

Telegram Bot Using Cloud Services For Public Rescue Operations

Hariprasad A, Murugan R

School of CS and IT, Jain Deemed-to-be University, Bangalore, Karnataka, India

School of CS and IT, Jain Deemed-to-be University, Bangalore, Karnataka, India

Abstract - Based on the study conducted on the Role of Social Media Applications in Public Rescue Operations during Disasters, identified many limitations in the previous applications only static information is been shared with the public, users cannot request for their needs and the application is not helping the rescue team for getting the information who needs help based on all this limitations and issues in the previous application This paper proposes a Telegram Linguistic Bot service using AWS Lex, Lambda, and RDS MySQL to bring both volunteers and victims together to ensure rescue operations are successful. By using this telegram bot, the victim and volunteer can enroll and start accessing the service. Similarly, the volunteers can also register with the application from anywhere, once victims send a help request for food and shelter the data will be stored in the cloud database which can be accessed by multiple rescue team management, so the team can easily identify which volunteers are nearby that particular victim and they can assign volunteer for fulfilling the victims needs this approach will help to reduce the difficulties in getting details of victims and volunteers. Using the victim's data, the rescue team management will get a clarification on how many people needs helps for only food and shelters makes team have a proper plan. The proposed application is developed using a serverless framework which helps to reduce the cost of application usage also if any failure or any issue happened to the application, all the logs related to each action performed in the application will be stored in the cloud watch, using cloud watch we can easily keep track of applications if there is an issue which affects the performance of the application we can redeploy the application to another region this will ensure 99.9% availability of the application.

Key Words: Telegram Bot, AWS, Public Rescue Community, Volunteers, Victims, Disaster.

1. INTRODUCTION

The public has experienced the importance of the Public Volunteer Rescue Community during Floods and other disasters. When a disaster occurs, early evacuation of victims is one of the effective ways to save humans life, we have seen the usefulness of social media such as Twitter, Telegram for disaster recovery operations is gaining worldwide notice, the Twitter and Telegram have been utilized as an information-sharing platform in the

recent operations of the natural disaster happened. For instance, in Recent rescue operations like floods in Kerala, Mumbai, and Cyclone in Tamil Nadu we saw social media played a vital role in rescuing the victims and providing volunteer support for victims. Using social media was easy for volunteers to reach victims and easy to collect resources needed for the recovery operations. Based on the survey conducted on the role of Social Media Applications in Public Rescue Operations during Disasters came across a lot of limitations and drawbacks of an existing application and in past years the usage of social media applications has been increased for finding information related to the disaster that happened in their locality since the application is used for disaster-related information sharing we need to ensure the application should be available at any circumstances.

The proposed system is a Telegram bot which is been integrated with cloud services, for ensuring high availability during disasters, telegram is one of the popular social application networks and it will help the public volunteer community to complete the rescue operations in an efficient and faster way. The proposed system aims to reduce time consumption during rescue operations. In India, according to the current statistics, the usage of the telegram has increased so the proposed system will be helpful for society to use the application during any rescue operations, to help public rescue communities to connect victims and speed up the rescue operation in an efficient manner.

2. Related Works

There are few related works available related to an application for public rescue operations.

“Mobile Application for flood disaster in Jakarta” was developed based on Flood disasters that greatly disrupt people's economic activities and cause various other problems including public health problems, one of which is causing infectious diseases. The proposed system was the mobile application developed for minimizing the impact of flood, physically and non-

physically by providing alerts and information about the flood.[14]

“Telegram-Based Chatbot Application for Foreign People in Japan to Share Disaster-Related Information in Real-Time” was developed by the authors because disasters occur frequently in Japan. Mechanisms for providing disaster information via television, radio, and smartphone are in place. However, most information is in Japanese, and there is still room for improvement in the information provision mechanism for foreigners staying in Japan. The developed Telegram-based application provides disaster-related information to foreign people in the affected areas of Japan.[11]

“A Proposal on Disaster Information and Rescue Request Sharing Application Using Sina Weibo” was a web application that can share disaster-related information as a post, the post contains necessary information type of disaster, user information, location of the user, message, The message will be displayed on the display board according to the time. The application was developed for the local governments and rescue experts because they have difficulty in gathering disaster-related information from many posts on social media and users face difficulties in providing information like current location, address, and issues.[16]

