Intelligent Response System for Indian Law: An Approach to Women Security

Riya Sil[1], Anindya Nag[2], Shabana Parveen[3] and Bijoy Kumar Nath[4]

[1] School of Engineering and Technology, Adamas University,
Adamas University, Kolkata- 700 126, India
riyasil1802@gmail.com

[2] Science, Engineering and Technology School, Khulna University
Khulna -9208, Bangladesh
anindyanag58@gmail.com

[3] School of Engineering and Technology, Adamas University,
Adamas University, Kolkata- 700 126, India
pshabana424@gmail.com

[4] School of Engineering and Technology, Adamas University,
Adamas University, Kolkata- 700 126, India
bijoykumarnath999@gmail.com

Abstract: **The advancement of science and technology has seized the attention of society for the Automated Response System. It helps end users in resolving their queries by disabling the constraint of physical presence. Nowadays, though use of interactive automated agents is common in various sectors including cultural, medical, educational, marketing and others, however, it is still not familiar in the field of law. The huge population of India has led to an increase in legal cases due to shortage of legal professional and also lack of legal knowledge amongst citizens. In this paper, the authors have provided a potential solution by proposing an interactive automated based agent named 'Avyanna' for women related legal support. This automated agent is capable of answering any legal-based queries that is either rule-based or artificial intelligence-based. It is basically a one-stop solution for women related legal issues mainly focusing on automated response system that can answer any legal queries and Indian Penal Code (IPC) sections related to violence against women. Other features include 'Police Calling' Button, 'Ambulance Calling' Button, Contact List of Lawyers that can be filtered on location basis, 'Fire Service Calling' Button, 'Medical Helpline' Button, 'Child Helpline' Button, 'Women Rights' Button that provides legal information related to women rights, and 'IPC Sections' Button that give a clear view of all the Indian Penal Code (IPC) sections related to violence against women. In the recent technological era smart home is one of the most popular technologies for making our life easy and it also provide more safety to the householders. This chatbot can be used with the smart home to give some extra safety for woman when they are alone at home. It can help to them to contact with the police or any emergency contacts very easily.**

Keywords: Intelligent Chatbot, Natural language processing, Legal chatbot, Artificial Intelligence, Machine learning, Smart home, Android Application.

I. Introduction

Communication is the process of sharing information between two individuals. Artificial intelligence has taken an unprecedented pace in the field of Communication. Creation of a human-like response system for the interaction between human and machines have always been an extensive area of research. The enhancement of interaction between human and computers in this era of technology in a more usual manner is very important for blooming of human-computer interaction [1]. The automated response system has eliminated the purpose of physical presence by providing online conversation facility to resolve queries. It has become an essential part of our daily life that provides 24x7 prompt response service. It can remove the time constraint barrier, and generate real time response scenario for responding to every query immediately. These systems are design for the ease of communication with automated response systems using natural language processing to get human-like response. Response systems are basically designed and trained for assisting a specific task such as web-searching a specific keyword, set appointments, etc. [2].

In the year 1966, Joseph Weizenbaum first introduced Chatbots [Survey of Design Techniques for Conversational Agents]. This was the beginning of a new era that had started for fun and entertainment but kept on enhancing with the increase of requirement and expectations of humans with the help of modern technology [3]. At present, for quick response to end-users, chatbot-based user response system has been developed using various advanced properties along with different services that can provide help in multifaceted sectors including educational, marketing, medical and others. However, most people are still not familiar with these in the

field of law till date. The concept of Automated Response System can be used in the field of law to handle various legal queries without any geographical barrier. It can be used for general legal assistance, finding resources and decision making [4].

