

# Nexllo: Next-gen Intelligent Assistant

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**Abstract:** The rise of Personal assistant and Natural Language Processing gives a clear idea of what people want. Nexllo is an intelligent personal assistant created for all web browsers. Nexllo can set reminders, recognize natural voice without the requirement for keyboard input, and answer questions using information from the Internet and provides exact search results from the Microsoft database. It has major application in Home Automation. It can perform the tasks based on user's voice commands. It integrates very easily with IOT components and can perform tasks based on it. Apart from Home Automation it has an embedded algorithm which can store the data and sync it with every device signed in. It can translate any word, phrase, sentence or even any paragraph to 8 Indian Languages and 2 Foreign Languages. It can get the weather updates at your location by creating geo coordinates from IP address from current location. It also shows exact address on the Map if user doesn't give the full information. It add to-do list and save it to cloud database in real time that synchronize across all of the connected devices.

**Index Terms:** Personal Assistant, Smart City, Natural Language Processing, Virtual Assistance, Web Application, Database.

## INTRODUCTION

The digital assistant dates back to the late 1990s, with the Microsoft Clippy 3 being one of the originals. It provided basic assistance by leveraging linear search capabilities, They could not do much other than resolve user queries statically using a small database.

Since then, in modern era, the technology has evolved from being primarily transactional to intelligent and focused on providing far better outcomes.

The technology computes thousands of situational parameters and delivers options best suited for a search query.

In today's digital first market, Artificial intelligence could be the key to unlocking the customers of tomorrow. Artificial intelligence is already around in the minds of customers, many rely on it day in and day out. Artificial intelligence is already around in the minds of customers, many rely on it day in and day out. About 38% of consumers have used virtual assistant services on their smartphones recently. with many enterprises adopting AI to deliver contextual , conversational, seamless and personalized services, the time is now to be intuitive and proactive about how customers will experience and purge the gap between what technology can do and how people are consuming it. The main purpose of Nexllo would be for developers to use it in their projects as a base. The NLP library (DialogFlow) is integrated with a realtime database (Firestore) supported in every platform whether it be macOS, Android etc. This can help developers to focus just on their business logic or view layer. The vast library of APIs available on internet can be used, hence producing numerous possibilities.

Nexllo is a proof that how much can be accomplished by using different libraries and APIs and integrating them together.

Home Automation, Chat Application, Personal Assistant etc are some of the examples. So, the IDE can be thought of as an application of an underlying architecture which can support multiple projects. Artificial intelligence is already around in the minds of customers, many rely on it day in and day out.

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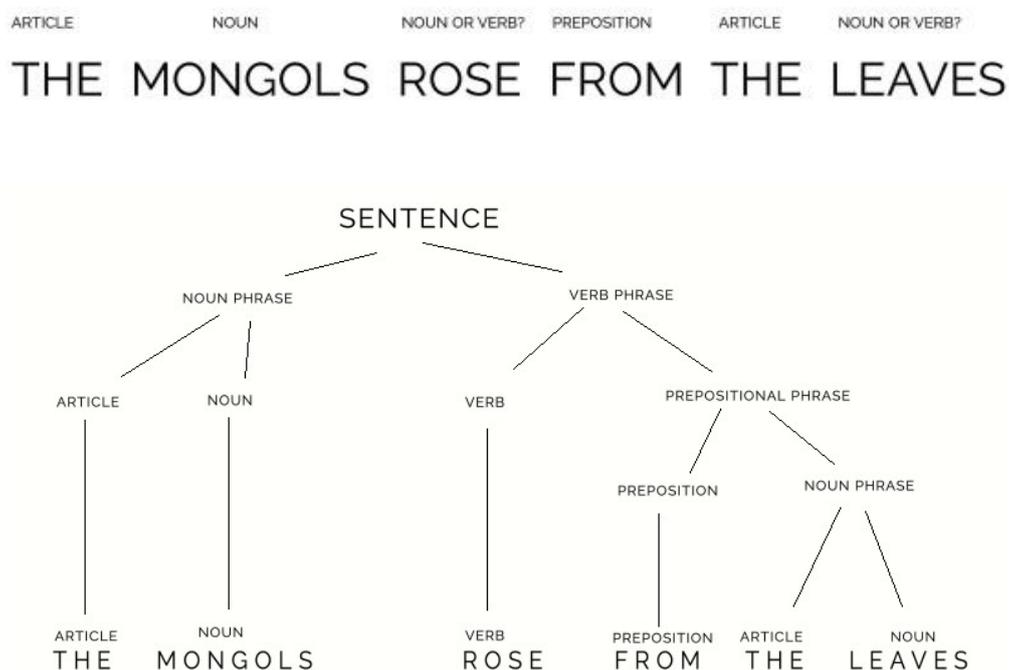
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About 38% of consumers have used virtual assistant services on their smartphones recently. With many enterprises adopting AI to deliver contextual, conversational, seamless and personalized services, the time is now to be intuitive and proactive about how customers will experience and purge the gap between what technology can do and how people are consuming it.

