What we are asked in the project:

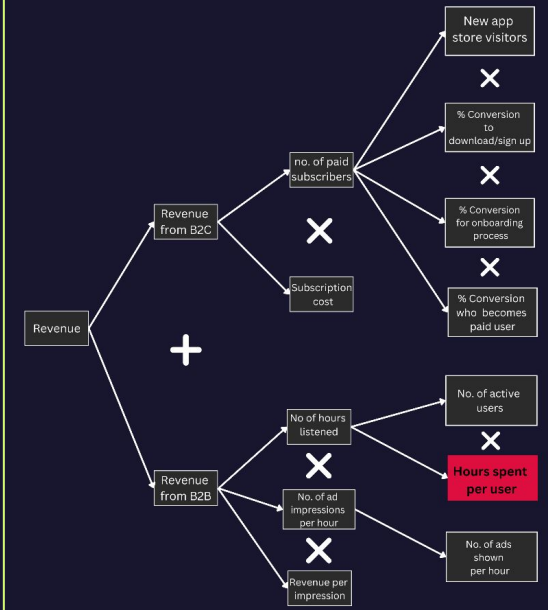
1) Product Outcome: **Increasing the time spent listening on the app**
2) Assume the tech bandwidth is infinite.

About Spotify:

By the end of fourth quarter of 2021,

- Total number of users: 406M
- It has basically two revenue models:
  - Advertisement and promotions as a B2B
  - "Spotify Premium" from the consumers as their paid subscription
- 180 million premium subscribers.
- 29% users are millennials.
- 52% listen from smartphones.
- Around 3M podcast, 80M+ tracks, 4B playlist available.
- Age 18-34: 55% market share.

Click here to check survey



Why is Spotify interested in achieving this product outcome?

Every company looks for achieving the business outcome, for every product outcome it states, so it's better to breakdown the equation of "Revenue" as the major business outcome to answer the above question. After breaking down, now we know why this outcome should be achieved.

Though this can be broken down further, the purpose was achieved and highlighted in red.

This product outcome has direct impact with the B2B revenue generation and indirectly with B2C too.

1 on 1 talk insights

I am an anime fan and the worst thing about spotify is that I am not able to find most of anime ost there. Like, I see an episode and I like the background sound, I try finding it on spotify but its never there early, so I go on to youtube music where I am generally able to find that.

-Ayush Gupta, Age:22

I spend a lot of time on instagram reels and youtube shorts and usually like the short sound tracks being used in those contents. It becomes really difficult for me to find those tracks on spotify as I don't know title of the song most of the times.
Because of this I am usually not able to add the music tracks which I like in the playlist curated by me.
I mostly listen to my curated playlist and this is one of the reason why I drop off, as the songs starts to become repetative.
I have tried recommended songs but I dont really like the genres they suggest, also the daily mix seems good for few days, but later becomes repetative.

- Harish RT, Age:22

Playstore reviews

Collection of songs are decent but these irrelevant songs are so annoying. Random songs starts to play between a song or two continuously. Each ad which plays goes for a minutes or half so please shorten their length.

- Niha Shareef

Overall I like the app, but there are changes I would make personally. I would make it easier to block unliked songs permanently the moment you hear them. Rather than having to go searching for the option.

- Samuel Mayer

I don't know what happened. Soptify has gone downhill. My homepage is now filled with things I hate. Daily Mixes are showing the same set of songs. After 10+ years subscribed, I'm really dissapointed that I feel I need to switch services.

- Conrad H. Appel, IV

Most common **Customer Painpoints**

Non-premium users are frustrated due to the **frequent ads** being shown on the platform.

The **recommendation system on the platform is broken** and users feels that the songs are repetative and not curated nicely.

Users are **not able to curate their own playlist** as they are not able to add the songs they like in their playlist, the main reason being they dont know about the title of the music track hence not able to find it on spotify.

Looking at the pain points stated above, I am prioritising the pain of "Users not able to curate their playlist".

The reason for choosing this is because:
1) Solving the problem of ads is directly proportional to impacing the business outcomes in a negative way.
2) Solving recommendation system is more on the tech side, and less of a product challenge as a whole.
3) Solving the problem of helping users "make their best playlist by themselves" is directly impacting the time spent on the platform.
4) Around 77% of the playlist being consumed is user generated which shows that users prefer their own playlist rather that what recommended by Spotify. Survey Link

JOBS TO BE DONE:

When I want to add a song from Youtube shorts to my Spotify playlist
But I am not able to find it on seaching in Spotify
Please help me with finding the specific song on Spotify
So I can add it in my playlist and spend time enjoying those songs.

What is the Problem Statement?