“Distress – An Application for Emergency Response and Disaster Management” was a web application developed for emergency response and disaster management using sos It displays disaster information, can view the image of the disaster that happened, and chat with users through the web application. the author was motivated to develop the application because The Frequency of disasters is increasing over the year, but lack of an efficient disaster management system to help people in crisis, and there is a lack of coordination between the public and trained professionals for rescue operations.[15]

“Chatbot Application for Sharing Disaster Information” was about a line bot developed in Japan for sharing disaster-related information with the public. In Japan, Disaster occurs every year, so the usefulness of social media such a twitter has been worldwide noticed during rescue operations. The existing system for sharing information is not user-friendly based on the proposed system that was developed.[6]

“A Twitter-Based Disaster Information Sharing System” was a continuation of DITS (Disaster Information Tweeting Subsystem), This system simply the workflow straightforward with more efficiency. In Japan, Disaster occurs every year, recently when an earthquake occurs, many people used Twitter for obtaining information regarding Twitter for obtaining information disaster based on this problem, the application was developed.[7]

“Disaster Information Sharing System Considering Communication Status and Elapsed Time” was developed because, In recent years, large-scale natural disasters frequently occurred in Japan, and each time there occurred physical corruption or failure of the communication infrastructure, congestion of the communication network due to abrupt communication traffic occurred, The proposed system was an alert server which sends disaster information to local servers and individual phones with hazard maps for evacuation purpose.[15]

“Online Media Usage by Disaster Volunteer Center” was a study based on online media usage by volunteers during rescue operations, collected data from online media analysis and the result was Facebook pages were trending during Rescue Operations, the objective was to identify online media usage of volunteers during Disaster operations. [2]

3. PROBLEM FORMULATION

Based on the study conducted on Survey on Role of Social Media Applications in Public Rescue Operations during Disasters understood that people's life was at risk because the volunteers are unable to contact the victims on time and, in the recent rescue operation the volunteers were working so hard to reach victims, many rescue operation was time-consuming. the previous works were sending alerts to the people and local government. The previous works mainly focused on sharing disaster-related information, after all, there is a lack of guidelines for the rescue operation, and the communities were unable to track who is near the affected places efficiently.

4. Telegram Bot for Public Rescue Operations

The proposed system is a Telegram bot, telegram is one of the popular social application networks and it will help the public volunteer community to complete the rescue operations in an efficient and faster way. The proposed system aims to reduce time consumption during rescue operations.

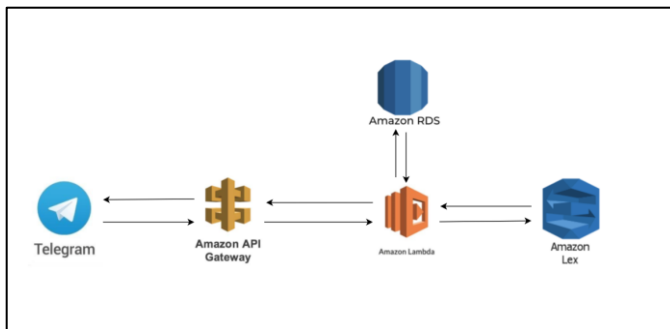


Fig 4.1: System Architecture

Figure 4.1 is the system architecture of the proposed system. The proposed system is a chatbot application using Node.js with Telegram bot API and cloud services using Node.js SDK (software development kit). The bot was developed using AWS lex, lambda function, and Amazon RDS MySQL database connected with lex bot for storing the details related to the rescue operations then integrated with telegram using telegram API through Amazon API gateway. The proposed system consists of the telegram connected with AWS lex bot through amazon API gateway and lambda function. When the user enters some utterances as inputs, the client API call will be initiated and the utterance is sent to the Amazon API gateway. The Amazon API gateway forwards the utterance to lambda, the lambda function will be using AWS lex runtime for validating the utterance and perform necessary actions based on users request and send the fulfillment response back to the user. The user can use this application to register as a normal user and as a volunteer, once the user has registered he can request food and shelter according to his need, once the user has requested his needs the order request will be saved in the database, the data will be helpful for the rescue team to understand users need and their proper address which helps to make rescue operation faster in an efficient way.