## NATURAL LANGUAGE PROCESSING

We might think that we always had this capability, the concept of higher level programming languages. While they certainly meet the definition of a language they also tend to have small vocabularies and follow highly structured conventions. Code will only compile and run if it's a hundred percent free of spelling and syntactic errors, of course this is quite different from human languages called Natural Languages containing large diverse vocabularies, words of several different meanings, speakers with different accents and also some interesting word play. People also make linguistic fore pass when writing or speaking like slurring words together, leaving out key details so things are ambiguous and miss pronouncing the words. The skillful use of natural languages is what makes us humans and for this reason desire for computers to understand and speak our language is been around since they were first conceived. This leads to the creation of Natural Language Processing or NLP, an interdisciplinary field combining computer science and linguistics.

There's an essentially infinite numbers of ways to arrange words in a sentence. we cannot input the computer with a dictionary of all possible sentences to help them understand what humans speak and write. So, an early and fundamental NLP problem was deconstructed from sentences into byte pieces which could be more easily processed.



## PROACTIVE BEHAVIOUR USING DIALOGFLOW

After converting the input from vocal speech into textual processable format (string), the computer can understand what kind of sentence it is (question, answer, informative) and according to that by finding keywords in the sentence the response is generated. The user's goals once attained, it's assistant's proactive behaviour that generates responses. Current assistants generally tend to possess reactive behaviour towards a user's query and hence are rather limited in their support. The usage of artificial intelligence and modern libraries to make responses intelligent and proactive is what the industry, customers and the world demands.

The reference model of next generation proposed by the researchers in TU Darmstadt can be implemented to integrate proactive behaviour in Next-Generation Digital Personal Assistants. It focuses

on developing and substantiating by identifying common areas of human-centered assistance, namely mental, physical, activity, environment, social, and technology support. This understanding of importance of proactive behaviour is very well implemented by Google's Dialogflow Natural Language Processing library