Existing users of Spotify are facing difficulty in finding the sound track and trendy music which they listen on other platforms like “Instagram Reels” and “Youtube Shorts” as they don’t have name of the track. Because of this, they are not able to curate their playlist well and hence listening time is getting reduced as they eventually drop off due to bad recommendation.

How does our ideal user persona for the above Problem Statement looks like?

- Gen Z
- Age group from 18-30 years
- 91% of these users according to survey spends time on social media apps like Instagram, Youtube, and Tik Tok.
- Music lover who wants to curate their playlist themselves.
- They love trendy sound track and wants to add the complete song in their playlist.

I conducted a survey where 31 respondents participated. This was done to validate the Problem Statement. Insights from the survey are as follows: Survey Link

- **63%** Use Spotify for listening music.
- **93%** Have created their own playlist on the different music platforms they are part of.
- **61%** User prefer spending time on playlist created by them. 43% also listen to random songs, and around 36% also listen to the playlist created in collaboration with friends.
- **43%** Users have searched songs on Spotify after listening them on other platforms.
- **67%** Users were not able to find those songs on search as they did not knew the title of the song as they heard them in reels and shorts.
- **53%** Users do not have all the songs they want in their playlist.
- **64%** Users were from the age group of 18-30 years

User Persona Biographics:

Name: Harish RT
City: Bangalore
Age: 22
Key traits:

- College Student
- Loves spending time online(4 ot 6 hrs).
- Only prefers listening to his own made playlist online.
- Short video lover and spends time on platforms like Insta Reels and Youtube shorts.

Scenarios:

- Harish was enjoying content on Youtube Shorts.
- He really liked a sound track being used in the one of the Shorts.
- He wanted to add the complete song of the sound track in his playlist on Spotify.
- He went on Spotify and tried searching for the song.

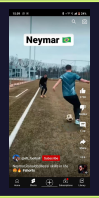
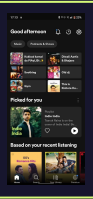
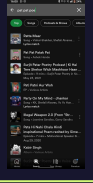
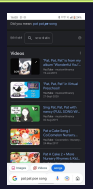
Harish's Expectations and Thoughts

- Finally my playlist will have a new song which I will be able to enjoy later.
- I just hope I am able to find this song on spotify.
- How should I know the name of the music track so that I can search it on spotify?
- Is the song even available or am I not able to search it?

Insights from the user journey

1. The problem starts as soon as the users wants to add the sound track and they don't know about the title of the track.
2. Since the title is not present, even Spotify is not able to show the adequate results.
3. They prefer Google for getting to know about the title of the song, so that they can come back and add the song with the exact title in their playlist.
4. Those who prefer listening to playlist push themselves to anyhow to get their favourite songs added in the playlist.

User Journey

Journey Screenshots	Doing	Thinking	Saying	Feeling
	- Harish is enjoying youtube shorts. - He heard a music track which he liked a lot. - But he could not figure out the name of the track.	"Oh this is such a good music track" "Let me figure out the title of the track with the lyrics of the track."	"Let's quickly add this song to my playlist" "I will enjoy this song later with tea, once this is added. This will be so fun."	
	- He then logged into his spotify account to add the song in his playlist. - He looks for the search button inside the app to find the song.	"I hope I am able to find this song" "I hope the title of the track is the same what I have figured out"	"Let me quickly open Spotify and search for this song." "Can't wait to add this in my playlist"	 Hoping
	- He typed out the few words he could figure out from the song. - After search, he started looking for the results of the song but couldn't find the one he was looking.	"Which of these result matches with the music track?" "I don't think it's present there, this is so heartbreaking."	"Why is it not present here?" "I think the title of the track is incorrect, let me search for some other title"	Disappointed 
	- Harish then left the spotify app. - He did not want to miss out on adding the song in his playlist so goes onto Google to search again. - He still couldn't find the song.	"Let me try finding on Google. Google will definitely have some result for this." "I will be able to know the correct title of the music track. Then I will go back to Spotify."	"Why I am getting so many random results on Google" "I guess I will not be able to find the music track."	 Frustrated

Possible Solutions

01 Search Flexibility

IDEA: A tag based search flexibility. Through this, if a user is looking for a particular song, even the few "known lines of the song" can also be searched.

FEATURES/WORKING:
1) If the user is looking for the song "Baby Shark" then they can even search for "Mommy Shark", "Shark tu tu tu", or "Daddy Shark".

2) Leveraging the elastic search algorithm in the backend to add the other tags in the json for searching.

02 Spotify Detective

IDEA: The feature will be able to detect the music being played on other platform. It will be able to work in background and whenever enabled will be able to detect the background sound in the other apps like Instagram and Youtube.

