

# Leveraging Generative AI in College Application Essay Preparation

Angel Nicole V. Iniego

Under the direction of

David Young-Jae Kim  
Research Staff  
Massachusetts Institute of Technology

Research Science Institute  
August 1, 2023

## **Abstract**

The rapid advancements and increased accessibility of artificial intelligence (AI) present promising opportunities to support college applicants. Generative AI models, such as Open AI's ChatGPT, possess the remarkable ability to generate human-like text in response to specific prompts. These models have demonstrated their effectiveness in various applications, such as drafting emails and creative writing, sparking interest in their potential for aiding students with college application essays. To assess the usefulness of ChatGPT, we introduce AltruBot, an innovative application that uses the power of ChatGPT to assist students in creating outlines for their college essays. AltruBot was developed using the MIT App Inventor, a user-friendly block-based application programming software, making it accessible and easy to use for a wide range of students. The application utilizes ChatGPT's language generation capabilities to deliver personalized and contextually relevant essay outlines based on user input, prompts, and preferred areas of focus. By analyzing the user's academic achievements, extracurricular activities, and personal experiences, AltruBot customizes the essay outline to emphasize the applicant's unique strengths and attributes.

## **Summary**

AI's rapid progress opens exciting opportunities for college applicants. ChatGPT, a generative AI model from OpenAI, produces human-like text and can be valuable in various tasks, including creative writing and drafting emails. Now, it's drawing attention for its potential in supporting students' college essays. AltruBot, an innovative application utilizing ChatGPT's language generation capabilities was developed using the user-friendly MIT App Inventor. AltruBot is accessible to a wide range of students. By inputting their academic achievements, extracurricular activities, and personal experiences, students receive personalized essay outlines. In summary, AI like ChatGPT can transform college applications, and AltruBot exemplifies this by offering tailored essay support, empowering students to impress colleges confidently. However, ethical considerations must accompany the use of AI language models like ChatGPT. Prioritizing transparency, fairness, and privacy protection in AltruBot's development and implementation is imperative. Embracing these principles ensures that the potential of AI in revolutionizing college applications is done responsibly.

# 1 Introduction

The transition from high school to college is a pivotal period in a student’s academic journey [1]. One of the most critical, yet challenging, aspects of this transition is the college application process [2]. Particularly, crafting the college application essay, a key component of most college admissions processes, poses a significant hurdle for many students [3]. For example, students may encounter difficulty in interpreting the questions, especially students that don’t have English as their native language [4]. These essays require students to introspectively reflect on their experiences, demonstrate critical thinking, exhibit creativity, and present effective written communication skills – a multifaceted challenge even for the most diligent students.

With the rapid advancements and increased accessibility in artificial intelligence (AI), there is a growing potential to utilize these technologies to aid students during the college application process. Notably, generative AI models, such as OpenAI’s ChatGPT [5], can generate human-like text based on the prompts given to them. These models have been used in a variety of contexts, from drafting emails to generating creative writing, raising the question of their utility in the realm of college application essay preparation.

In this research study, we explored the potential of OpenAI’s ChatGPT in the context of college applications. With the increasingly competitive nature of college admissions, high school students often grapple with creating compelling application essays that effectively encapsulate their experiences, achievements, and aspirations. Given the remarkable capability of ChatGPT to generate human-like text, we believe it can be utilized to aid students in formulating their college essays.

To facilitate the interaction between students and ChatGPT, we developed a mobile application using the MIT App Inventor platform [6]. This platform offers a user-friendly, block-based programming environment, enabling us to rapidly design, test, and iterate our

application. The application served as an interface for students to provide input about themselves, their experiences, their interests, and their goals for higher education.

Once the students input their information, the application leverages ChatGPT to generate an outline for a college application essay. The AI model will take the user's input and, based on its training on a diverse range of texts, provide a structured, creative, and compelling essay outline. This outline was used by the students as a starting point for their essays, providing a roadmap to articulate their unique stories effectively.

By bridging the capabilities of ChatGPT with the accessibility of a mobile application, we created a practical tool that has the potential to ease the college application process for students. Through this study, we hope not only to examine the effectiveness of ChatGPT as a tool for college application preparation but also to explore how cutting-edge AI technologies can be made accessible and beneficial to a wider audience through user-friendly interfaces.

Through this research, we aimed to expose the potential benefits and limitations of using AI tools like ChatGPT in the college application process, providing valuable insights for educators, students, and developers of educational technology. As the landscape of education continues to evolve, understanding the role of AI in this context is not only beneficial but crucial for shaping a supportive and efficient learning environment for future generations.

