

**Sri Lanka Institute of Information**

TMP-21-021

Technology**Project Topic Assessment – 2021****Topic**

Real-Time Augmented Reality Based Tool for Digital Media Production

Abstract (200 Words Max):

News broadcast is one of the main items presented by any television channel. Every channel is responsible for presenting daily news in a way that every citizen of the country could understand by not only listening but also by looking. Attractiveness and correctness of a news broadcast can increase number of viewers and it will increase the channel's popularity. Currently we can observe different approaches to increase the attractiveness of a news broadcast. Some approaches cannot be applied to all types of news broadcasts. Using technologies to create this attractiveness is another approach. Technologies such as using Augmented reality or creating 3D effects to represent news can create a modern and attractive broadcast. Currently, some local channels tend to use these technologies in some occasions such as election periods. Most of the times, these high technical graphic works are outsourced to other companies which can cost a significant amount to these channels. We propose a solution and a simpler way that any television channel can do to improve their attractiveness of daily news broadcasts without spending much money and effort.

Research Area/Group: Select the area by referring to the document uploaded to the Course web

Human Computer Interaction

Supervisor should fill this part

Supervisor: I certify here that co-supervisor and myself can guide this students to acquire required knowledge skills and attitudes pertaining to above sub domains of his/her specialization.

Supervisor: **Dr. Shyam Mehraaj**

Signature

Continuation of Previous Year Project? ☐
If yes, state the Project ID

and year

Co-Supervisor: **Mr.Thusithanjana Thilakarathne**

External Supervisor

Name

Team Members:

| Student Name | Student ID | Specialization |
|---------------------------------|------------|----------------|
| Leader: Wanigaasekara.M.P.W.P.A | IT18108514 | IT |
| Member 2: A.Vihanga Nivarthana | IT18091380 | IT |
| Member 3: R.M Bawantha Thilan | IT18175080 | IT |
| Member 4: Gankanda G.M.J.U | IT18063738 | IM |

Research Problem:

Broadcasting correct and attractive daily news needs substantial amount of money and workforce. Because of the high budget many channels only focus on creating accuracy but forsaking the attractiveness of the delivery. Below are few problems we came across in our research.

- Some television channels add creative content like bringing physical objects to the studio to represent the content that they are included in the news broadcast. But this is not practical in all situations. For example, a problem associated with coconut industry the presenter can bring a coconut to the studio and explain. But in a problem associated with Covid 19 virus, they can't bring a Covid patient to the studio.[1]
- Sometimes in some television channels, they outsource the graphic and 3D creative designing work to other companies. This happens specially in situations like the election period. This costs a fortune to the television channels. So, not all channels can spend huge amounts like that to increase the attractiveness.
- Correctness of using designs such as graphs also needs special attention. If a statistical information needs to be shown to the views in understanding manner, they uses different graphs such as pie charts, bar graphs etc. we have observed in last few months that some television channels (foreign and local) had difficulties of expressing the correct values in the charts that they have used. Once in a local channel, they have used wrong graph values for current Covid 19 patients verses patients who have recovered. There are existing tools for generating these graphs, but we can see that they are flawed in some ways. And, sometimes the people who are responsible of these graphs lacks the knowledge of statistics and mathematics. [2][3]

These are the problems that we came across which effects the creativity in broadcasting daily news.

References:

[1] Sri Lanka, N., 2020. වට ප්‍රමාණය අනුව පොල් මිලදී ගන්න, පාරිභෝගික සම්මිති නියෝජිතයින් වෙළෙඳපොළට. [video] Available at: < <https://youtu.be/bmEKuHvCdmM?t=12> > [Accessed 22 January 2021].

[2] Jayaweera, D., 2020. *Bad Graph !!! Hope This Will Be Corrected By Ada Derana With An Apology ..* [image] Available at: < <https://www.facebook.com/dilith.jayaweera/posts/10157995591750977> > [Accessed 19 April 2020].

[3] Channel Africa, e., 2020. *The Race 2020 | Details From The US Presidential Election.* [video] Available at: < <https://youtu.be/NLI07fgpyH8?t=286> > [Accessed 22 January 2021].

