A Location specific and Trends based Video Streaming Platform with integrated Web Speech API through Angular 6

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Abstract— Online video search and play is an aspect of that is used for innumerable purposes which comprise infotainment, video-logs, advertisement, endorsement, etc. It is one of the most resource intensive processes. Using up-to-date technologies to create an application to improve both user experience and application performance is important so as to adapt with the changes like hardware capability, bandwidth speeds and software platforms. To attract users from conventionally used platforms to newer ones we utilize the latest Angular v6 framework for creating a cross platform single page application (load once and refresh dynamically mechanism) which can be developed on a component and service driven model using any popular programming language along with the features like voice enabled search through integration of open source web speech API for real time voice recognition and content filtering based on trend, geographic location and other statistics. To create such application the primary need is to avail it with vast amount of organised data that can be easily accessed; a suitable data API like YouTube API can seamlessly be used with the application. This web application is highly responsive with support for mobile devices like tablets and smartphones. It can be easily morphed as the technologies advances, newer versions Angular provides facility to extend older versions with features introduced with them. The proposed application has the potential to be extended by adding other APIs to suit user's need and expand our application's database by adding more than one source for videos through integration of multiple data API.

*Keywords—*Angular v6, Single page application, video player, web speech API, voice recognition, location based search, YouTube API

I. INTRODUCTION

Angular 6 is a JavaScript framework that makes it convenient to build applications on the web. It supports applications that live on the web, mobile, or the desktop thus providing cross platform solution. Each Angular application consists of Components and one Angular Root Module, which can then have various components to divide the functionality into several parts. A component consists of a Class which contains its properties and methods, Metadata is used to decorate the class and enhance its features and Template is used to illustrate the view which is visible in the application.

Angular v6.0 shows a sizable innovation in the structure the architecture of Angular v1 is based on MVC (Model-View-Controller) whereas Angular v2 is Service/Controller type architecture while the latest i.e. v6.0 operates a much flexible component and services model. The Angular Development Community makes use of the features provided by the Angular 6.0 which has brought major improvements in the developed code size and application performance, with features like two-way binding the Angular reduces the development effort and time while implementation of unidirectional tree based change detection which efficiently manages the flow of application and hierarchical dependency injection significantly boosts performance.

For dynamic web applications Angular 6 provides a structural framework that allows the developers to extend HTML as a template to express application components clearly and in a summarized format. Its data binding and dependency injection allows creation of business components without having to get deeply into creating the services (security checks, input output validations, etc.). All these features are available with the application that could be accessed through any web browser, making it an optimal partner with any server technology.

Media streaming have grabbed huge attention in last 10 years, as of January 2018 an average of 85% of total computer users with internet access it. Interacting with

computers intelligently makes a significant contribution to the future application of human computer interaction [1]. Modern day requirement is to work with high efficiency coupled with minimal resource utilisation and very acute time consumption. And thus, key to the problems arising in the traditional media players is deficit of user convenience that is expected from available media players. This paper cites an idea of a web-based platform that presents online video streaming along with the amenity of voice search and is developed with the power and performance potency of the latest Angular framework.

Along with most of the inherent capabilities of a video player that this platform proposes to integrate with streaming, several features are added to the platform to provide enhanced overall user convenience and improved usability. This platform proposes to integrate location based video search capability, improved voice input for searching using Web Speech API, and video playlist management with ability to create, edit, queue, shuffle, modify, and remove the contents.

The Web Speech API that is used in the system makes better interaction of web application with the help of voice is open source. This API is capable of real time, vocabulary speech recognition. By this we can recognize both words and number provided in the form of voice and get the result in the form of text [5]. Another aspect is achieved by utilising the geographical identity of a user which defines the location from where the application is being accessed [9]. Therefore, in our system, we propose an approach to deliver location-based trending videos. For this, we have used a service i.e. youtube.service.ts in our application which fetches the searched text from the user in the form of voice and extracts the trending videos based on users choice.

71% of the people in United States accepted to prefer voice based technology so it is natural to integrate a better human interfacing technique to improve the UX (User Experience). User should be able to interact to the system with least difficulty thus, providing voice search (through speech recognition) and location based search will allow user to be closer to the application in terms of usability. The system provides elimination of language barrier and content filtration that is location specific and could be modulated as per the needs of the user.