## **2 Background**

### **2.1 Generative AI Overview**

Generative AI refers to a type of artificial intelligence that is designed to create new content. This can range from text, images [7], and music [8], to more complex outputs like speech and video. The goal of these models is not simply to analyze and understand data, but to learn from this data and generate new, original content that is similar but not identical to the input data. There are various types of generative AI models, each using

different techniques and suited to different tasks or expected outputs.

In the realm of text generation, transformer-based Large Language Models (LLMs) like GPT-4 from OpenAI have made significant strides. These models are trained on large amounts of text data and can generate remarkably coherent and contextually relevant sentences. A simplistic view is that they work by predicting the next word in a sentence given all the previous words, allowing them to generate entirely new sentences.

Despite the significant progress in generative AI, there are still challenges to overcome. These include issues related to control over the generated content, ensuring the content is appropriate and unbiased [9], and handling the significant computational resources these models often require. As research continues, the capabilities of generative AI are expected to continue to improve, opening up new possibilities for AI-generated content.

## 2.2 App Inventor

App Inventor is a web-based, open-source platform that allows beginners to create software applications for Android [10]. Developed by Google and maintained by the Massachusetts Institute of Technology (MIT), it provides a highly intuitive, visual programming environment that empowers users to build fully functional apps for smartphones and tablets.

With its intuitive interface, MIT App Inventor has been used in classrooms worldwide to introduce students to programming concepts and to foster creativity and innovation [11]. It has been used by hobbyists and entrepreneurs to build prototypes or even fully functional apps, proving its versatility and effectiveness as a tool for mobile app development.

Recently, the MIT App Inventor acquired an innovative addition to its platform - a chatbot component. This new feature abstracted the integration of advanced text-based generative AI models, like OpenAI's ChatGPT, into mobile applications built with App Inventor. With just a few programming blocks, developers can now tap into the power of these AI models, opening up a wide range of possibilities for app functionality.

The addition of the chatbot component represents a substantial step forward in making AI technology more accessible to citizen developers and grade-school programmers. By reducing the complexity of integrating generative AI models into mobile apps, the MIT App Inventor is democratizing access to these advanced technologies. Users can now leverage the capabilities of models like ChatGPT in their applications, enabling a myriad of uses, from AI-powered personal assistants to tools for generating creative content [12].

The simplicity of integrating ChatGPT, coupled with the intuitive, block-based programming of App Inventor, enables us to focus on optimizing the user experience and evaluating the effectiveness of ChatGPT in aiding students with their college applications. In turn, this represents a significant opportunity to explore how generative AI can be leveraged to support students during a pivotal moment in their academic journey.

### **3 Methods**

Our research commenced with the creation of a mobile application using the MIT App Inventor platform. Following the successful development and refinement of our application, we initiated the participant recruitment process. Our target demographic included high school students in the throes of the college application process, as well as college students who had already navigated this journey. These participants were asked to engage with the application over a designated period, thereby enabling us to observe and assess their interactions with the AI tool.

The user testing phase was instrumental in providing insights into how students utilized the AI and how the application performed in a real-world context of college essay preparation. The qualitative and quantitative data collected during this phase formed the foundation for our subsequent analysis.

Once we completed the user testing phase, we embarked on a thorough evaluation of

the application’s performance. This evaluation was multifaceted, drawing on user feedback, the quality of the AI-generated essay outlines, and metrics of user engagement within the application. Our aim was to gauge not only the operational performance of the application but also the efficacy of ChatGPT as a supportive tool for students embarking on the college application process. The results of this comprehensive analysis offered robust insights into the opportunities and challenges associated with incorporating generative AI into the college application journey.