The contrast between the vast population of India and the insufficient number of legal professionals has led to the increase in the number of legal cases. Plaintiffs are kept waiting for their well-deserved justice for years. It is a major issue that has been faced by each citizen of India who is fighting for their own legal right. The global pandemic situation of Corona virus (Covid-19) had worsened it. It has led to a huge number of unemployment which in-turn had led to increase in violence on soft-targets that includes domestic violence against women [5]. To provide support for these victims, the authors in this paper have provided a one-stop potential solution that would help women to deal with such situations. An application named 'Avyanna' have been developed that will be providing various services that includes (i) Legal Automated response system/ legal chatbot that provides information on Indian Penal code (IPC) sections related to violence against women and legal related queries. Moreover, the legal bot performs search operation on the basis of requests related to legal cases. The bot is designed to behave human-like to provides with various request commands by users. (ii) other services include 'Police Calling' Button, 'Ambulance Calling' Button, Contact List of Lawyers that can be filtered based on location, 'Fire Service Calling' Button, 'Medical Helpline' Button, 'Child Helpline' Button, 'Women Rights' Button that provides legal information related to women right, and 'IPC Sections' Button that give a clear view of all the Indian Penal Code (IPC) sections related to women. This application acts as a virtual legal advisor that can be used widely by women in their every life. For knowing the concept in detail, the authors have provided a detailed study on automated response system and surveyed on some of the well-known conversational agents and their respective response systems that have provided the authors knowledge to propose an application with better facilities [6]. In smart home efficient security systems and other efficiency in other appliances have led to the growth of the smart home application. Smart home service application offers efficient solutions to all kind of needs for elderly people, women and their respective families, helps to monitor the physiological problems and different kinds of functional issues, and also provide proper aiding. when an emergency situation is found Smart home service with this chatbot helps to contact with emergency contacts. If any susceptive situation occurs householders can contact with police very easily. If CCTV camera is installed in smart home and the camera will detect any doubtful activity then and there it will send the information to the police with location and images. User can also find any law if needed via our application [7-9].

Section – 2 provides a clear vision of the state of art that includes detailed study of chatbot models, architecture of chatbot and various chatbot platforms. Section – 3 gives an idea of the various chatbots being used all over the globe. Section 4 - thoroughly explains the proposed model, and also gets a detailed idea of the results and performance analysis.

Section – 5 concludes the paper with a direction to future scope of this research work.

II. State of Art

In this section, authors have discussed about the recent approaches related to legal chatbots. For better understanding and evaluation of the proposed architecture, it is necessary to know about the background and other metrics. In the following subsections, different chatbot models, basic architecture of chatbot and various chatbot platforms have been discussed.

A. Chatbot Models

A natural language conversational program is constructed by Joseph Weizenbaum in 1966, which prompt a chat between a user and a computer program. A Chatbot executes in many areas nowadays. It also creates to counter to a query. This was a enhancement. It has a good effect on the recent chatbot technology which is taken a great shaft in the last decade; Artificial intelligence and natural language processing are the algorithms used in chatbots, to grow the accuracy and productivity. Maximum Chatbots take out the objective of the users with by dint of natural language processing abilities to give suitable response from verbal input [46]. It can be classified into 4 types that includes: *1)* Open and closed domain Chabot, *2)* Retrieval-Based Chatbot, *3)* Long and short conversation chatbot, *4)* Generative-based Chatbot [10-11].

1) Open and Close Domain Chatbot: It can be classified as an open domain chatbot or a closed domain chatbot on the basis of domain, where the chatbot is executing. When a chatbot is imposed to work in open domain, its adobe the type of the conversation cannot be predefined, the user can talk anything with the chatbot. The Open domain chatbots are unfit to reach a goal. On the other hand, the Closed domain chatbots are advised to work on feasible inputs and outputs in this kind of domain the conversations are to some degree bounded because the chatbot is built to reach a specific goal. Nowadays maximum chatbots which are used are closed domain in type [12].

2) Retrieval-Based Chatbot: These kind of chatbots use collection of predefined questions as well as suitable answers to reply to the inquiry that is asked. These chatbots don't put together any new content. A proper answer is chosen from the pre-defined collection and reveal as an output for the inquiries. It takes the users via a scripted interconnection flow. Normally Retrieval based chatbots handle a single domain and elasticity is one the constraint.

3) Long and Short Conversation Chatbot: This type is also using artificial intelligence and machine learning algorithms. They have the capability to learn from their past inquires. The translation feels like translation of one language to another. It has Machine Translation techniques as base. The advantages of these chatbots are they evolve themselves like humans answering any inquiries from their past experience These chatbots work along multiple domain [13].

4) Generative-Based Chatbot: It's an open domain program. These type of chatbot use artificial intelligence and machine learning algorithms. Rather than predefine response it gives combination of language. It interprets the inputs to the outputs in one language to another. These chatbots can evolve themselves for answering any inquiries they faced in the past. These chatbots work in multiple area.