WORKING:
1) This will work by analyzing the captured sound and seeking a match based on an acoustic fingerprint in a database of millions of songs.

2) If it finds a match, it sends information such as the artist, song title, and album back to the user. This can be used to add the song later in the playlist.

03 Introducing Trendy Playlist

IDEA: Introduction of dedicated playlist for the users which includes only those songs which are trending on the other platforms.

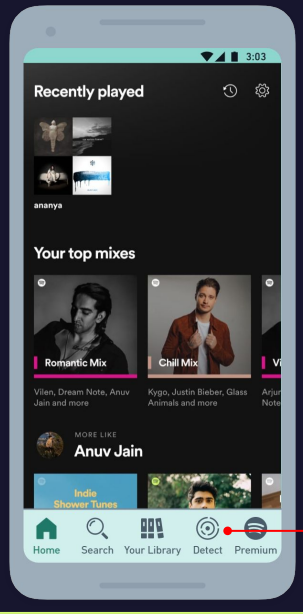
PROBLEMS WITH THE SOLUTION: How will the song be selected as trendy and what criteria will be considered to claim a song as trendy.

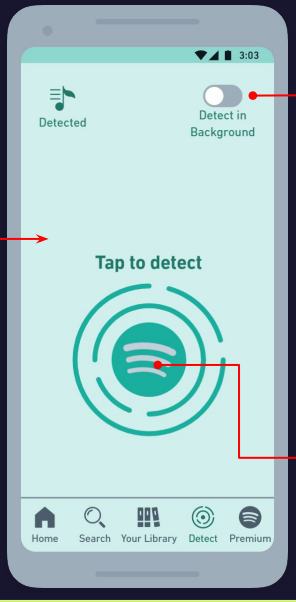
FEATURES/WORKING:
1) Dedicated playlist with "Trendy Song List" being updated accordingly.
2) It will be present with the other set of playlists like "Daily Mix", "Your top mixes" and others.

Solutions	Value	Reach	Alignment with company goal	Efforts	Final Score
01	★★★★☆	★★★★★	★★★★★	★★★★★	3.6/5
02	★★★★★	★★★★★	★★★★★	★★★★★	4.3/5
03	★★★★☆	★★★★★	★★★★★	★★★★★	3.6/5

Looking at the different criteria after prioritizing and considering the efforts as equal for all the solutions due to the unlimited bandwidth, **Solution 2** is what I will be implementing.

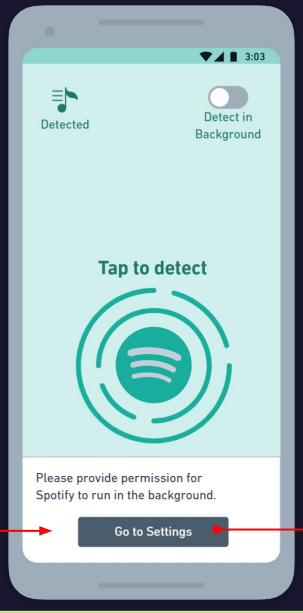
WIREFRAMING AND PRODUCT FLOW

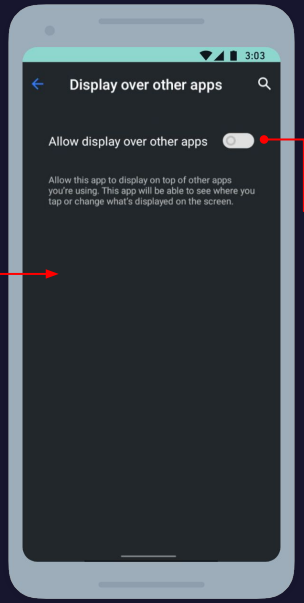




On clicking for the first time

If the song is being played on some other device, this can be pressed to detect the song and adding it in the library.





A new tab in the bottom section which is for Spotify Detect.
"Detect" CTA is the only entry point into the feature as of now.

There are two type of songs which the user can detect:
1) If the song is being played on some external device, which may be laptop, so satisfying the need of a web user.
2) If the song is being played on the same device.

