

Multi-View Segmentation & Assisted Correction of Images

Team

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Work-let Area – Computer Graphics | A software tool to generate Multi-view Image Segmentation & Correction

SAMSUNG

Work-let expected duration – 6 months.

Problem Statement:

- Image Segmentation is a technique of partitioning a digital image (or video frames) into multiple groups, based on similar characteristics. This requires high quality point-wise boundary annotation for object segments, for training DNN-based segmentation models. This annotation process is manual and time taking.
- If a scene is captured from different viewpoints, each view point image needs to be segmented and labelled individually.
- Goal is to develop a web-based annotation tool, hosted on Linux server, to generate the segmentation in multi-view images automatically, including interactive correction.

Web-based Annotation Tool with Correction Methodology:

- ✓ **Module 1:** Given an image, generate manual annotation by creating point-based polygons, and assign suitable labels.
- ✓ **Module 2:** Given a manually segmented image and other images of same scene from different views as inputs, automatically generate the segmented images for all the views.
- ✓ **Module 3:** Given an already segmented image, support Interactive Correction, which is a click-based interactive refinement, for correcting the segmentation mask in case of both false positives and negatives.
- ✓ Basic functionalities to be supported: browse folder, previous image, next image, create polygon, edit polygon, create segmentation, add segment and remove segment.
- ✓ Open source DL based models can be plugged-in at the backend for multi-view image segmentation and interactive correction.
- ✓ Scope includes creation of a small multi-view image dataset for testing the functionality of the tool.

References:

- <https://github.com/labelmeai/labelme>
- <https://github.com/gap-lab-cuhk-sz/mvimgnet>
- [CVAT](#)



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Expectations

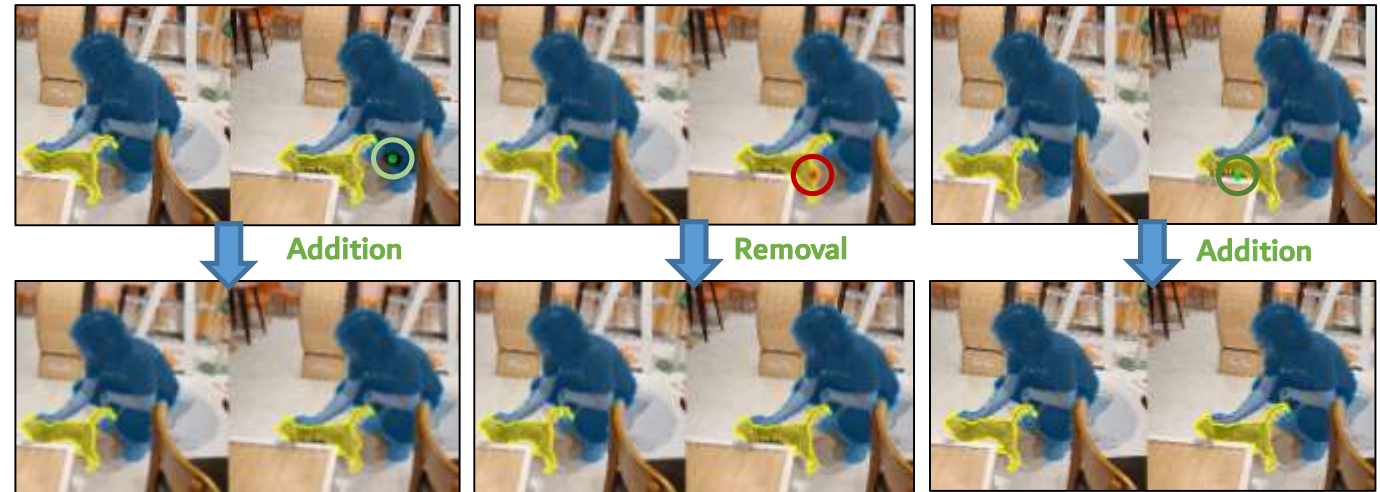
Module 1



Module 2



Module 3



Kick Off < 1st Month >

- Problem definition, scoping
- Understanding the requirements
- Basic design of the web based tool for segmentation annotation (Linux based, hosted on server)
- Use of open-source DNN models for multi-view image segmentation and interactive correction.