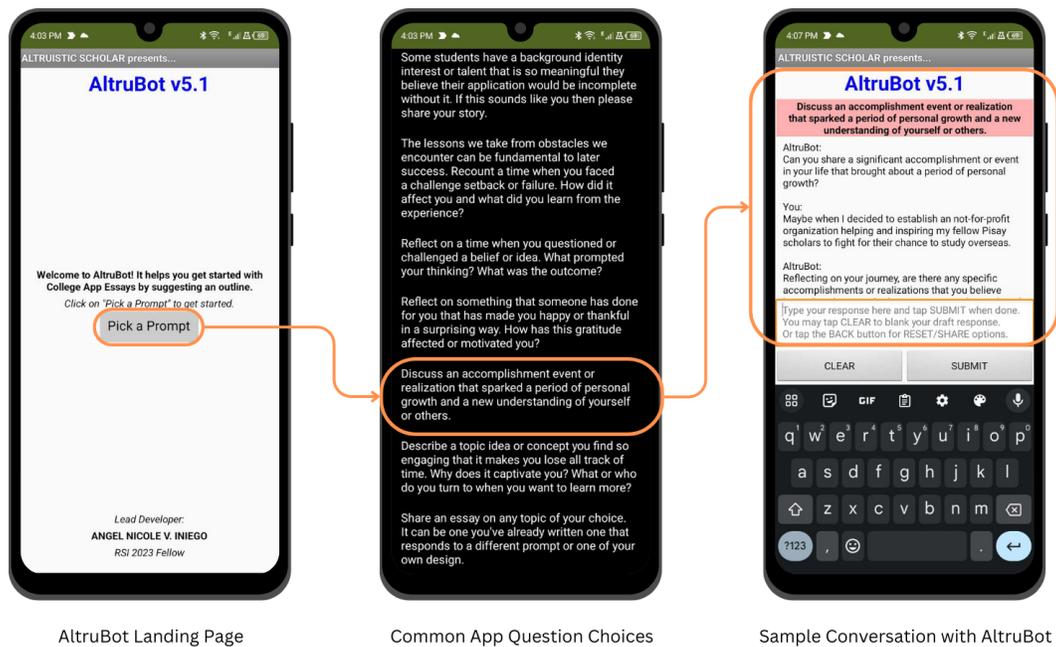


Figure 1: App User Interface in the Android Platform

### 3.1 AltruBot

In this section, we present the user interface of AltruBot, our AI-assisted tool for college essay preparation. AltruBot operates through a simple and intuitive interface. Upon launching the application, users are prompted to answer a series of questions about themselves, their experiences, and their academic goals. Based on these responses, AltruBot, powered by ChatGPT, generates an outline for a college application essay. Users can then use this

AI-generated outline as a foundation upon which to craft their unique and personalized college essays. For reference, the screenshots (Figure 1) of the AltruBot app as shown as used in the Android platform. The screenshots for iOS is attached in the Appendix Section A AltruBot's Interface in iOS.

The user is led to the landing page which features a brief introduction from AltruBot and a button labeled Pick a Prompt. When clicked, a list picker pops up and enumerates all the seven Common App questions [13]. Once the user has chosen a prompt, AltruBot asks the user a follow-up question related to the prompt picked. The user responds by typing in their answer in the `Text Box` and then clicking on the `Submit Button` beside it. Then, AltruBot asks three follow-up question. Finally, AltruBot generates the outline of the college essays based on the whole conversation with the students. To store the conversation, users are given the option to share their responses (e.g., via email, Notes, etc.)

The entire Preliminaries and Operations of the AltruBot are attached in the Appendix Section of this paper.

### **3.2 Testing and Data Gathering**

Upon finalizing the application, we proceeded to the testing phase of our research. An initial sample group was recruited and provided with AltruBot, along with comprehensive instructions for testing. The participants were asked to interact with AltruBot, providing responses to various prompts, with the ultimate goal of AltruBot generating an essay outline based on the user's inputs.

Each participant was required to produce three essays: their essay with no AI intervention (which will further refer as Human Only), an essay generated solely by ChatGPT (AI Only), and an essay crafted based on the outline provided by ChatGPT (Human+AI). To gain insights into the participants' experiences and perceptions, we designed pre- and post-surveys. The pre-survey collected information about the participants' familiarity and

previous experience with both ChatGPT and the Common Application, as well as any difficulties they had encountered in essay writing. The post-survey focused on gathering the readability scores of the essay samples.

In order to streamline the process of response retrieval and respect the privacy of the participants, we developed a Python script. The participants used this script to input their essays, which then automatically generated readability scores. These scores were subsequently entered into a Google Form by the participants. This methodology ensured that the participants' essays remained confidential, as there was no requirement for us to directly access or read them.

### 3.2.1 Readability Tests

The Python code used the `textstat` library to calculate the statistics from the essays. The specific functions used are Word Count, Difficult Words, Dale-Chall Readability Score, and SMOG Index.

The word count intuitively counts the number of words in the essay and Difficult Word is measured by counting the syllables per word and if it goes over 3, the formula counts it as a difficult word.