B. Basic Architecture

To developed and design any system first we have to divide the system for modular development which works in an efficient manner. Here a basic structure of chatbot is given bellow, which includes data input then processing of the data and finally giving the output. It takes data as input then it will go for processing. In processing first, it will go in tokenization then stemming and then intent matching and finally responses. After that it will provide us the output in the form of response [14-16]. The block diagram is given below in Figure 1.
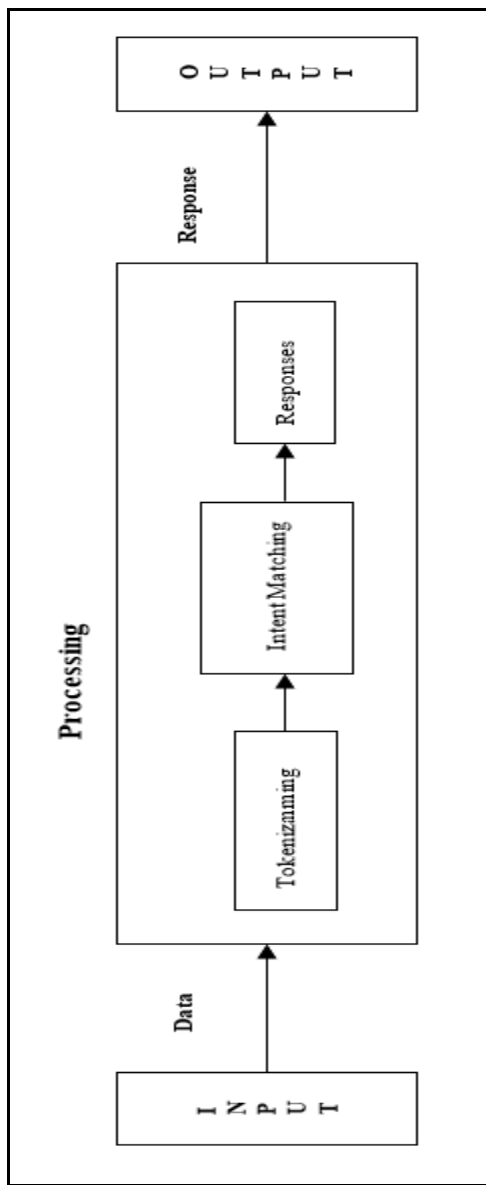
IV. PROPOSED MODEL

There are a lot of chatbots which are deployed in businesses and for commercial use but there is no chatbot which can understand the problem faced by women in terms of harassment and their feelings. It's an Interactive Automated Agent-based Response System over Legal based Domain. Which can understand the problem faced by women in terms of harassment and their feelings and will look after the women related issues and give them proper knowledge and advice. Based on Indian Penal Code Section: 375, 498a and 304b [37-38].

Here a block diagram of Agent Avyanna Model is given below in Figure 2, fist the input is taken from user and pass it to Agent Avyanna. Then for Matching Intent it will pass through training phrases, action parameters and responses. And lastly it will give us the output as response.
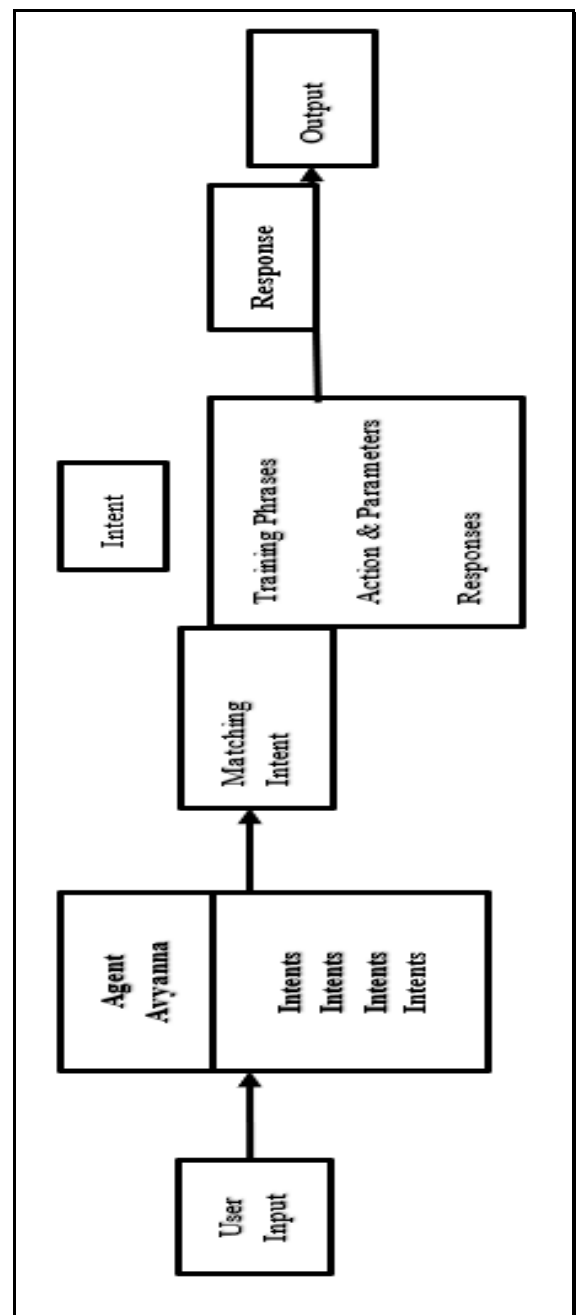

