 Rank Predictor

When the user selects the exam option in the homepage, they will land to the above shown page in Figure 5, which contains different exam options for the user to choose from. If the user has registered to a particular exam, then they can select that option in the Exams page, in order to make use of the functionalities provided by the agent for that exam. If the user selects JEE Mains as the exam, then along with all the other functionalities provided for the other exams, there is an additional functionality to predict the rank and suggest the corresponding colleges for the user, as we can see in Figure 6.

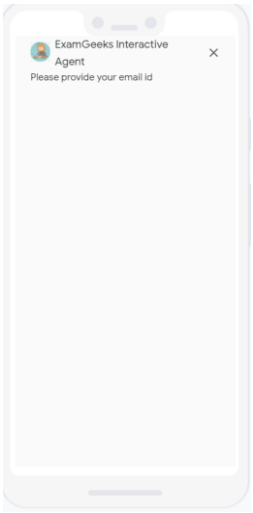


Figure 7 Reminder EmailID

When the user selects the reminder option in the homepage, they will land to the above shown page, wherein they'll be asked to provide their email id, followed by the exam name for which they want the reminder and the number of days prior to which they wish to receive the reminder.


Figure 8 Test Page

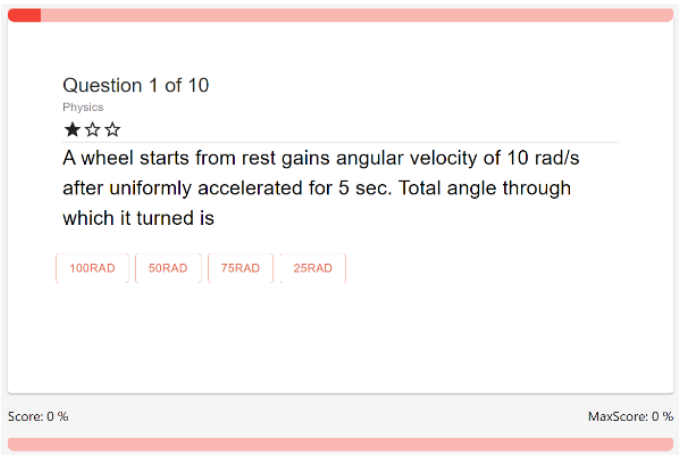


Figure 9 Test interface

When the user selects the timetable option in the homepage, they will land to the above shown page in Figure 8, wherein the user has to take up tests provided by the agent in either easy or hard level. Once the user gets the score based on their performance, a particular timetable would be created.

TYPE- M&C(Maths- 4hrs/day, Physics – 2.5hrs/day, Chemistry-4hrs/day)

| DAY | SUBJECT-Math | SUBJECT-Physics | SUBJECT-Chemistry |
|---|---|---|---|
| DAY-1 | M1 or M4 or M2 | P1 or P4 or P5 | C1 or C2 or C6 or C3 |
| DAY-2 | M1 or M4 or M2 | P1 or P4 or P5 | C1 or C2 or C6 or C3 |
| DAY-3 | M1 or M4 or M2 | P1 or P4 or P5 | C1 or C2 or C6 or C3 |
| DAY-4 | M1 or M4 or M2 | P1 or P4 or P5 | C1 or C2 or C6 or C3 |
| DAY-5 | M1 or M4 | P1 or P4 or P5 | C1 or C2 or C6 or C3 |
| DAY-6 | M3 | P1 or P4 or P5 | C1 or C2 or C6 or C3 |
| DAY-7 | M3 | P3 or P2 | C4 or C5 or C7 or C8 |
| DAY-8 | M3 | P3 or P2 | C4 or C5 or C7 or C8 |
| DAY-9 | M1 or M3 | P3 or P2 | C5 or C4 or C7 or C8 |
| DAY-10 | M1 or M3 | P3 or P2 | C5 or C4 or C7 or C8 |

Table 2 Timetable

As mentioned above based on the user's score, the agent provides a timetable specific to their performances in each subject while considering the time gap between two tests taken. The P, C, M series mentioned above indicates units with their matching difficulty levels in order for the user to complete within a specific number of days.

As shown in Figure 10, our agent can respond to user's queries which are general to the agent or specific to a particular exam to provide extended functionalities and to make the agent provide "Under one-roof" platform.

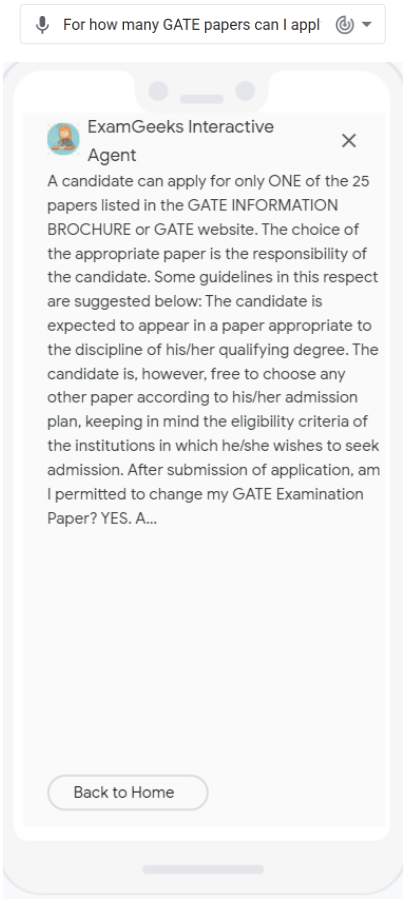


Figure 10 General queries

## ACTIONS ON GOOGLE

Actions on Google could be a development platform for the Google Assistant. It permits the third-party development of "actions"—applets for the Google Assistant, that give extended functionality. The actions platform supports "direct" actions, still as "conversational" actions for a lot of advanced applications. We can build the extradentary applications using the actions on google console. The Actions on Google enables us to seamlessly integrate our services with Google Assistant and we can reach users across 500M+ devices, including smart speakers like Google Home, phones, cars, TVs, headphones and more.

## 6. APPLICATION

This agent is used for a student to utilize the "under the one roof" strategy in order to perform various actions over one platform, such as to download previous year papers, check eligibility criteria, and get answers to the queries regarding various exams and a

one-on-one conversation with the application to resolve the queries.

## 7. FUTURE SCOPE

The proposed system has very a vast scope in future. This project has been designed with the combination of both technical requirements and user requirements which is needed in future. We can integrate Google maps with the existing system to know the location of the nearest exam. Also, in order to decrease the chances of copying while taking up assessments we can employ advanced AI algorithms to detect malpractices.

## 8. CONCLUSION

Therefore, in this way we can create an Artificial Intelligence & Machine Learning based google assistant for any organization. This process is easier when compared to other procedures that can automate the basic and complex tasks and reduces the employee intervention of organization to solve the user queries. The proposed system is mostly used for the beneficiary of the educational aspects for the society. The agent aids to serve the economically backward aspirants by providing free access to the resources.

## ACKNOWLEDGEMENT

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