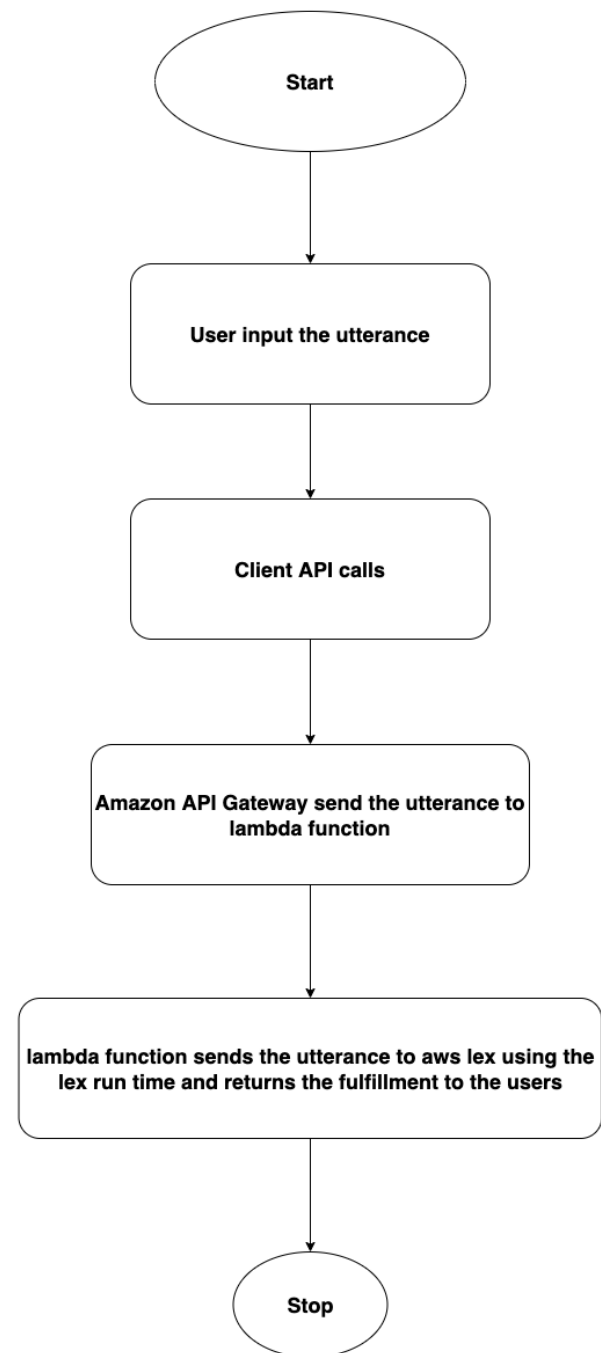


Fig 2: Telegram lex bot workflow

Fig 2 represents the telegram lex bot working flow, once the user has entered a command the bot event handler will get triggered and the event handler sends the event through the amazon API gateway to the lambda once the event reaches the lambda function. The lambda function triggers the lex bot by sending the event value to the bot, lex bot will send the response to the bot by asking if any values from users need to be entered, after running all

the validations and operations the lex bot sends back the fulfillment message to the user through Amazon API gateway.

5. Results and Discussion

The developed system is a telegram bot integrated with cloud services, The proposed system is a serverless bot implemented using lambda, RDS MySQL AWS lex and it is integrated with telegram bot using Amazon API gateway. Implementing serverless in the system will help to reduce the latency and allow multiple users to use the bot simultaneously. This system will be useful for society during rescue operations. The benefit of using this system is this system can be integrated with any platform. The proposed system is a serverless application, because of the serverless application, the operational cost of the application is less, and all the data are stored in the cloud so it can be easily retrieved whenever the managing team needs it, the system offers better speed response, less latency in the network, the data is stored in a cloud database helps to access the data from anywhere in the world and the application is provisioned in the cloud, so if any disaster happens it won't affect the operation of the application. The system is an AI-powered bot that replies to any utterance that the user types, which ensures that the bot is capable to handle any situation by providing the appropriate responses. Using CloudWatch we can monitor the logs of the bot and lambda function that will help to trace if any issues have happened or not. The bot was deployed in multiple availability zones to ensure high availability and fault tolerance and by enabling backup for the lex bot, if any failure occurs the bot and data will exist, we can use the backup data to work normally without any interruption.