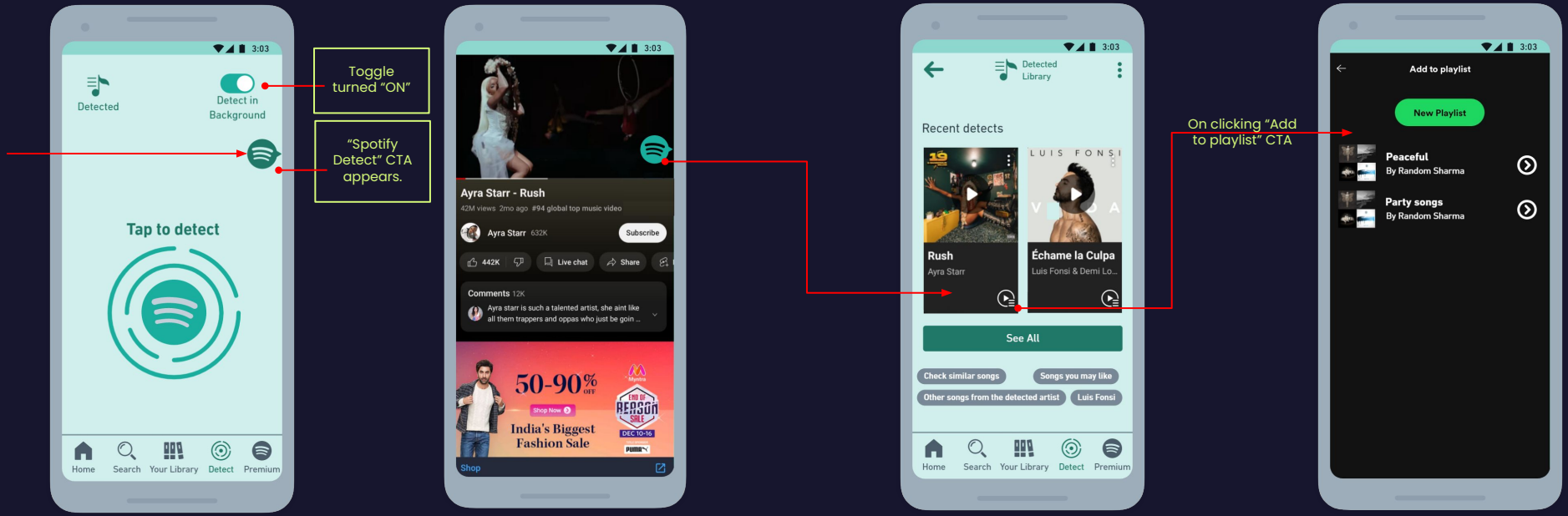
On clicking the "Detect" CTA, a new "Spotify Detective" Screen opens up with three key features:

1) An "External song detect" CTA in the mid of the screen.
2) An "Internal song detect" toggle button on the top right, which is used to detect songs being played on the same device.
3) A "Detected Library" CTA which when clicked takes the user to the list of songs which has been detected successfully.

What does "Internal song detect" toggle button do?

1) First time click:
   a) When clicked on the first time, a bottom sheet opens up where Spotify asks permission from the user to run in background of the other apps. For this "Go to Settings" CTA is provided which directs the user to the mobile settings.
   b) In the Settings of the mobile phone user provides the permission for Spotify to run in the background.
2) The above process doesn't activate the toggle, the user again needs to click the toggle to start running the Spotify in the background.

WIREFRAMING AND PRODUCT FLOW



As I explained in the previous slide, after providing the permission, the toggle will still be in "OFF State".

Once clicked again, the "Internal song detector" toggle turns on and a "Spotify Detect" pop up CTA appears on the screen.

This CTA can be removed in two ways:
1) Switching off the toggle button.
2) Killing the Spotify App.

Now the user can go back to the platform they were enjoying like Youtube Shorts or Instagram Reels and click on the "Spotify detect" pop up CTA.

The song will then get matched with the database of millions of songs of Spotify and detected through the process which will be explained in the next slide.

User can then come back on to the platform to enjoy the song.

Once the song gets detected successfully, the user can come back to Spotify and in the "Detect" tab, they can click the "Detected Library" CTA.
On clicking "Detected Library" screen opens up. The screen contains:
1) Two recently detected songs will be there on the screen with a "Add to playlist" CTA on each card. User can listen to the song from here or add them in their respective playlist and listen to them.
2) There is a "See all" CTA to check out all the detected songs.
3) And hyperlinked tags for other recommendations which the user can check out.

On clicking the "Add to playlist" CTA, a new screen opens up where the user can add song in the playlist they like or create a new playlist.
This entire journey will help users add the songs they like and thus they will spend more time on the platform hence solving the problem and achieving the product outcome.

TECH IMPLEMENTATION of Spotify Detective

Spectrogram:
It is a visual representation of a sound. It is a 3D graph with time on the x-axis, frequency on the y-axis and amplitude on the z-axis.

This is the 3D graph which can be analysed and stored and this is the base of sound recognition.

But there are lot of data in Spectrogram, and with more data, more computational time will be required to find the match of the song.