Milestone 1 < 2nd & 3rd Month >

- Development of Module 1 feature of the automation tool, along with functionalities for browse folder, previous image and next image.
- Creation of multi-view image dataset for testing.
- Finalizing the open-source DNN models

Milestone 2 < 4th Month & 5th Month >

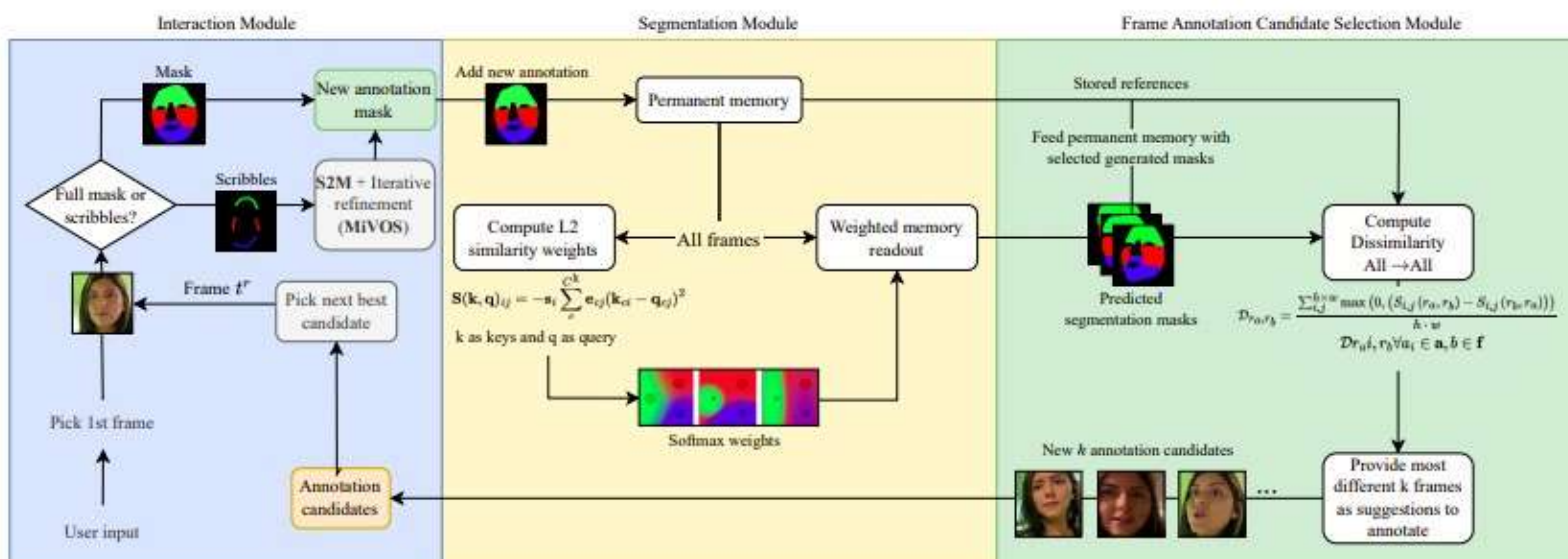
- Development of Module 2 and Module 3 features of the automation tool
- Individual testing of each module

Closure < 6th Month >

- Final verification of entire system/tool together and testing.

- Overview of model architectures provided, is gone through thoroughly. The workflow of XMem++, RITM and LabelMe has been completely understood
- React UI for multiview and Polygon points based correction has been implemented
- The model architecture workflow has been designed along with the feedforward mechanism
- Timeline of progress has been made.

GitHub Repo Link: <https://github.com/codegallivant/autosegmenter-webapp>



Tasks for the upcoming week (By 31 Jan):

- Get a working implementation of just XMem++ Integrated with labelme for rapid prototyping (the react web app with necessary components will slowly be built over time)
- XMem++: Production-level Video Segmentation From Few Annotated - <https://max810.github.io/xmem2-project-page/>, <https://arxiv.org/pdf/2307.15958>

Tasks for next two weeks (7 Feb):

- Get the complete model pipeline ***ritm_interactive_segmentation*** for interactive correction fed back to XMem++.
- *React UI with multiple polygon selection and label allocation to be done.*

Tasks for next 5 weeks (28 Feb):

- Create complete mimic of LabelMe in React UI

- Challenges :

(Discuss in the form of bullets, what are the next action steps, any road blocks / bottlenecks)

- Can we use different languages/frameworks slightly deviating from Django/ReactJS? As we will be mimicking Python based LabelMe in ReactJS.

Academic Calendar Breaks

Exams/Internals

- Mid-term exams - 03/03/25 to 08/03/25
- Mid-term re-test(tentative) - 04/04/25 to 25/04/25
- End-semester exams - 30/04/25 to 14/05/25
- End-semester makeup – 05/06/25 to 19/06/25
- Lab-end-semester exams(tentative)- April 1st week to 2nd week.