The proposed system contains four modules, Welcome User, Register User, Book Shelter, Order Food, and Register Volunteer.

In the register user module, the victim will be able to register by providing the necessary information's so that each time user doesn't want to provide his information to the bot for requesting any services. Users' information's are very important it can be used for further analysis of the impact of disasters.

Register Volunteer module is used by the user, for registering as a volunteer, if a disaster happens finding or identifying the volunteers for the rescue operation is difficult and time-consuming, this module helps the user to register themselves as a volunteer so that community can contact each other for coordination during rescue operations.

Book Shelter Module helps the victims for requesting for evacuation to another place if any disaster occurs, it takes the phone number and place the names of victims and saves them to databases, so that the volunteers will get to know accurate information about the location of the user, and they can reach out to the place quickly. when we get users' information we can easily identify which volunteers are near to those locations based on that we can arrange volunteers for users' requests.

Order Food module will help the user or victim for requesting food using this service, so the request will be entered to the databases and will be shared with volunteers, also using the data, the team can analyze how many orders they have got for food.

6. Screenshots

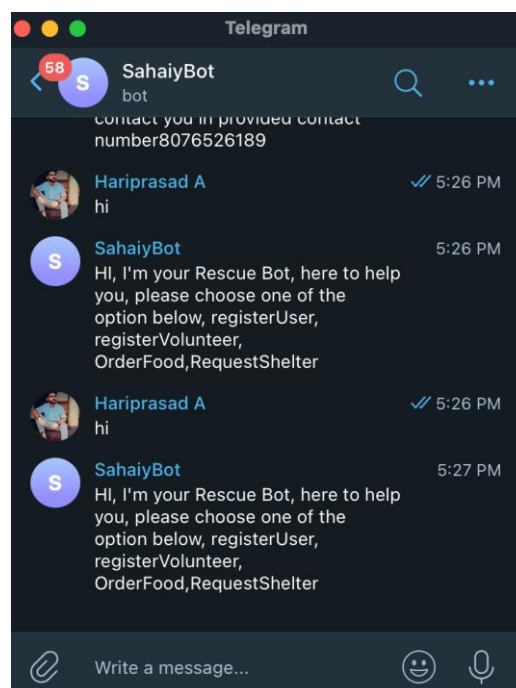


Fig 6.1: Welcome Note

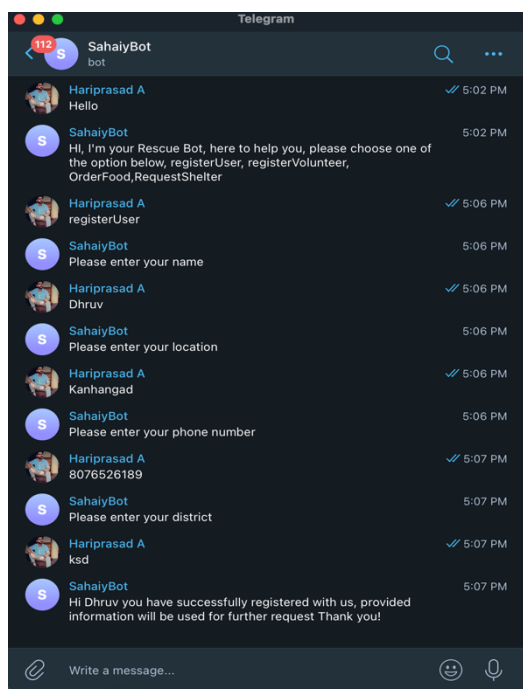


Fig 6.2: Register User

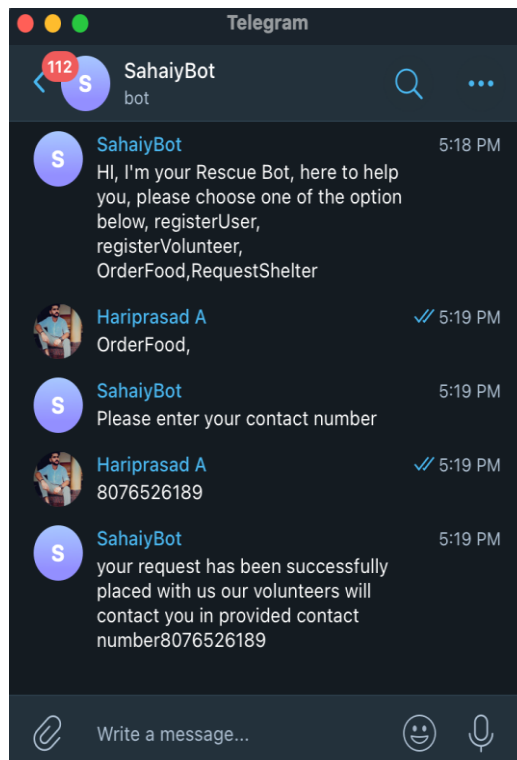


Fig 6.4: Order Food

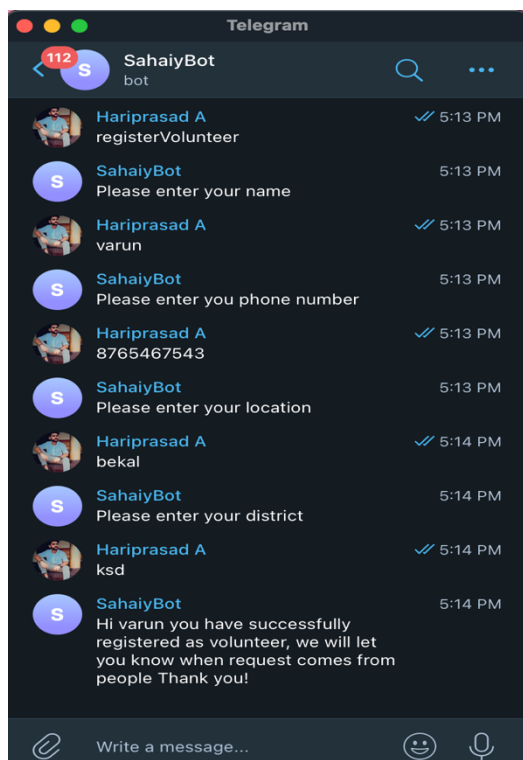


Fig 6.3: Register Volunteer



Fig 6.5: Shelter Request

CONCLUSION