Dale-Chall's Readability formula measures the difficulty of comprehension that readers experience while reading a text. It utilizes a list of 3000 words known to be understandable by fourth-grade American students [14]. Any word not on this list is considered difficult for readers. The raw score is calculated using the formula below:

$$\text{Dale-Chall's Readability} = 0.1579 \left( \frac{\text{difficult words}}{\text{words}} \times 100 \right) + 0.0496 \left( \frac{\text{words}}{\text{sentences}} \right) \quad (1)$$

Finally, the SMOG Index is a readability metric used to estimate the educational level

required for understanding a given text [15]. SMOG stands for “Simple Measure of Gobbledygook”. The SMOG grade provides insight into the level of comprehension needed to grasp the content of the writing. To determine the SMOG Index, extract three sets of ten sentences each from the text under consideration. Then, count the number of polysyllabic words (words with three or more syllables) within these sentences. Then, the grade can be calculated using the formula:

$$\text{SMOG index} = 1.0430\sqrt{\text{number of polysyllables} \times \frac{30}{\text{number of sentences}}} + 30 \quad (2)$$

## 4 Results

The ensuing results were obtained from a cohort of users during the designated period of the Research Science Institute (RSI). It’s important to note that due to time constraints, the number of end-user respondents we could engage was limited. As a consequence, our data set does not meet the size typically required for robust statistical analysis. Therefore, while we can present and discuss the trends observed in our data, we must exercise caution and acknowledge that these findings may not allow for comprehensive interpretations or conclusions. In the following sections, we will present both qualitative and quantitative results derived from our study. This mixed-methods approach enables us to explore not only numerical trends and patterns in the data, but also the participants’ subjective experiences and perceptions in using the AI tool for college essay preparation.

### 4.1 Quantitative Results

Among the three graphs, the AI-only essays exhibit the highest average word count, indicating that they generally contain more words compared to other essays. Additionally, the AI-generated essays show the lowest standard error, indicating a consistent word generation

pattern by ChatGPT.

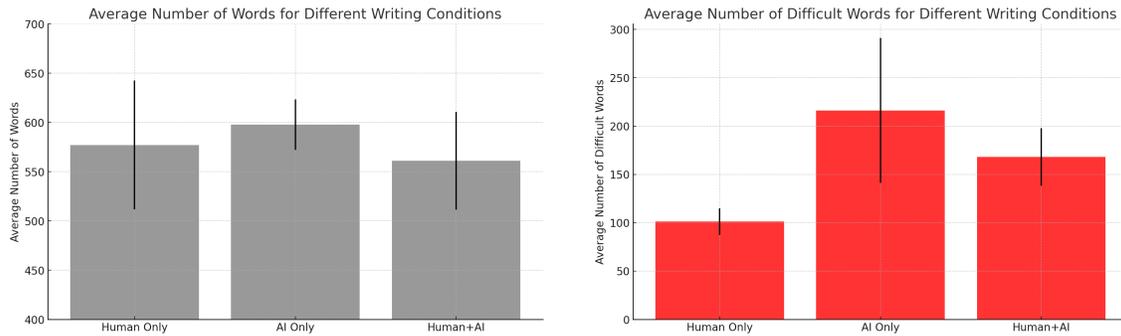


Figure 2: Average Number of Words and Average Number of Difficult Words Bar Graphs

For the number of difficult words, AI-only essays produced the largest mean of Difficult Words. On the other hand, the human-only essays produced the lowest mean for difficult words. Nonetheless, the Hybrid essays got a mean that is in between the extremes.

The average Dale-Chall Readability Score was highest for the "Human+AI" condition, followed by "AI Only" and then "Human Only". The Dale-Chall Readability Score provides a measure of the complexity of a text, with higher scores indicating more difficult texts. This suggests that essays written with AI, either solely or in collaboration with humans, tend to be more difficult to read.

The average SMOG Index was highest for the "Human+AI" condition, followed by "AI Only" and then "Human Only". This suggests that both AI-generated and AI-assisted essays tend to have more complex sentences, as the SMOG Index estimates the years of education a person needs to understand a piece of writing.

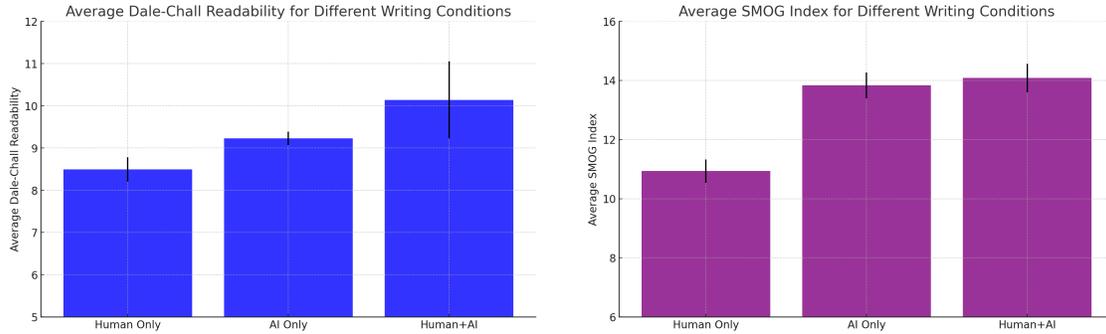


Figure 3: Dale-Chall Readability and SMOG Index Bar Graphs

At large, the Essays made with AltruBot’s Outline yielded results that are somehow intermediate between the Human-only essay and the ChatGPT-only essay.