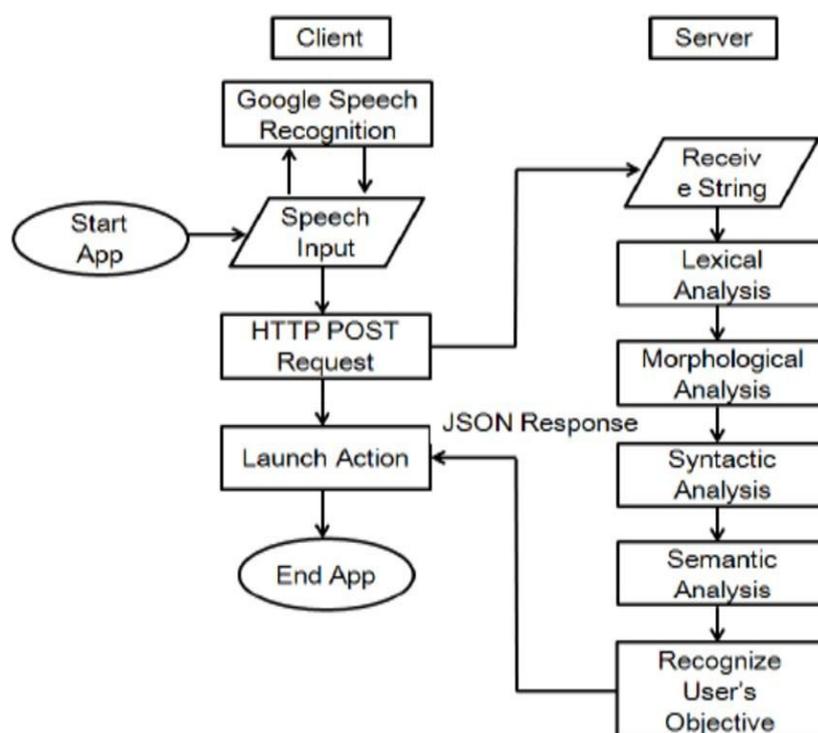
## DIALOGFLOW

Dialogflow is a natural language processing library which is built on the top of google machine learning infrastructure. It uses powerful machine learning mechanism and tools to understand what is the most expected contexts of what user can say. Dialogflow works seamlessly across all platforms of devices including Mac, Windows, Linux, RHEL and Debian systems. The context detection mechanism is so strong and it doesn't need rigorous training to push the model into production.

The intent is based upon what user wants to say or in technical words which function or job should be triggered when user speaks or writes certain statement. The natural language is processed and based on this intent the respective function is triggered by passing all the parameters which is required for the proper operation.

Entities are those objects which are parsed after processing the Natural Language and then later

is integrated with respective API and called by mentioning the proper tokens to call the API. Dialogue Control is a mechanism by which the user can start a conversation with the assistant and goes on by communicating with the assistant in the same context.



User: What's the temperature in Delhi ? Assistant: 17 degree Celsius

User: What was that ? Assistant: 17 degree Celsius

The assistant doesn't forget the context in which the conversation goes on which provides rich user experience. Conversation design is designed in the sense by which the statements should not contradict with two intents. i.e. for one statement first intent is triggered for other statement of same context other intent is triggered. The assistant should not get crashed after clashing with two or more intents and entities. Although the Dialogflow already has a mechanism to train the built agents but it's always recommended to train the models in the particular domain as training the model with respect to particular domain provides greater accuracy and more flexibility rather than just utilizing general trained models.

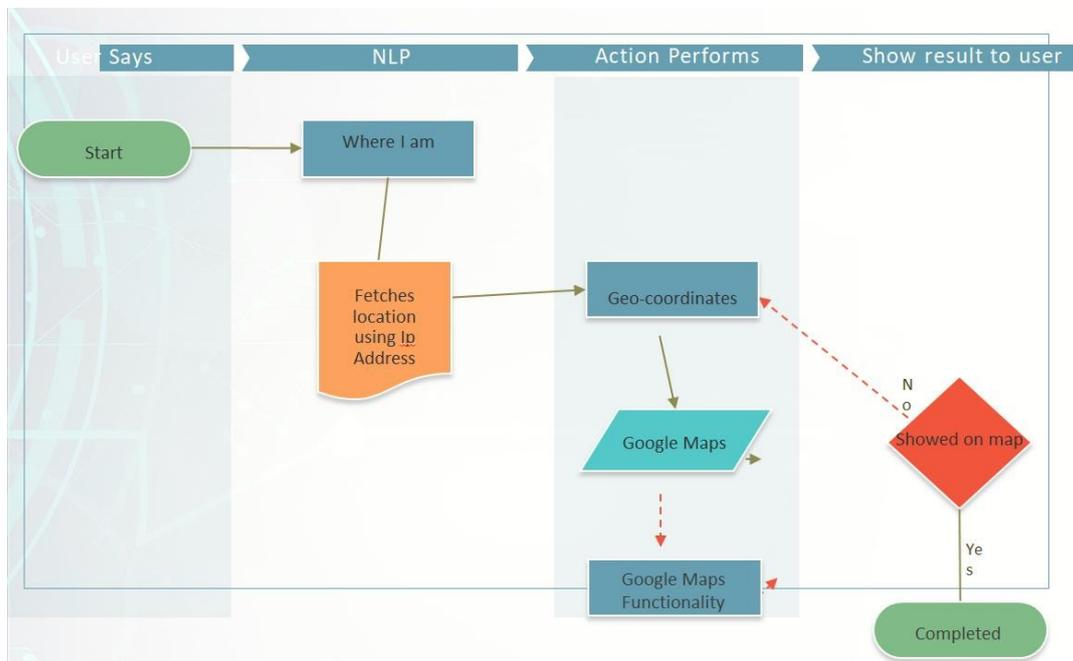
Custom logic can be added in DialogFlow which is the major concept in building customizable agents and projects. We have added so many custom logics in the project by linking context to respective APIs.