Figure 1. Block Diagram

Figure 2. Block Diagram of Proposed Model

III. LITERATURE SURVEY

Chatbots are gaining traction in practically every business, and the legal profession. Legal chatbots are an excellent method to streamline a work process and save time and money. Table 1 presents a detailed comparison of various tools of Conversational agents over Legal Domain.

Table 1. Comparison of many tools of Conversational agents over Legal Area.

Sl. No.	Paper Title	Company	Technology Used	Description	Limitation of Existing Model
1	Robot Lawyer LISA [17]	Chrissie Lightfoot	Artificial Intelligence	It is an Artificial Intelligence (AI) lawyer.	No customer service is available.
2	BillyBot [18]	Chrissie Lightfoot	Artificial Intelligence	It's a legal chatbot used to find mediators for any legal problem	The service provided is not good and it has limited solutions.
3	Ross [19]	Andrew Arruda (CEO and Co-founder) and Jimoh Ovbiagele (CTO and Co-founder).	The Artificial Intelligence Machine, powered by IBM's Watson technology	It's a legal chatbot used for handling bankruptcy.	Lack of professionalism.
4	Docubot [20]	1LAW	Artificial Intelligence	It's a legal chatbot that helps lawyers for generating their respective legal documents.	No customer service is available.
5	Improving Access to Justice with Legal Chatbots [21]	Marc Queudot, Éric Charton and Marie-Jean Meurs	Artificial Intelligence	It delivers legal data and deals with Canada-related immigration issues and helps bank employees with their legal jobs.	No customer service is available.
6	Solosuit [22]	George Simons	Artificial Intelligence	It's a legal chatbot that helps with law-related issues and helps to generate legal documentation.	No customer service is available.
7	Renters Union [23]	UK based Legal firm	Artificial Intelligence	It's a legal chatbot that gives legal guidance on the inhabitation problem in London.	Can't solve some complex inquiries that are unknown to the chatbot
8	LegalMation [24]	James M. Lee	IBM Watson	This provides legal advice to the users.	Provide limited service.
9	Parker [25]	Stephen Parker	Artificial Intelligence	It is used for answering questions regarding privacy law.	No customer service is available.
10	Legalibotin Spain [26]	Spain-based Legal Chatbot	Artificial Intelligence	It's a legal chatbot used to generate legal papers.	It required Facebook and Messenger applications for getting the service.
11	LAWBO: A Smart Lawyer Chatbot [27]	Subhashri G, Unnamalai N, Kamalika G	Deep Learning, Natural Language Processing, Artificial Intelligence	It's a legal chatbot that helps lawyer to work on cases. It gives information about similar cases.	Can't find properly the similar information and connections between rules.