These findings suggest that when humans collaborate with AI, the complexity and difficulty of the text increase, but the length decreases slightly compared to human-only essays.

However, it’s important to note that these are average trends and individual cases may vary. It’s also worth noting that complexity and use of difficult words do not necessarily equate to better quality or more effective communication. Depending on the audience and purpose of the writing, simpler language can sometimes be more appropriate and effective.

## 4.2 Qualitative Results

The user feedback from two of the respondents highlighted the AI tool’s commendable ease of use and its effectiveness in stimulating brainstorming. They found it valuable in prompting reflections on personal experiences and providing a solid starting point for their essays. Additionally, the tool’s ability to save time and offer guidance in structuring their narratives was well-received.

However, one respondent expressed a preference for independent writing, considering it a more “rewarding process.” This observation underscores the significance of individuality and personal touch in college application essays, aspects some participants believed were better

achieved through independent writing. The essays produced, while technically sound, were often perceived as lacking originality and were characterized by common tropes, thus failing to exhibit the unique character or charm that college admissions officers typically seek. Some users noted that the AI-generated essays did not accurately reflect their personal feelings or experiences. For example, another respondent mentioned that the AI inquired about their homeland despite the user indicating that they hadn't traveled there.

These insights signify areas where improvements are needed in ChatGPT's understanding of user inputs and its ability to generate content that is both original and reflective of users' personal experiences. Addressing these issues will be crucial for enhancing the overall utility and effectiveness of the AI tool.

#### **4.2.1 Feedback on User Interface and User Experience**

One of the predominant themes in the user feedback was the need for an improved viewing experience. Users reported that the content was concentrated in the top half of the screen, particularly on iPhone devices, which made it difficult to read and necessitated excessive scrolling. In addition, the viewing window for the text was reported to be insufficiently large to comfortably view large portions of text. These issues could be addressed by optimizing the layout to make better use of the screen real estate, and by making the text viewing window adjustable or more expansive.

Another area identified for improvement was the handling of images. Users noted that some images were distorted to fit the available space, impairing the clarity of the information presented. To resolve this, the application could implement a more responsive image handling system that maintains the aspect ratio of images regardless of the screen size or resolution.

Feedback also highlighted the desire for more interactivity and customization in the AI's output. Users expressed a desire to see their responses more directly incorporated into the AI-generated outline, and to have the ability to modify the initial outline provided by the

AI. This suggests a need for a more flexible and interactive AI feedback system that can better adapt to user inputs.

Users also suggested the inclusion of an explanatory video on how to use the app. Such a resource could provide a valuable orientation for new users, helping them understand the app's features and capabilities and how best to utilize them.

Overall, the feedback underscores the importance of a user-friendly, intuitive, and interactive UI in maximizing the effectiveness and user satisfaction of the application. By addressing these areas of improvement, the application could offer a more engaging and satisfying user experience, thereby enhancing its utility as a tool for college essay preparation.

## **5 Discussion and Future Work**

Within the time frame of RSI, we were able to gather expert feedback on various aspects of the research such as the research scope, the AltruBot app, and data gathering and evaluation methods.

### **5.1 Post-RSI Testing**

Firstly, it is advised to conduct further tests after gathering more responses, preferably through another round of end-user evaluation following the completion of the beta version. This round of End-User Evaluation after the completion of the Beta Version testing will ensure a more comprehensive assessment of the application's capabilities.

### **5.2 Revised Data-Gathering Method**

Secondly, to enhance respondent convenience and encourage greater participation, it is recommended to revise the method of data-gathering. This can be achieved by implementing a streamlined approach, where pre-installed instances of the app are tested simultaneously

versus that of an OpenAI session on a computer. By removing the installation overhead, users will find it easier to engage with the application, leading to more reliable and meaningful data.

### **5.3 Feedback Feature**

In the future direction of the work, a crucial feature can be developed to provide feedback to students on their college application essays for improvement. This feature will leverage the power of artificial intelligence to analyze and evaluate essays, offering constructive suggestions and highlighting areas that require enhancement. By empowering students with personalized feedback, they can refine their essays and increase their chances of college acceptance. This student-centric enhancement will not only improve the application's utility but also positively impact the academic aspirations of its users.