The telegram bot using cloud services is developed successfully that help the public rescue community work efficiently during a disaster. The proposed system will help the victims to share their problems and needs with the public rescue community without time-consuming. The proposed system is a serverless bot implemented build using lambda, AWS lex and it is integrated with telegram bot using Amazon API gateway and integrated with AWS relation database service for storing the data. Implementing serverless in the proposed system will help to reduce the latency and allow multiple users to use the bot simultaneously. In the proposed system, the victim can send their needs to the public rescue community in an efficient way without time-consuming, in the future bot will be able to connect with call centers so that the bot can respond to the calls also and report the disaster. Using the developed bot multiple users can use the bot efficiently with low latency. The bot is developed using cloud services based on serverless frameworks so need to worry about server failure issues the advantage of the developed bot is it can be integrated with multiple social media platforms simultaneously. Using cloud watch we can monitor the logs of the bot and lambda function that will help to trace if any issues have happened or not. Compared to the previous applications major advantages are the developed application will work efficiently with low latency using the concept of the serverless framework in the cloud, not need to be taken care of servers. In the future, the bot can be integrated with call centers where the bot will be taking to users and collecting the details, sharing live locations that will help the rescue team to know the exact location of the users and the bot can be integrated with government authorities which helps the government to know the need of peoples and can take appropriate actions.