So next step is to reduce data required to classify a song. This is where Fingerprint comes in.

Fingerprint: In this process, each spectrogram of the music is changed into a 2D graph looking like a star map, with each star(point) represents the strongest frequency at particular times.

This reduces the data to be stored drastically and even the graph gets reduced to 2D optimising the space required in the database.

Hence ever song in the database is stored in the form of fingerprint.

So as soon as the button is triggered to detect the song being played, the microphone process the sound and the algorithm will convert the sound into its fingerprint.

Hash Table:
Now comes the time of computation.

Now, if we find the song directly in the huge database, the time for the processing will be really high. So here comes the catch of using Hash table.

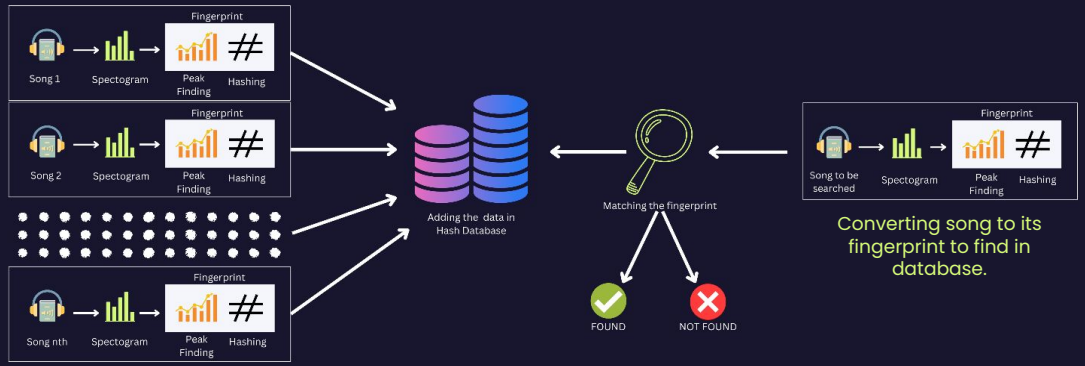
It is basically a data type that maps keys to values. A hash table uses a hash function to compute an index, also called a hash code, into an array of buckets or slots, from which the desired value can be found.

During lookup, the key is hashed and the resulting hash indicates where the corresponding value is stored.

So now for searching:

- Our hash function will take data from two frequencies separated as a particular time(this can be found from the fingerprint) as input and produces a number between a range let us say 1 and 1 billion.
- Then first we will have to go through the database of songs and calculate the hash number for each anchor point pairs.
- Songs will contain multiple anchor points, which will allow to categorise short snippets of songs by the frequency of anchor point, the frequency of following point and the time between them.
- And now we store each of these anchor point in order of hash.
- These addresses are also categorised with the song IDs, and the timestamps within the song in a secondary hash table running parallel to it thus allowing us to search for matching songs.

This will make the entire searching possible among millions of songs and boiling down the search to few seconds.



IMPORTANT METRICS

TYPE	METRICS	TREND
NORTH STAR	Time spent on the platform listening to songs added/detected through the Spotify Detective.	↑
ACTIVATION	**1)** # of users clicking on the “Spotify Detector” CTA on the main screen / # of users who can see the CTA. **2)** # of users providing permission to use Spotify in the background for Spotify Detector / # of users entering the Spotify Detector screen. 3) Time taken by user to provide permission after exploring the “Spotify Detector Screen”.	↑
ADOPTION	1) # of users detecting the song for the first time / # of activated(permission granted) users. 2) % active users who detect at least one song weekly(WAU).	↑
ENGAGEMENT	1) # of users successfully detecting a song / # of users detecting a song. 2) Total number of songs being successfully detected by the users weekly. 3) # of songs being added in the playlist from detected list / # of songs being detected 4) Average time spent by the user over the detected songs.	↑
RETENTION	1) % activated(permission granted) users detecting more than one song in a week. 2) % activated users detecting songs successfully more than once in a week. 3) % users adding more than one song from the detected songs into the playlist in a week.	↑
CUSTOMER SATISFACTION	1) NPS(Net Promoter Score) to know how likely the present activated users are likely to recommend the feature to family and friends.	↑

POSSIBLE PITFALLS

Risk 1: Users may not be able to understand the feature.
Solution: Proper info icon for explanation should be provided with a first time walkthrough experience.

Risk 2: The user may feel threat providing permission to Spotify running in background.
Solution: Inform users that the platform will only detect the sound and only when the CTA for detecting is clicked.

Risk 3: User consistently not able to find the song successfully.
Solution: The database of the songs should be updated frequently depending on the trend with optimisation of the search.