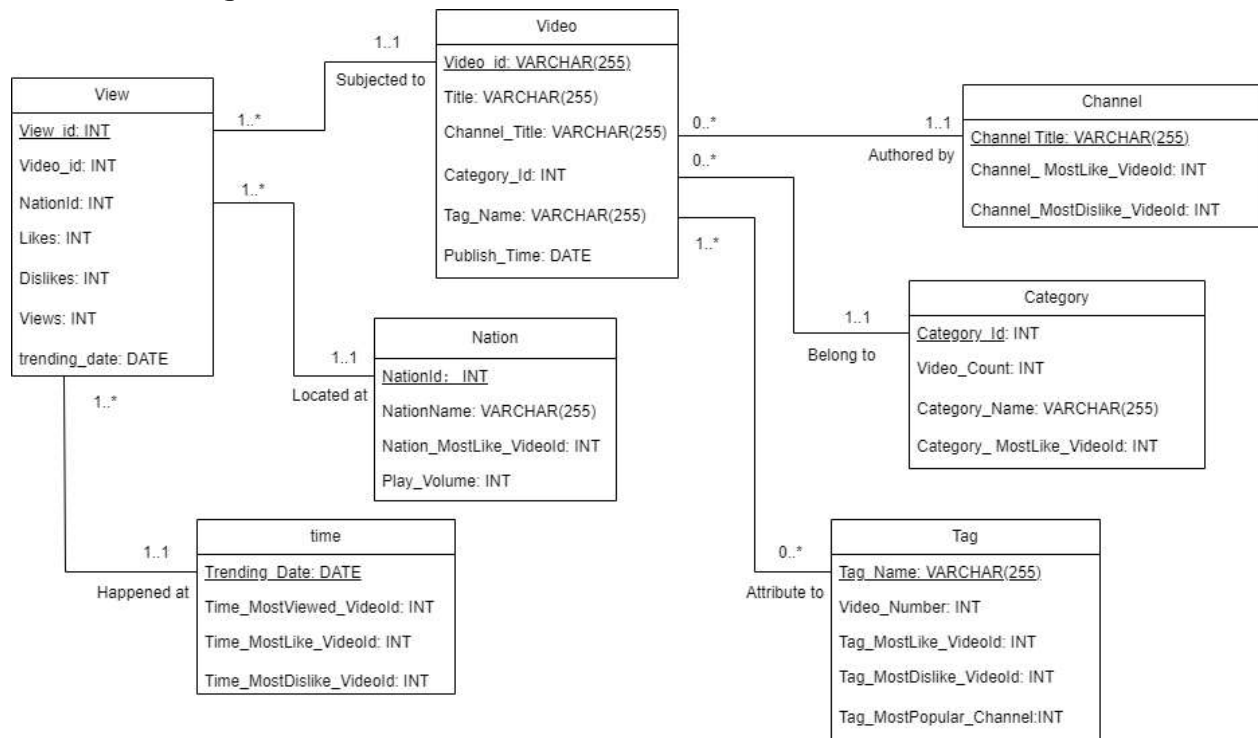


1. UML Diagram:



2. Normalization & show 3NF

In entity View, Regard View_Id as A', Video_id as A, NationId as B', Likes as C', Dislikes as D', Views as E', trending_date as F'

In entity Video, Regard video_id as A, Title as B, Channel_Title as C, Category_Id as D, Tag_Name as E, Publish_Time as F

In entity time, regard Trending_date as F', Time_mostviewed_videoid as A'', Time_MostLike_videoid as B'', Time_MostDislike_videoid as C''

In entity Nation, regard NationId as B', NationName as A''', Nation_MostLike_Videoid as B''', Play_Volume as C'''.

In entity Channel, regard Channel_Title as C, Channel_MostLike_Videoid as A#, Channel_MostDislike_Videoid as B#

In entity Category, regard Category_Id as D, Video_Count as A*, Category_Name as B*, Category_MostLike_Videoid as C*.

In entity Tag, regard Tag_Name as E, Video_Number as A~, Tag_MostLike_Videoid as B~, Tag_MostDislike_Videoid as C~, and Tag_MostPopular_Channel as D~.

Show 3NF: The third paradigm (Third Normal Form, 3rd NF) is that all the data elements in the table must not only be uniquely identified by the main keyword, but they must also be independent of each other, there is no other functional relationship.

Functional Dependency:

A->BCDE
A'->AB'C'D'E'F
F'->A''B''C''
B'->A'''B'''C'''
C->A# B#
D->A*B*C*
E->A~B~C~D~

Minimal Basis:

A->B, A->C, A->D, A->E
A'->A, A'->B', A'->C', A'->D', A'->E', A'->F
F'->A'', F'->B'', F'->C''
B'->A''', B'->B''', B'->C'''
C->A#, C->B#
D->A*, D->B*, D->C*
E->A~, E->B~, E->C~, E->D~

So in all tables of our UML, there is no data element in the table that depends on other non-keyword data elements in other tables. So our UML satisfies 3NF.

3. Relational Schema Definition

View (

View_Id: INT [PK],

Video_Id: INT [FK to Video.Video_Id],

Nation_Id: INT [FK to Nation.Nation_Id],

Likes: INT,

Dislikes: INT,

Views: INT,

Trending_Date: DATE [FK to Time.Trending_Date]

)

Nation (

Nation_Id: INT [PK],

Nation_Name: VARCHAR(255),

Nation_MostLike_VideoId: INT,

Play_Volume: INT

)

Time (

Trending_Date: INT [PK],

Time_MostViewed_VideoId: INT,

Time_MostLike_VideoId: INT,

Time_MostDislike_VideoId: INT

)

Video (

Video_Id: INT [PK],

Title: VARCHAR(255),

Channel_Title: VARCHAR(255) [FK to Channel.Channel_Title],

Category_Id: INT [FK to Category.Category_Id],

Tag_Name: VARCHAR(255) [FK to Tag.Tag_Name],

Push_Time: INT

)

Channel (

Channel_Title: VARCHAR(255) [PK],

Channel_MostLike_VideoId: INT,

Channel_MostDislike_VideoId: INT

)

Category(

Category_Id: INT [PK],

Video_Count: INT,

Category_Name: VARCHAR(255),

Category_MostLike_VideoId: INT

)

Tag(

Tag_Name: VARCHAR(255) [PK],

Video_Number: INT,

Tag_MostLike_VideoId: INT,

Tag_MostDislike_VideoId: INT,

Tag_MostPopular_Channel: INT,

)

4. Description of Assumption of Relations

1. We assume that one nation corresponds to multiple views because one nation could have multiple people who have watched the video.
2. We have one time corresponding to multiple views because the trending date for different videos could be the same.
3. We assume one video corresponds to multiple views because one video could be watched by multiple nations.
4. We assume one video corresponds to only one channel, but one channel could have multiple videos.
5. We assume one video only has one category, but one category could contain multiple videos.
6. We assume that one video could have zero to multiple tags.