### **5.4 Prompt Engineering**

To achieve these improvements and maximize the potential of AI tools like ChatGPT, prompt engineering emerges as a vital aspect of development. Due to the way large language models (LLMs) are trained prompt engineering is a crucial aspect of developing AI tools such as ChatGPT to maximize their potential. For instance, in the case of AltruBot, providing more detailed prompts results in better responses that accurately express the user's thoughts. From a broader perspective, if we want to promote the use of AI tools for positive purposes, it is essential to emphasize the importance of being specific with our instructions when using these generative AI tools.

## 5.5 Success Reporting Failure and Metrics

Lastly, to gain deeper insights into the application's predictive ability or success rate, an additional feature may be considered. This feature will enable users to report whether they were admitted to the colleges they sent their essays. By gathering such feedback, the research analysis can be enriched, providing valuable data to evaluate the effectiveness of the application in real-world scenarios.

## 6 Conclusion

Our initial exploration into the potential of generative AI, specifically in the context of college application essay preparation, has yielded encouraging outcomes. Given the perennial nature of the college application process and the rapid advancement of generative AI, this study indicates that the application of AI in this context can offer both benefits and challenges.

On the positive side, the use of AI can serve as a valuable starting point for students, particularly for those who are non-native English speakers. It can assist with the brainstorming process and provide a structured approach to organizing thoughts and ideas.

However, the limitations of AI must also be considered. Despite its sophisticated algorithms, AI currently lacks the ability to infuse its outputs with the depth and nuance of human experiences, and it may not match the diversity inherent in human responses. Furthermore, there's a risk of students becoming excessively reliant on AI, which could potentially impede the development of their critical thinking skills.

In light of these findings, we hope that our study will stimulate further research into the role of AI in education, especially concerning college applications. This area remains a pertinent issue for the foreseeable future, as long as the academic world continues to value and require personal essays as part of the admissions process.

## 7 Acknowledgments

I wish to extend my profound gratitude to all those who supported and guided me throughout this research, as their contributions have been invaluable to its successful completion. First and foremost, I am deeply thankful for the mentorship and expertise provided by my main mentor, David Young-Jae Kim, and the enlightening guidance offered by Professor Hal Abelson, the principal investigator of the lab. Their belief in my abilities and encouragement motivated me to push the boundaries of my research.

I would also like to express my sincere appreciation to Mr. Piotr Mitros for his valuable comments and constructive feedback. Furthermore, I am grateful to Shuvom Sadhuka for his unwavering dedication and proficient tutoring, which provided essential support in navigating the complexities of this research journey.

The Research Science Institute and the Center of Excellence in Education and to all generous sponsors, Massachusetts Institute of Technology, deserve special recognition for their generous support and provision of essential resources that facilitated the successful completion of this research project.

I owe a debt of gratitude to my esteemed teachers, my research adviser Mr. Jenschiam E. Balgua, Mr. Heherson C. Tolentino, Mrs. Aimee Marie C. Gragasin, and Mrs. Mari-cel D. Bata, whose recommendations were pivotal in my participation in the prestigious RSI Program. Their mentorship and encouragement have been integral to my growth and accomplishments.

## References

- [1] J. M. Delaney and P. J. Devereux. Choosing differently? college application behavior and the persistence of educational advantage. *IZA Institute of Labor Economics Discussion Paper Series*, 2020.
- [2] P. Oreopoulos and R. Ford. Keeping college options open: A field experiment to help all high school seniors through the college application process. *Randomized Social Experiments eJournal*, 2015.
- [3] R. Todorova. Institutional expectations and students’ responses to the college application essay. *Social Sciences*, 2018.
- [4] J. Warren. The rhetoric of college application essays: Removing obstacles for low income and minority students. *American Secondary Education*, pages 43–56, 2013.
- [5] T. B. Brown, B. Mann, N. Ryder, M. Subbiah, J. Kaplan, P. Dhariwal, A. Neelakantan, P. Shyam, G. Sastry, A. Askell, S. Agarwal, A. Herbert-Voss, G. Krueger, T. Henighan, R. Child, A. Ramesh, D. M. Ziegler, J. Wu, C. Winter, C. Hesse, M. Chen, E. Sigler, M. Litwin, S. Gray, B. Chess, J. Clark, C. Berner, S. McCandlish, A. Radford, I. Sutskever, and D. Amodei. Language models are few-shot learners, 2020.
- [6] E. W. Patton, M. Tissenbaum, and F. Harunani. Mit app inventor: Objectives, design, and development. *Computational Thinking Education*, 2019.
- [7] A. Ramesh, M. Pavlov, G. Goh, S. Gray, C. Voss, A. Radford, M. Chen, and I. Sutskever. Zero-shot text-to-image generation, 2021.
- [8] A. Agostinelli, T. I. Denk, Z. Borsos, J. Engel, M. Verzett, A. Caillon, Q. Huang, A. Jansen, A. Roberts, M. Tagliasacchi, M. Sharifi, N. Zeghidour, and C. Frank. Musiclm: Generating music from text, 2023.
- [9] I. Solaiman, Z. Talat, W. Agnew, L. Ahmad, D. Baker, S. L. Blodgett, H. Daum’e, J. Dodge, E. Evans, S. Hooker, Y. Jernite, A. S. Luccioni, A. Lusoli, M. Mitchell, J. C. Newman, M.-T. Png, A. Strait, and A. T. Vassilev. Evaluating the social impact of generative ai systems in systems and society. *ArXiv*, abs/2306.05949, 2023.
- [10] D. Wolber, H. Abelson, and M. Friedman. Democratizing computing with app inventor. *GetMobile: Mobile Comp. and Comm.*, 18(4):53–58, jan 2015.
- [11] K. Perdikuri. Students’ experiences from the use of mit app inventor in classroom. In *Proceedings of the 18th Panhellenic conference on informatics*, pages 1–6, 2014.
- [12] M. Tissenbaum, J. Sheldon, and H. Abelson. From computational thinking to computational action. *Communications of the ACM*, 62(3):34–36, 2019.