## FIREBASE

Firebase is a platform which is backed and powered by Google and it provides features and full compatibility to all the platform (MAC, iOS and Windows).

Why we chose firebase is because it provides real-time updates, notification push messaging service hosting, authentication with Gmail, facebook and github. The serverless architecture of the firebase enables developers to create robust application without worrying about scaling up the server and scaling down the servers.

The scaling process happens dynamically in the background i.e. For an application if live traffic is low at some point of time then it scales down the servers and saves the computation cost, but in some cases if the traffic is huge then proactively scales up the server without crashing or putting processing overhead on limited servers.



The hosting is done on firebase and it happens in one click with the command "firebase deploy" in the firebase repository. The app is hosted on the firebase servers and the uptime provided by firebase is 99.99% which is almost equal to 100%

Push notifications feature is provided and whenever a new function is triggered in background an job gets triggered in background which provides real-times updates seamlessly on front end

We have authenticated storage feature in the app which will directly store user files and transfer it to database

## AXIOS CLIENT

Axios is promoted by node package manager which is promise based HTTP client for the browser and node.js It makes XMLHttpRequest from the browser which supports the promise and handshaking concept unless and until the both the client side request and server side response gets in sync. the response is not delivered to the client Moreover it provides the feature to cancel the requests and automatic transfer to JSON Data which can be accessed by response. data.parameters Axios supports both GET and POST request although POST is better if security is a great concern but Axios also make GET requests secure upto some extent.

Axios supports:

1. No authentication
2. Key based authentication
3. OAuth authentication by providing proper headers.

## PROPOSED SYSTEM

The present leading IDAs such as Google Allo, Amazon Alexa, Apple Siri, Microsoft Cortana etc, tends to be more abstracted and organizational centric. The user has to create the account in the respective

company's portal, use their proprietary devices and methods to get started. There is no present IDA which works on Web, every present system uses its own native platform. The hardware required for automation and providing IOT-based operations are extremely expensive with little service and care. For e.g.: Smart Bulb offered by amazon for incorporating with alexa costs around Rs1000. The unnecessary abstraction can actually lead to making users more paranoid, not to mention the actual personal data these devices get off of users can be used in any illegal means. The existing assistant's ulterior motive is to collect user's personal data which and allegedly use it for other inappropriate tasks. Although, with such a huge radical database of users and continuously updating it with their powerful machine learning algorithms which helps them improve and get better every second. Nexllo is platform independent IDA/Web application which can perform the tasks on any device working on any account registered in any company's portal. It mostly uses open-source libraries for most of language processing part for which the code is available on github itself. This gives user independence to perform any personal customizations on it, for instance adding an extra layer of security.