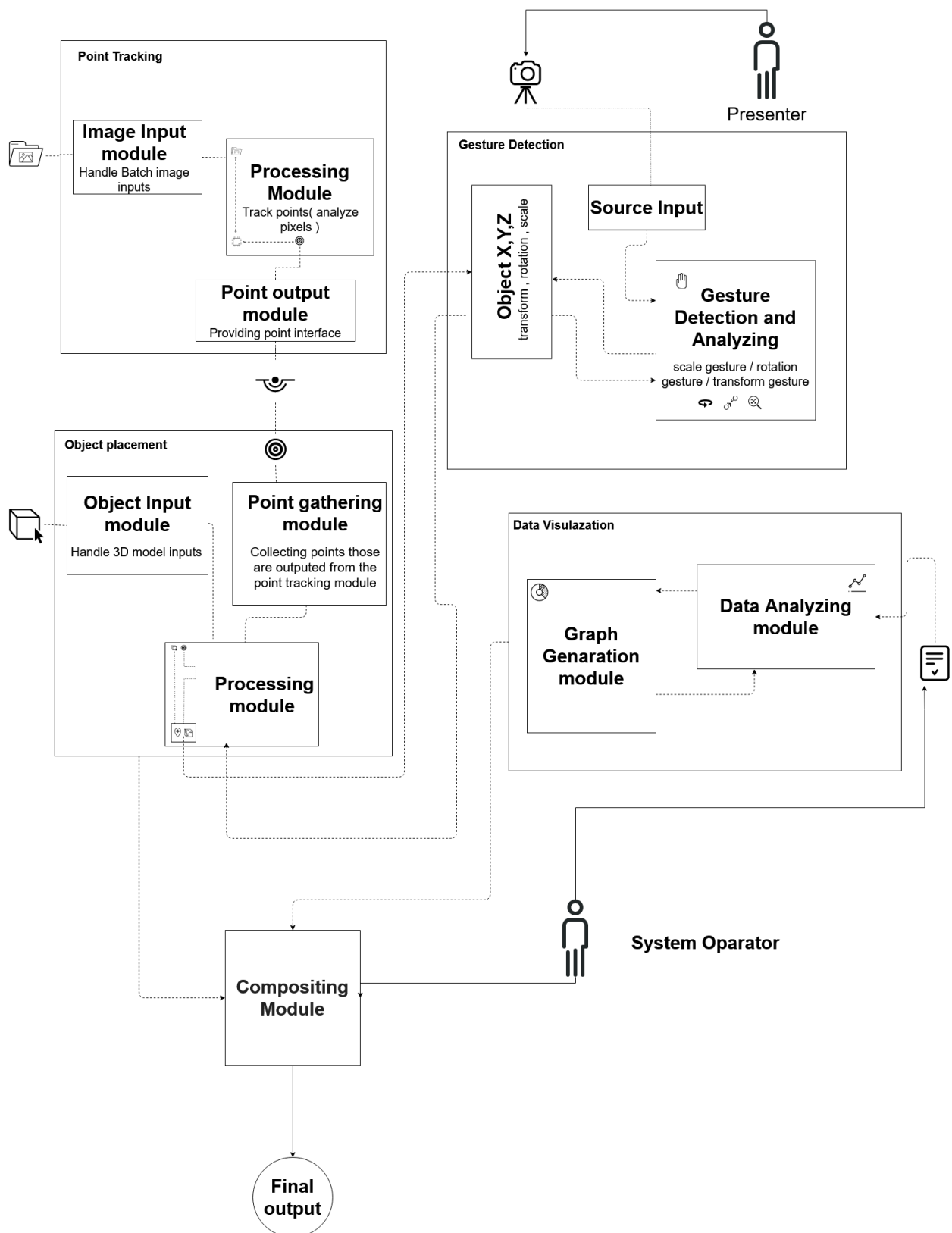
Solution proposed:

Our proposed system focuses mainly on increasing the attractiveness of a daily broadcasting news. This system we proposed is human decision support system. With this system the news technical operator can decide what is the most suitable attractive element needs to be used according to the news. We are also focusing on improving the accuracy of the data visualization. With the experiences of watching daily news on television broadcasts, we thought that the attractiveness of daily news can be improved more. So, we conducted researches to observe how television channels use technology to improve their attractiveness. We found that using technology for this can cost a huge amount. Therefore, we came up with a solution to make any television channel to improve their attractiveness with less cost and workforce.

- We are planning to use Augmented reality as a main technical item to improve the attractiveness. We will be using simpler ways to use this technology, so that anyone in the daily news generation team can use this for their daily news broadcasts with less processing time and cost.
- As a first step to use this technology we will take imagers of the studio of these news broadcasting channels to analyse and identify the points which can be used as effective locations to place these objects. So, for this we will be using point tracking technologies.
- Next is the object placement. This to be done after identifying the points in the diagram which we can place the object appropriately. The object can be a 2.5 dimensional. This method can improve the attractiveness of the news and the viewers of the news programs can listen to the news while enjoying the visual distribution.
- Another way of improving attractiveness is controlling objects using gestures. These can be done through gesture detection technology. Having gesture detection of hands and positions, we can easily manage the positioning the objects according to the presenter of the news.
- For the problems related to the representation of correct graphs we are using data visualization technology. Correct color themes will be identified with the given news alerts and representation of correct statistical graphs which any viewer of any social status can understand. These graph generation will be auto generated so that the graphical designing team will not need much mathematical knowledge. This can solve the inaccuracy of
- displaying statistical graphs.