- [13] The common app: Everything you need to know. <https://www.usnews.com/education/best-colleges/articles/common-app>.
- [14] E. Dale and J. S. Chall. A formula for predicting readability: Instructions. *Educational research bulletin*, pages 37–54, 1948.
- [15] G. H. Mc Laughlin. Smog grading-a new readability formula. *Journal of reading*, 12(8):639–646, 1969.

# A AltruBot's Interface in iOS

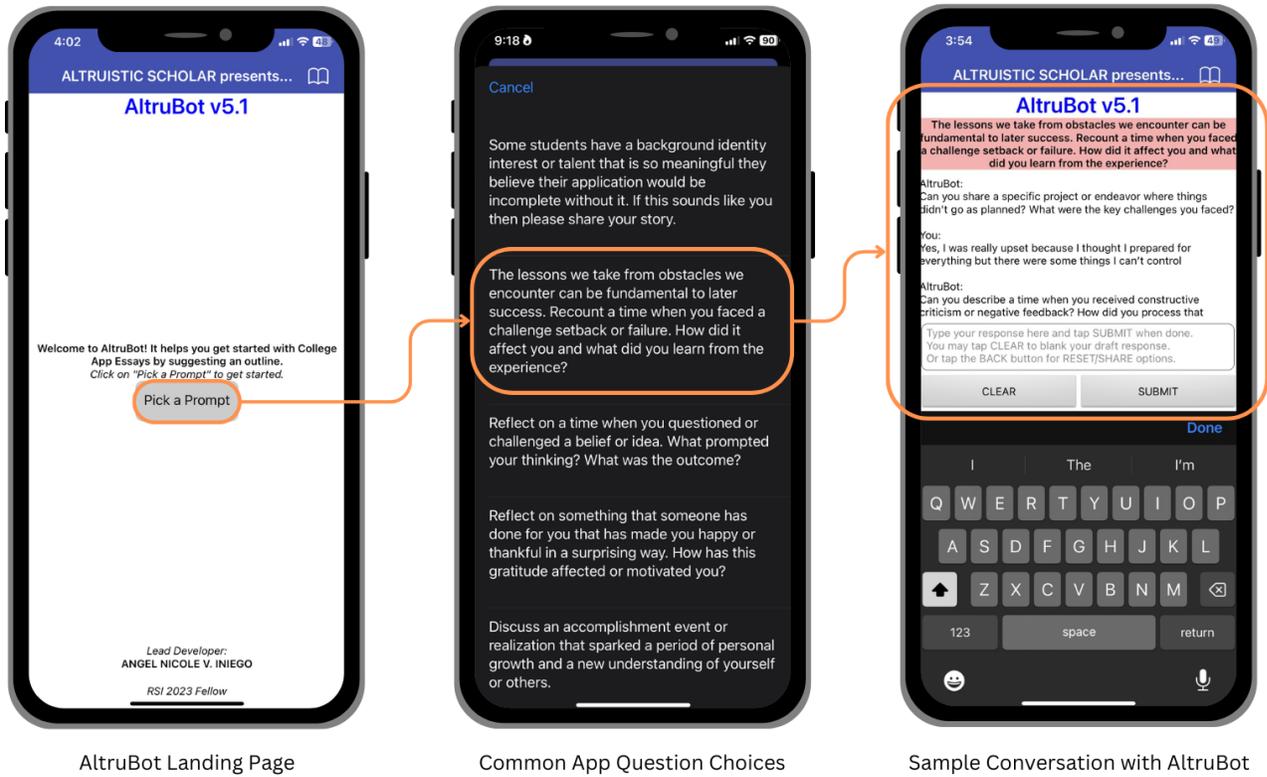


Figure 4: AltruBot's Main Screen in iOS

## B Preliminaries

To start, we declare three global variables which are the *chosenQuestion*, *iterations* to keep track of the number of exchanges with the user and the AltruBot, and *list\_of\_questions*.