II. LITERATURE SURVEY

We saw with the emergence of web 2.0, plethora of contents being hosted of the servers with applications accessing these data. Over the time it has become a challenge to provide fast, responsive and optimized content thus, we need platforms over the web to provide same pre-existing services but with improved performances.

Angular v6.0 [7] is a new JavaScript toolkit having been introduced March 2018. It has already become prominent among web developers and UI engineers ranging from Start-ups to big industrial setups. The frameworks like angular can provide much needed resource friendly and fast services [8], thus, we try to implement the fore-mentioned in our system for the most resource heavy web service i.e. video streaming on the media players available online [10]. With the use of Angular [2] and with added usability improvements [1] we can create a media streaming platform over popular websites with location based search supported by web services [4], this system leverages the latest version of framework technology available to keep up with the fast pacing web development industry and provide service with at most efficiency and performance.

A comparative perspective is very necessary before selecting a framework for application development; Angular was the clear choice for creating single page application and integrating the API's. The paper on comparative study of frameworks provides this important view with respect to diverse criteria like data management, code optimization and third party external packages to choose among the most popular frameworks [3].

A Location-based service is an instance of pervasive computing. It considers the user's location in order to deliver a service as required on web applications [9]. It employs accurate, real-time positioning to provide content as per users location. Our system looks to use this with the content filtration to provide best possible list of videos. Several data API's were taken in account to judge which would suit the best with vast data store to provide ample content for the system, average user consensus and traffic were accounted for, [11] these points helped us decide the YouTube API to begin with.

Integrating voice based search in this type of application will provide capability to understand specific context of sentences, words and make the user flexible to input as a voice and also help to control all the web application text available on the web server. Many implementations are already done on English speech recognition [5] which is employed in the application. Adding the voice based search as proposed in [5] and [6] enables the system with a feature highly sought after in the web development domain for single page applications.

We can achieve a solution that is closer to the user, with present day requirements of performance [8] to get a system as envisioned in [10], which still attracts users through its added capabilities.

III.   PROPOSED SYSTEM

The system being proposed is an online video player application which follows a component driven latest angular v6 architecture to fetch and play videos using a data API. The system proposes to integrate web speech API which would add the capability of speech for searching through the content and provide filtered results based on the geographical location of the user. Upon receiving the result, a user can choose from the list and play the content.

Selecting a framework is the most prominent aspect for any web application development process, the proposed system aims to develop a single page application by leveraging Angular v6 framework following criteria are taken in account to select this framework.

a)   *Overheads in development*

Angular packs minimal overhead in the code, its unique loading mechanism, declarations and directive structure combined with code injection and decorators reduces the overheads greatly. This allows us to concentrate efforts on feature development of proposed system rather than the service code.

b)   *Workflow among components*

Angular v6 has a defined workflow to start with a bundled application is heavily optimized and compiled to get an efficient workflow among the components, enhancing the inter-process communication. Integrating the API becomes rather simple as workflow is managed by the framework; this forms major criteria for selecting the angular platform.

c)   *Rendering on server-side*

For any single page application this is the most important factor towards its efficiency, the Angular connects with Node.js (a JavaScript runtime environment for web applications) and runs the same application at server as well as browser, then statics pages are generated and rendered as response to browser. Angular has capability to generate HTML pages beforehand allowing reduced response time as compared to other architectures; this feature is most realized in the proposed system.

d)   *Simplicity and reduction of code*

Angular simplifies the complex large code through its defined conventions and file structuring, unlike other frameworks the file attributes are provided in detail. This ability of Angular factored while selecting a framework for our proposed system since writing business logic is easier.

e)   *External packages*

Unlike other frameworks where third party packages need to be installed to extend the application and often includes, some extra costs. This is not the case with Angular, its huge base community provides a vast number of function packages most which are included in installation bundle or freely available on its website for application development.
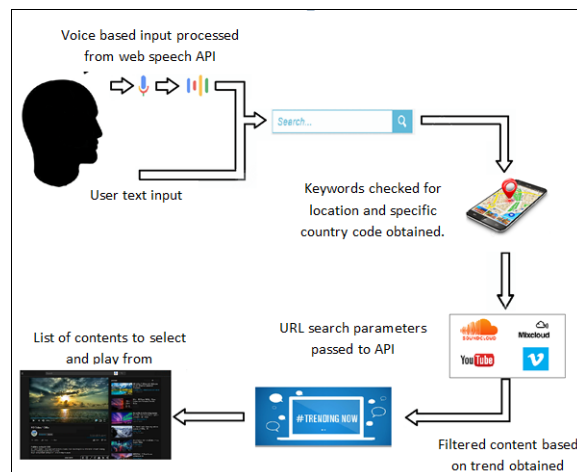

Figure 1: Architectural flow of the system

The given flow diagram depicts the overall flow of the proposed system and the integrated modules. The system works on the same line as shown.