12	Law and Word Order: NLP in Legal Tech [28]	Robert Dale, Language Technology Group	Natural Language Processing	It provides legal decisions. It is done by implementing natural language processing in legal fields. It gives legal advice.	No customer service is available.
13	LawGeex [29]	Noory Bechor	Artificial Intelligence	It's a legal chatbot, that helps to analyse business-related contacts and proposes highlight and edit-based problems.	No customer service is available
14	Ailira [30]	Adrian Cartland	Artificial Intelligence	It's a legal chatbot used as an assistant for business-related planning, tax searches, and wills.	Unable to provide relevant solutions to users' quires.
15	Intelligence Chatbot for Indonesian Law and Electronic Information & Transaction [31]	VAH Firdaus, P Y Saputra and D Suprianto	Natural Language Processing	It's a legal chatbot that provides general information about legal norms. It is only used for Indonesian to know about their law	Improvement in the database is needed for conversation processing.
16	DoNotPay [32]	Joshua Browder	Artificial Intelligence	It's a legal chatbot used to solve parking ticket-related problems in the UK.	Need to expand for more group of people,
17	Using a chatbot to increase tourists' Engagement [33]	Samane Hosseini	Artificial Intelligence	This chatbot helps the tourist by providing locations they want to visit. It also uses customer support, reservation system.	Limited feedback was conducted. Need more user's feedback.
18	Immigration Virtual Assistant (IVA) [34]	BotsCrew	Dialog Flow, NLP, Java, MySQL, Spring	It's a legal chatbot that provides free legal consultation to the user who is willing to go to Canada from abroad for any immigration reasons.	Can't find unknown inquiries. It takes limited inquiries.
19	Automio [35]	Claudia King	Artificial Intelligence	It's a legal chatbot used to create legal documentation.	No customer service is available
20	A Chatbot Framework for the Children's Legal Centre [36]	Jay Morgan, Adeline Paiement, Monika Seisenberger, Jane Williams, Adam Wyner	Machine Learning, Neural Networks, Natural Language Processing	Legal chatbot used for guiding the children with legal advice.	Limited cases. Need more cases for different group of people

V. Result

Figure 3. Avyanna

Avyanna (Figure. 3) is a legal chatbot for crime against women. Chatbot which can understand the problem faced by women in terms of harassment and their feelings. A Chatbot which will look after the women related issues and give them proper knowledge and advice.

Some Complex Results and their Proofs:

Figure 4. User Type

In Figure 4, user type a person can register as a lawyer or a normal user. If anyone registers as a lawyer their details will be shown in the lawyer list.

Figure 5. Program Snippet of User Type

Figure 6. Sign In

From Figure 6, Here a user can sign in with their email or directly Sign in using their Google Account.
Email: This is used to input the Email.
Password: This is used to input the Password.
Sign in Button: When this button is clicked it checks for valid email and password. It's used for the authentication purposes.

Figure 7. Program Snippet of Sign In
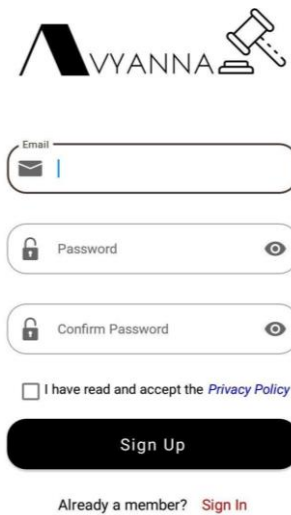
Figure 8. Sign Up

In Figure 8,
Email: This is used to input the Email.
Password: This is used to input the Password.
Sign Up Button: When this button is clicked it sends a verification link to email
from firebase, after clicking the link it verifies the email address. After that user can sign in with their email and password

Figure 9. Program Snippet of Sign Up

Figure 11. Program Snippet of Create

Figure 10. Create

In Figure 10, This form allows the user to create a new account. This form has four text fields, one combo box and one button.

Username: This is used to input the username.

Full Name: This is used to input the full name.

Number: This is used to input the phone number.

Select Gender: The type of the gender is selected from the combo box.

Full Address: This is used to input the full address.

Submit Button: Adds a new user by inserting the entered details into the firebase database.

Figure 12. Other Features of Legal chatbot

In figure 12,

It has Eight buttons.

Police Button: When this button is clicked it redirects to call 1091

Ambulance Button: When this button is clicked it redirects to call 102

Lawyer Button: When this button is clicked it shows the lawyer list, the lawyers who registered in the application as a lawyer.

Fire Service Button: When this button is clicked it redirects to call 101 Medical Helpline Button: When this button is clicked it redirects to call 9830079999

Child Helpline Button: When this button is clicked it redirects to call 1098

Women Rights Button: When this button is clicked it displays the women's rights in text.