When the AltruBot initializes, the ChatBot’s API key must be specified. By default, the ChatBot uses the MIT App Inventor’s API Key, which was obfuscated against hackers. However, this would pose limitations to the tokens, which are the currency for asking questions to the ChatBot. Hence, using the `ChatBot1.ApiKey` block, you can specify your own API key to bypass the token limit.

### B.1 Obusfucate API Key

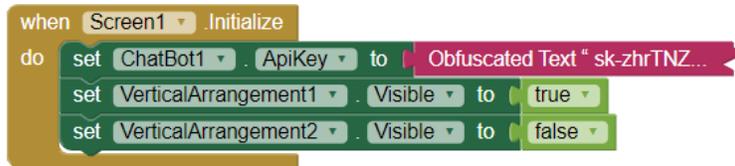


Figure 5: Obfuscate the API Key

The user interface design is composed of two `VerticalArrangement` components. The first one is for the cover screen, which was by default visible at the app start. The second is the conversational screen, which is hidden at this point.

### B.2 Operation

After selecting a prompt, the two `VerticalArrangement` components will swap visibility to focus on the functional screen. For reference, the chosen question is displayed prominently at the top center of the app. `VerticalArrangement2` is also initialized such that the clickable buttons are set to their default states. The states of these buttons also changes based on the status of the AI conversation.

At this point, the `ChatBot` procedure is performed in a controlled loop. Using the `ChatBot1.System` block, the ChatBot is assigned the role of a College Application Advisor. This provides context for the ChatBot to gather the most relevant responses. Then, the `if-elseif-elseif-else` block determines the current value of `iterations`. Finally, the ChatBot is asked to generate text in response to `iterations` carefully engineered prompts, in the exact order associated with the `iterations` value.

```

to ChatBot
do
  set ChatBot1 . System to " College application advisor "
  call pickFollowup
  if
    get global iterations = 1
  then
    call ChatBot1 .Converse
      question join " From the following list of question please pick ..."
                get global list_of_questions
    call notifier
  elseif
    get global iterations = 2
  then
    call ChatBot1 .Converse
      question join " Please choose another question that is most rela..."
                get global list_of_questions
    call notifier
  elseif
    get global iterations = 3
  then
    call ChatBot1 .Converse
      question join " Generate a follow-up question only, not an essay..."
    call notifier
  elseif
    get global iterations = 4
  then
    call ChatBot1 .Converse
      question join " Ask one more follow up questions to get addition..."
    call notifier
  elseif
    get global iterations = 5
  then
    call ChatBot1 .Converse
      question join " Now, generate the college application outline fo..."
    call notifier
  else
    call ChatBot1 .Converse
      question UserResponseTextBox . Text
    call notifier
  
```

Figure 6: ChatBot Procedure Block

The first exchange instructs the AI to select related questions from the `list_of_questions` array, one at a time, and display that on the `ConversationLabel.Text` for the end-user to answer. The user's response typed at the `UserResponseTextBox` text field appends to

the `ConversationLabel.Text` chat history. Each new prompt is dependent on the user's response and the AI combines all responses for coherent context. After four exchanges, ChatBot generates the essay outline.

The `SUBMIT` button is clicked whenever the user has a response to AltruBot's questions.

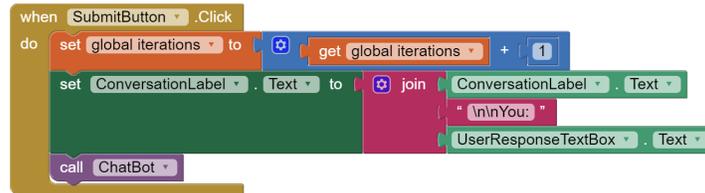


Figure 7: Submit Button

As stated in the `UserResponseTextBox.Hint`, the user may tap the `CLEAR` button to erase the `UserResponseTextBox` text field or tap the device `BACK` button to access end-of-session actions. At this point, `Notifier2` will ask the user to tap either `RESET` or `SHARE` button. `RESET` re-initializes the ChatBot session while `SHARE` forwards the generated outline for post-processing into paragraphs. Either way, the app reverts to the startup display.



Figure 8: Notifier2 Procedure