A.   *User Input*

The user provides the input for showing the list of related content; any user will have two ways to give this input.

1)   *Text based keyword search:* By typing the keywords directly into the search bar which could then directly be fed to the next step for recognition of location based entity and search parameters in the data API.

2)   *Voice based search:* User can provide input through speech which gets processed by the speech recognition functionalities to provide the system with keywords that could be used by other features to get the further processing completed.

B.   *Voice Input*

This feature is provided through the web speech API which is integrated to process the voice input given by the user, this parses the voice and provides the appropriate output which is automatically fed into the search bar to carry forward the process.

We propose to utilize version 2 of this API through which we get properties to set the language of speech, the alternatives that can be predicted for any input and possible resulting keywords from the speech processed. Several Event Handlers are availed in the API; we use these to control the processing in API. A list of methods to start/stop the recognition process, to identify and notify of any errors if occurs and to perform similar activities used to manage the control throughout the API.

C. Search bar

This bar primarily is angular v6 element which is designed with autocomplete feature to assist the user. The keywords are received from user either by typing or through web speech API. This API is capable of real time, vocabulary speech recognition. By this we can recognize both words provided in the form of voice and get the result in the form of text.

The system's search bar processes this text and provides keywords to the data API for fetching the content. In YouTube API, the YouTube search algorithm is extensively utilized, SEO based optimizations are used to select and filter from its data store.

D. Location and Trend based filtering

This feature of the proposed system takes care of filtering the output from the YouTube API and provides a list of results that is trending specific to user's provided location. The provided keywords from the search bar are traversed to find location specific string which is then matched with an array of country names along with its specific codes, if a match is found the code is extracted and set to the selected country data structure this value is now used to filter data from the source by providing a constraint while selecting the final content.

E. Data API

We use an API to search through the content and provide output to next module. Although any data API can be integrated to the proposed system, to begin with we have chosen YouTube API. Its interface consists of data along with analytics information pertaining to files and capability for live streaming services. This API can work with simple HTTP requests with mutli-language support with all prominent programming languages (Java, python, JavaScript, PHP, .Net). To access this data, user only needs to have a valid API key that can be availed with a Google account.

In our proposed system input is provided to the YouTube API v3.0 through the search bar by text or the result from web speech API. In either case, the keywords are matched with country location (if present) and appropriate country code is selected. An Event Emitter calls the YouTube service. The API key is statically set and when a service call occurs, functions are called to set the URL search parameters, to get the selected video details like:

    a) *Number of views*

    b) *Likes and dislikes for each video*

    c) *Content description*

    d) *SEO related keywords*

    e) *Metadata*

Another function opens video player to play the video. The DOM Sanitizer service maps the selected video to its id and provides the embedded URL for that video.

IV.   FUTURE SCOPE

The domain of web development is an ever evolving set of technologies, with better performing frameworks and tools coming on top of existing ones in a very short span. Considering this rapid improvement the most important future scope with the proposed system would be to keep updating the underlying frameworks and tools used to take care of the performance aspect of the system while keeping it relevant to that future. The system also has several areas of enhancement, from usability perspective the support for multi-language input for searching and handling the system and adding up multiple data API (which work parallel) on the same interface to avail user with richer content which is always the aim to generate more engagement with the system.

V.   CONCLUSION

This location and trend based media search platform is culmination of several up-to-date aspects of web development to deliver high standards of performances and enhancements. Using latest Angular framework i.e. v6 ensures efficient and reliable system development, integrating latest versions of web speech API and YouTube API to extend their functions in our system is flawlessly supported by Angular. Adding the speech input to the system improves usability and attracts user base that prefer it over conventional methods. The location based content filtration is another aspect of the system that provides diverse set of result amongst the vast content library of the selected data API. Several other consensuses formed from the metadata and description is accounted while presenting the output. With combination of these aspects we get a unique system to present users with a fresh interface to work with.

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