REFERENCES

1. Austin, L., & Jin, Y. (Eds.). (2017). Social Media and Crisis Communication (1st ed.). Routledge. <https://doi.org/10.4324/9781315749068>.
2. D. Sato and H. Sone, "Online Media Usage by Disaster Volunteer Centers," 2018 5th International Conference on Information and Communication Technologies for Disaster Management (ICT-DM), 2018, pp. 1-4, doi: 10.1109/ICT-DM.2018.8636391.
3. Kondo, S., Hirose, Y., Shiroshita, H. (2019). Risk Communication and Disaster Information. In: Abe, S., Ozawa, M., Kawata, Y. (eds) Science of Societal Safety. Trust, vol 2. Springer, Singapore. https://doi.org/10.1007/978-981-13-2775-9_12.
4. Hariprasad A, Murugan R "Survey on Role of Social Media Applications in Public Rescue Operations during Disasters", Journal of Emerging Technologies and Innovative Research, Volume 9 Issue 2, February-2022, eISSN: 2349-5162, c425-c428.
5. Hannah Ritchie and Max Roser (2014) - Natural Disasters". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/natural-disasters' [Online Resource].
6. J. J. Wellington and P. Ramesh, "Role of Internet of Things in disaster management," 2017 International Conference on Innovations in Information, Embedded and Communication Systems (ICIIECS), 2017, pp. 1-4, doi: 10.1109/ICIIECS.2017.8275928.
7. M. Kosugi and O. Uchida, "Chatbot Application for Sharing Disaster-information," 2019 International Conference on Information and Communication Technologies for Disaster Management (ICT-DM), 2019, pp. 1-2, doi: 10.1109/ICT-DM47966.2019.9032901.
8. M. Kosugi et al., "A Twitter-Based Disaster Information Sharing System," 2019 IEEE 4th International Conference on Computer and Communication Systems (ICCCS), 2019, pp. 395-399, doi: 10.1109/CCOMS.2019.8821719.
9. M. Kosugi et al., "Improvement of Twitter-based disaster-related information sharing system," 2017 4th International Conference on Information and Communication Technologies for Disaster Management (ICT-DM), 2017, pp. 1-7, doi: 10.1109/ICT-DM.2017.8275693.
10. Q. Zou, "A Prototype System using Location-based Twitter Data for Disaster Management," IGARSS 2019 - 2019 IEEE International Geoscience and Remote Sensing Symposium, 2019, pp. 9514-9517, doi: 10.1109/IGARSS.2019.8898545.
11. R. I. Ogie and H. Forehead, "Investigating the accuracy of georeferenced social media data for flood mapping: The PetaJakarta.org case study," 2017 4th International Conference on Information and Communication Technologies for Disaster Management (ICT-DM), 2017, pp. 1-6, doi: 10.1109/ICT-DM.2017.8275672.
12. S. E. Ahmady and O. Uchida, "Telegram-Based Chatbot Application for Foreign People in Japan to Share Disaster-Related Information in Real-Time," 2020 5th International Conference on Computer and Communication Systems (ICCCS), 2020, pp. 177-181, doi: 10.1109/ICCCS49078.2020.9118510

12. Salamati, Payam & Kulatunga, Udayangani. (2017). THE IMPORTANCE OF DISASTER MANAGEMENT & IMPACT OF NATURAL DISASTERS ON HOSPITALS. https://www.researchgate.net/publication/318128263_THE_IMPORTANCE_OF_DISASTER_MANAGEMENT_IMPACT_OF_NATURAL_DISASTERS_ON_HOSPITALS.
13. Sakurai, M., & Murayama, Y, 2019, "Information technologies and disaster management –Benefits and issues", Progress in Disaster Science, Volume 2, July 2019, 100012.
14. V. L. P. Anta, I. A. Liestyo and H. L. H. S. Warnars, "Mobile Application for flood disaster in Jakarta" 2021 International Conference on Artificial Intelligence and Smart Systems (ICAIS), 2021, pp. 506-510, doi: 10.1109/ICAIS50930.2021.9395799.
15. V. Mody, V. Mody and S. Parekh, "Distress – An Application for Emergency Response and Disaster Management," 2020 International Conference on Smart Electronics and Communication (ICOSEC), 2020, pp. 830-836, doi: 10.1109/ICOSEC49089.2020.9215288.
16. Y. Liu, O. Uchida, and K. Utsu, "A Proposal on Disaster Information and Rescue Request Sharing Application Using Sina Weibo," 2020 5th International Conference on Computer and Communication Systems (ICCCS), 2020, pp. 419-423, doi: 10.1109/ICCCS49078.2020.9118483.
17. Y. Shibata, T. Goto, G. Sato, and K. Hashimoto, "Disaster Information Sharing System Considering Communication Status and Elapsed Time," 2017 31st International Conference on Advanced Information Networking and Applications Workshops (WAINA), 2017, pp. 621-626, doi: 10.1109/WAINA.2017.79.