System Overview Diagram for the solution proposed. Recommended to draw using draw.io. Note: This is not an activity/flow (UML) diagram

1. Man components including the data sources, stakeholders, interaction among the stakeholders, etc.
2. Interconnection among the components
3. Major SW and HW components



<https://mysliit.sharepoint.com/:i:/s/CDAP2021Reg-TheVirtualBroadcastAutomationSystem/EVRFOuKiSY1DtSt0XX0xiG4BqORk-d8KfHncsuXS1c08dA?e=PeCRpf>

Objectives (1 main objective and 4 sub objectives):

Main Objective:

- Our main objective is to increase attractiveness of daily news broadcasts.

Sub Objectives:

- By using Point Tracking technique, we can identify the points of an image.
- Object Placements can be used to place the object according to the points tracked of an image.
- Manipulate AR objects real time using Gesture Detection
- Chart accuracy can be solved using data visualization.

Task divided among the members

Member 1: A. Vihanga Nivarthana - IT18091380

In this part, we are going to identify a mark on the studio's environment which is suitable for inserting a 3D object and 3D graphs, for that the user places a mark on a selected location in a particular frame and the system applies the same mark to all remaining applicable frames. For example, in a news setting there is a table, we take a point on the table and we mark a point on the table. This point should stay the same despite different camera angles, movements, and multiple presenters.

To make this happen, image point tracking can be used. Image point tracking detects two-dimensional planar images from a custom-defined target set, and then continuously tracks the images' locations and orientations to place objects we need. With this, you can place authored content based on the presence of a physical image. We can capture images taken from the studio and analyze the points using image processing techniques to track the points necessary to place objects. With these marks analyzed we can place the objects and continue with the object placement done next.

Member 2: R.M Bawantha Thilan - IT18175080

After point tracking, we can identify the points marked and use these identified marks to place the imported existing object. In this part we do not create objects because we can find all the specific objects needed for a news broadcast. Already created objects are available for day-to-day news. So, allocating time to create an already exist items which can be predicted easily in day-to-day news is a waste of time and resources. When a new situation arrived, the objects needed for the representation of that situation can be created using a graphic software (MAYA, 3D MAX, Blender) which is already in the market. So, using such a graphic software, object creation can be done easily with more specific details rather than creation of objects through our system. For example, in the Covid 19 situation, as soon the situation arrived the appropriate object has been created using the graphic software mentioned to create with more accurate details.

In a current news broadcast, we saw that the news team had brought a physical coconut to the studio to compare the prices. But this situation is not applicable to situations like Covid 19 patients or a news regarding elephants and human struggles. As a solution we can import 3D objects which is suitable of the situation and place the objects on the correctly identified newsroom space.

The objects and the 3D graphs (created in the visualizing data section) generated will be embedded to the live feed of a news broadcast using this system through this part.

Member 3: Wanigaasekara.M.P.W.P.A - IT18108514

Identifying the presenters hand gestures and the presenter's location to place and manage the object accordingly. Gesture of the presenter is detected from the original images from the input devices to place the object. Live review of the object will be provided for the presenter as he/she moves their hands or changing their positions. Camera sensors can be used to detect the movements of the presenter.

In a stage, when the presenter moves their hand to the left, the object should also perform the specific task intended. Having such a performance in a news delivery, can increase number of viewers and grab the viewers' attention. Unlike a radio delivery (voice delivery), in a television broadcast we can use gestures, facial expressions and movements to deliver the news more attractively. For example, to show a specific county and its location we can use a globe (3D object) and the presenter can use hand gestures to zoom the globe and show the location.

Member 4: Gankanda G.M.J.U - IT18063738

In this part, we are bringing a solution for the visualization of statistics, how to bring out 3D objectified graphs and the attractiveness of the graphs. These graphing works are done by the designer team of the news channel. So, the team might lack mathematical perspective on the correctness of these graphs. We saw the lack of correctness of the graphs several times in both local and foreign news channel. In one of the local channels, there was an incorrect graph representing statistical data which was on Covid 19 patients vs. the recovered patient from Covid 19. And in the foreign channel, there was an incorrect graph on presidential election results of Donald Trump Vs. Joe Biden.

These graphs are then shown as AR objects in the news studio. These charts then can be shown as objects in the newsroom using object placement done through this research.

Automation of Data visualization will provide the advantage of simplifying large amounts of data into visually appealing and easily understandable for the public. With less time, less effort and with accuracy the graph creation can be done and shown in the studio. Pre-defined chart models will be given to choose for the users. Then user will be given the opportunity to choose the graph (bar, pie, line) which is suitable of the news type and the statistical data. Then the user will be able to manage the X, Y, Z coordinates according to the data.