Sections Button: When this button is clicked it displays the section lists. The sections are: 304-B, 326, 354, 366, 370, 372, 373, 375, 376, 498-A of IPC

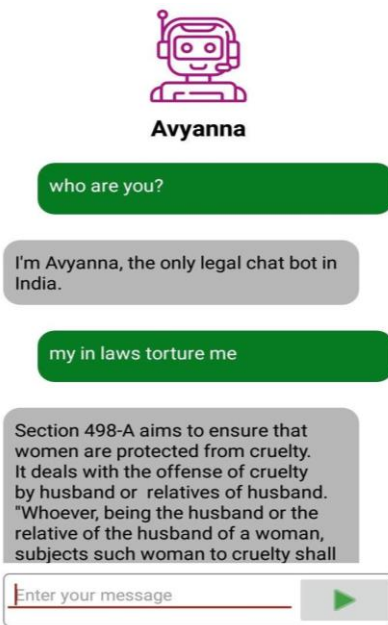**Figure 13.** Program Snippet of Other Features

Figure 14. Avyanna Chatbot

In Figure 14, It takes queries from the user, then remove the stop words, stem them, check matching intents and display the responses.

Figure 15. Program Snippet of Avyanna Chatbot
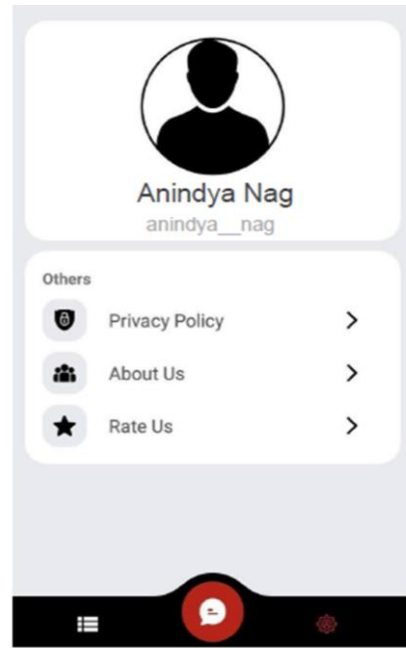
Figure 16. Setting Menu

Figure 16. displays the username and the profile name of the user.

It also has 3 sections: Privacy Policy, About Us, Rate Us.

Figure 17. Program Snippet of Setting Menu

VI. Conclusion

Artificial Intelligence has a unique communication field that has resulted in the cumulative use of conversational agents in every industry. It is used in various fields in our day-to-day life for ease and comfort. This also includes conversational agents in the legal field and action which are used broadly in everyday life for intention of conversation, as a virtual legal advisor. In the recent technological times smart home is one of the most popular technologies for making our life easy and it also provide more safety to the householders. This chatbot can be used with the smart home to give some extra safety for woman whether they are at home or outside of the home. It can help to them to contact with the police or any emergency contacts very easily. They can also find legal solutions through this app. We have studied the previously existing Conversational agents and their response system to suggest a case-based alike system in India. A survey has been done based on the different types of Conversational Agents used

over Legal Domain that will provide a clear view of the use of Chatbots. The future scope of this application involves mainly on upgrading various faults of the existing application interface and also adding various new services like contact with police and legal officers. This app is free for every woman who needs it.

In this paper, authors have implemented the Legal Chatbot for crime against women. This will definitely useful for woman safety in the outside as well as in the home.

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Author Biographies

Riya Sil is currently working as an Assistant Professor in the Department of Computer Science and Engineering, Adamas University, Kolkata, India. Her research interests include legal analytics, machine learning and artificial intelligence.
Corresponding author email:
riyasil1802@gmail.com

Mr. Anindya Nag is currently an adjunct lecturer at the Department of Computer Science and Engineering at North Western University in Khulna, Bangladesh. He completed his undergraduate degree at Adamas University in Kolkata, India, and is currently pursuing a Master's degree (MSc Engg.) in Computer Science and Engineering from Khulna University in Bangladesh. He is focusing his research on NLP, Artificial Intelligence, IoT, Blockchain, Cloud Computing, and Networking Systems.

Ms. Shabana Parveen is pursuing her bachelor's degree (B. Tech) in Computer Science and Engineering from Adamas University, Kolkata. She is in the final year of her B. Tech degree. Her area of research are AL and ML.

Mr. Bijoy Kumar Nath is a skilled Android and backend developer, with a particular focus on AI-based and real-time applications from Chittagong, Bangladesh. As an Android and backend developer, Mr. Nath has been involved in the design, development, and deployment of multiple software projects, ranging from small-scale applications to large-scale enterprise systems. His areas of expertise include software architecture, UI/UX design, database management, and web development.