**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**

**SECOND SEMESTER 2019-20**

DSE CL ZG628T **DISSERTATION**

**Dissertation Outline**

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**Designation of Supervisor**: GROUP DIRECTOR,

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**Qualification and Experience: M.S., M.phil (IIT Roorkee) and 30 years**

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**Topic of Dissertation**: Data- based optical butting correction and enhancement of high resolution satellite data imagery

**Name of First Examiner:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Designation of First Examiner**:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Qualification and Experience: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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(Signature of Student) (Signature of Supervisor)

Date: ------------ Date: --------------

**Dissertation Title**

**Data-based optical butting correction and enhancement of high resolution satellite imagery**

**Problem statement**

In high resolution space born cameras, optical butting regions are affecting the image quality. After preprocessing of the received data from satellite, while constructing the image in its full resolution, the optical butting zones (may be different for different cameras) are to be corrected and enhanced to provide better interpretability or perception of the information in the imagery for human viewers and thumbnails for catalogue generation.

Perform these elements as part of stream processing, as and when the data is available from data pre-processor.

**Business process flow**

**Input:** Data-preprocessor output – Raw image in its full resolution

**Output:** optical butting zone corrected, enhanced image

List of steps include

1. Raw data received from satellite is subjected to data pre-processing
2. Construct the image for its full resolution(full swath)
3. Stream the data through stream processing framework ---
4. On the received stream data - apply optical butting correction –
5. Apply the enhancement model
6. Generate the data output that goes for display – Near-real-time display

Project is to realize the points 3 to 6

**Objective of the project**

Optical butting region corrections, enhancement and display the high resolution imagery in its full resolution using stream processing and artificial neural networks.

**Uniqueness of the project**

Correction, enhancement of high resolution imagery in near- real time

**Benefit to the organization**

These modules/model(s) will be integrated as part of pre-processing of the satellite data processing chains and provide the real-time visualization of the data. This will give the immediate information about the quality of the imaging data to aid the decision makers in case of emergencies and disasters.

**Scope of work**

The scope of the project may be extended to the implementation of classification in terms of vegetation, urban areas, cloud, snow or desert regions, object detection, annotation along with geo-reference for the high resolution imagery in near real-time. Models has to be developed and can be integrated with the existing setup.

**Resources needed for the project, including people, hardware, software, etc.**

Sufficient resources in terms of systems, software and hardware are available to carry out this task.

**Potential challenges & risks in doing the project**

Dealing with high resolution data (<0.5 m) is very much challenging and volume data is also huge.

**Background of previous work done in the chosen area**

Radiometric correction of the satellite data imagery was done

Solution architecture, if any

Detailed Plan of Work (as follows)

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Task** | **Expected date of completion** | **Names of Deliverables** |
|  | Literature survey regarding the data based correction of optical butting regions,  Enhancement techniques | 1 week | Choosing the algorithms. |
|  | Implementation of algorithms for optical butting region corrections | 2 weeks | Code |
|  | Testing and results evaluation | 2 weeks | Generation of image outputs |
|  | Refinement of the algorithm | 1 week | Optical butting region correction module , output images |
|  | Implementation of algorithms for enhancement | 2 weeks |  |
|  | Testing and results ( includes training as well) | 1 week |  |
|  | Refinement of algorithms | 1 week | Enhancement Model and output images |
|  | Implementation of stream processing frameworks for reading the satellite data | 2 weeks |  |
|  | Integration of the developed modules and its Testing and results evaluation | 2 weeks |  |
|  | Refinement of integrated version | 1 weeks | Output images |
|  | Final Report | 1 week |  |

**Supervisor’s Rating of the Technical Quality of this Dissertation Outline**

EXCELLENT / GOOD / FAIR/ POOR (Please specify): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Supervisor’s suggestions and remarks about the outline (if applicable).**

Date\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Signature of Supervisor)

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