Attractiveness is another major factor aside the correctness. To achieve the attractiveness, we can assign proper color themes to these graphs. Proper color theme is very important factor for the broadcasting the news in an attractive manner. For example, in an election time the graph should show the proper color according to the political party.

A default (average) color themes which is suitable for the studio's environment color theme is suggest to the chart and an option is given to the user if that default color theme needs any other changers. The user can change it manually, for that an opposite color pallet to the default color pallet is suggest to the user to select. For example, if the chart is to show UNP party statistics it should show green color in the default color pallet. If it's not shown the default color pallet then the user selects it manually.

References:

- [1] Instant Clue: A Software Suite for Interactive Data Visualization and Analysis, IEEE Standard 308, 1969.
- [2] MICROSOFT CORPORATION, WASHINGTON, "Large scale data visualization with interactive chart ," U.S. Patent 3 624 125, Jul. 16, 1990.
- [3] Tracking and Reshaping of Humans in Videos, IEEE Standard 308, 1969.
- [4] Google Technology Holdings LLC ,"Apparatus and methods for head pose estimation and head gesture detection," U.S. Patent 3 624 125, Jul. 16, 1990.

Technologies to be used:

- ✓ Python
- ✓ Pytorch
- ✓ Keras
- ✓ Tensorflow
- ✓ JavaScript
- ✓ Chart.js

If supervisor States that this year is a continuation of previous work, state the further work the students should do compared to the previous years.

(NOTE: This part has to be filled by the supervisor)

This part will be filled by the Topic Screening Panel members

Acceptable: Mark/select as necessary

| Acceptance/ Rejection | Correction State | |
|--------------------------|--------------------------|-------------------------------------|
| | Minor Correction | Major Corrections |
| Accepted | <input type="checkbox"/> | <input type="checkbox"/> |
| Resubmit | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Rejected | <input type="checkbox"/> | |

Corrections (if necessary)

Sub objective 3 is acceptable.

It is not clear how objective 1,2, and 4 are achieved using the specified tasks.

For example,

In sub objective 1 : How is it decided where to place each object?

In sub objective 2: Are the objects developed by the students? If not, placement of the object alone might not be enough for the scope.

In sub objective 4: Data visualizing using existing techniques would not be enough for the scope

Any other Comments:

Approved by the review panel:

Panel 01:

| Member's Name | Signature |
|---------------------------------|-----------|
| Dr Anuradha Karunasena | |
| Ms. Samanthi Eranga Siriwardene | |
| Ms.Vijani piyawardana | |


Panel 02:


| Member's Name | Signature |
|---------------------------|-----------|
| Mr. Jayantha Amararachchi | |
| Dr. Shyam Reyal | |
| Mr.Prasanna Sumathipala | |








Important:

1. According to the comments given by the panel, do the necessary modifications and get the approval by the **same panel**.
2. If the project topic is rejected, find out a new topic and inform the CDAP Group for a new topic pre-assessment.
3. A form approved by the panel must be attached to the **Project Charter Form**.

Appendix:

2021-Reg-Topic Assessment form of TMP-21-021 for Supervisor Dr. Shyam Mehraaj 

 Wanigasekara.M.P.W.P.A it18108514
TopicAssesment_1_TMP-21-021.docx Fri 1/22/2021 10:13 PM


 Shyam Reyal <shyam.r@sliit.lk>
Fri 1/22/2021 10:35 PM      

To: Wanigasekara.M.P.W.P.A it18108514
Cc: A. Vihanga Nivarthana it18091380; Bawantha Thilan Priya Rathnayaka R.M it18175080 +2 others

I accept this topic as primary supervisor


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[Thank you!](#) [I accept!](#) [Great, thanks!](#)

 Are the suggestions above helpful? [Yes](#) [No](#)

[Reply](#) [Reply all](#) [Forward](#)

Reply from the supervisor – Dr Shyam Mehraaj

2021-Reg-Topic Assessment form of TMP-21-021 for Co-Supervisor Mr.Thusithanjana Thilakarathne 


 Thusithanjana Thilakarathna <thusithanjana.t@sliit.lk>
Fri 1/22/2021 10:26 PM      

To: Wanigasekara.M.P.W.P.A it18108514
Cc: A. Vihanga Nivarthana it18091380; Gankanda G.M.J.U it18063738 +2 others

Dear all,

I accept this as the Co-Supervisor

Best regards,



Thusithanjana Thilakarathna
 BEng(Sunderland), MSc (Colombo)
Assistant Lecturer
 Department of Computer Science and Software Engineering
 Faculty of Computing
 SLIIT | Malabe Campus

...

[Reply](#) [Reply all](#) [Forward](#)

Reply from the co-supervisor – Mr.Thusithanjana Thilakarathna