Holidays/Events

- Manipal entrepreneurship summit – 06/02/25 to 08/02/25
- Revels (MIT cultural event) - 12/03/25 to 15/03/25
- Utsav (MAHE cultural event) - 24/03/25 to 28/03/25
- Ramzan – 31/03/25
- May day – 01/05/25
- Semester break – from 14/05/25

Our Academic Calendar

EVEN SEMESTER JANUARY - MAY 2025

Jan -25	Feb -25	Mar -25	Apr -25	May -25	Jun -25	July -25
1 W	1 S	1 S Applying for Branch Change starts	1 T Last Date for Applying for Branch Change	1 TH May Day	1 SUNDAY	1 T
2 TH	2 SUNDAY	2 SUNDAY	2 W Saturday Timetable	2 F Publishing list of unsuccessful students in Lab Courses	2 M	2 W
3 F II, IV, VI Semester B. Tech./I Semester M.Tech./MCA and II, IV semester M.Sc. classes start; VIII Semester B. Tech. and IV Semester MCA Project Work start	3 M	3 M Mid-term Exam	3 TH Second Class Committee Meeting	3 S	3 T Last Date to register for Makeup Exam	3 TH Re-registration of lower semester courses starts (Maths-I, II, V, VI semester B. Tech. courses / I semester M.Tech., I II semester MCA/M.Sc. courses)
4 S	4 T First Class Committee Meeting	4 T Mid-term Exam	4 F	4 SUNDAY	4 W	4 F
5 SUNDAY	5 W	5 W Mid-term Exam	5 S	5 M	5 TH Makeup Exams Start	5 S
6 M	6 TH	6 TH Mid-term Exam	6 SUNDAY	6 T Registration for Summer Lab starts	6 F	6 SUNDAY
7 T Makeup Exams End/ Re-registration of 1 year B. Tech. courses (except Maths-I) start	7 F Manipal Entrepreneurship Summit	7 F Mid-term Exam	7 M	7 W	7 S Bakrid - *	7 M Makeup Exams Results / 1 year M. Tech. start
8 W	8 S	8 S Mid-term Exam	8 T	8 TH	8 SUNDAY	8 T
9 TH	9 SUNDAY	9 SUNDAY	9 W	9 F	9 M	9 W
10 F	10 M	10 M	10 TH	10 S Last Date to Register for Summer Lab session	10 T	10 TH Last Date for re-registering for lower semester courses starts (Maths-I, II, V, VI semester B. Tech. courses / I semester M.Tech., I II semester MCA/M.Sc. courses)
11 S Last Date for Re-registration of 1 year B. Tech. courses (except Maths-I)	11 T	11 T Saturday Timetable	11 F	11 SUNDAY	11 W	11 F
12 SUNDAY	12 W	12 W Revels	12 S	12 M	12 TH	12 S
13 M Answer Script View of Makeup Exam	13 TH	13 TH Revels	13 SUNDAY	13 T	13 F	13 SUNDAY
14 T	14 F	14 F Holi*/Revels	14 M	14 W Last Working Day (End Semester Exams End)	14 S	14 M
15 W B. Tech. Re-registered courses start	15 S Holiday	15 S Holiday/Revels	15 T	15 TH Summer Labs start	15 SUNDAY	15 T
16 TH	16 SUNDAY	16 SUNDAY	16 W	16 F Answer Script View (Round 1)	16 M	16 W
17 F	17 M	17 M	17 TH Friday Timetable	17 S Holiday/ Answer Script View (Round 1)	17 T	17 TH
18 S Holiday	18 T	18 T	18 F Good Friday	18 SUNDAY	18 W	18 F
19 SUNDAY	19 W	19 W Last Date for Applying for Re-test (Mid-term Exam)	19 S Holiday	19 M	19 TH Makeup exam end	19 S Holiday
20 M	20 TH	20 TH	20 SUNDAY	20 T	20 F	20 SUNDAY
21 T	21 F	21 F	21 M	21 W	21 S Holiday	21 M VIII/VII Semester B. Tech., I semester M. Tech., I II Semester MCA/ M.Sc. Classes Start
22 W	22 S	22 S	22 T	22 TH Answer Script View (Round 2)	22 SUNDAY	22 T
23 TH Makeup Exam Results	23 S	23 SUNDAY	23 W	23 F	23 M	23 W
24 F	24 M	24 M	24 TH	24 S	24 T	24 TH
25 S	25 SUNDAY	25 T	25 F Last Instructional Day	25 SUNDAY	25 W	25 F
26 SUNDAY Republic Day	26 W	26 W Utsav	26 S	26 M	26 TH Answer Script View of Makeup Exam	26 S
27 M	27 TH	27 TH	27 SUNDAY	27 T	27 F	27 SUNDAY
28 T	28 F	28 F	28 M	28 W	28 S	28 M
29 W	29 S	29 S	29 T	29 TH	29 SUNDAY	29 T
30 TH	30 SUNDAY	30 SUNDAY	30 W End Semester Exam Starts	30 F	30 M	30 W
31 F	31 M Ramzan~	31 M Ramzan~	31 TH	31 S End semester exam Results	31 TH	31 TH

Professor Comments

- Slide to be filled in by professor (Either of two)
 - Proposed monthly progress approach: One monthly meeting with Samsung Prism
 - Latest paper reviewed regarding the problem statement area: Will Start as well as engage students
 - Professor Expert Insights: We thought it as normal project. Muralikrishna Sir and Myself know computer vision and our next HOD Sir is also from same domain. Professors and students will work together towards the successful completion of the research project.

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Thank you