Microcontrollers like Arduino and raspberry pi can be used for automation and IOT-based operations, which tends to be less expensive and more universal and efficient. Nexllo aims on providing user the flexibility to make his/her own decisions which present system lacks. While, the proposed system is cross platform and tends to be more open to user and provide room for customizations, the present system are still backed out on huge databases and strong training models.

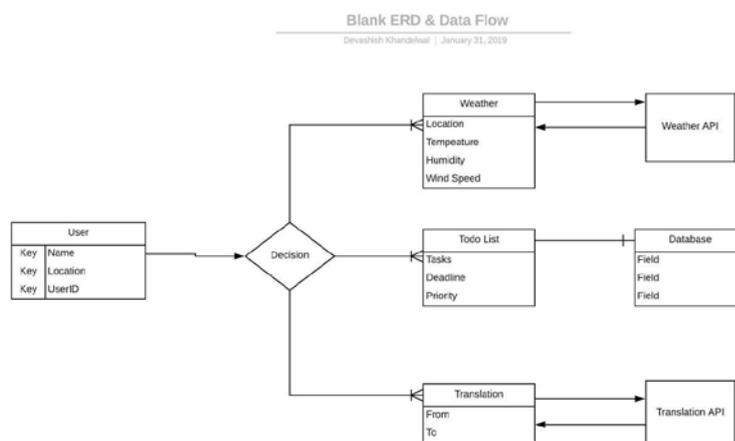
The algorithms used in present systems are much more efficient and fast which can be used in the proposed system as well.

The Large radical customer base of Google and Alexa provide the machine learning algorithm with huge amount of data to train upon and learn and grow better as time goes. The realtime human day to day human interactions that are saved in these assistants are used for training the algorithms making them get better and improve every second.

These like Google's Dialogflow algorithms that are made available which provides intelligent responses following the reference model can actually be used in other applications to make them better. Since, Nexllo works on top of various other applications, the overall control over the device and functionalities offered by other applications can be controlled just by a simple voice command. It is proved to be useful intensely among BLIND PEOPLE. The project aims on the user's flexibility thereby letting user to add modifications and customizing the IDA according to his/her own needs. It follows the universal intent of personal assistants - To make lives easier.

## USAGE

1. Translation to and from 8 regional and 2 foreign languages.
2. Detailed weather report of the user's current location or a query for any location around the globe.
3. Notes and to-do list maintenance for users.
4. Inbuilt Chat support with other users registered.
5. Inbuilt E-Recharge system for any service provider.
6. Location detection which is shown as marker on the Google maps.
7. Integrated with IoT Components.



## CONCLUSION

This paper focuses on the application and development of Nexllo. Our digital assistant can provide multiple features with proactive responses running on any platform of user's choice. The application uses real-time database to sync among all the user's devices.

The usage of DialogFlow and its importance is properly mentioned. The huge radical database of Google which keeps on improving the library by machine learning and artificial intelligence can be directly used dynamically in the our application and therefore benefit from it, hence proving the decision of using DialogFlow appropriate and efficient. It is important to mention that are project would also support IoT devices and likes of which are being tested. The microcontrollers like arduino and raspberry pi can be used to perform home automation as they are cheap and easy to use as compared to other proprietary devices. So, to conclude Nexllo is a platform independent next- generation digital personal assistant that possess proactive behaviour which is cross -platform and perform all kinds of personal day to day activities like setting up alarm, checking news, language translation, checking weather, perform internet searches etc. with the possibility of home automation Creating a Cross Platform application presents a lot of challenges in itself, generating a codebase which can seamlessly operate on top of any device may it be macos, android, windows or linux. Understanding how the assistant interacts with underlying operating system was of the utmost importance. For controlling various applications, permissions were needed. Making several different APIs work together to produce results is a tricky task. Cross- Origin Policy adopted by many modern browsers which does not allow requesting resources from multiple domains presented itself as a challenge.

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