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| **MINI PROJECT EVALUATION SHEET** |

## OCES-2023

TSO NAME & CC No.: Rinkesh Hemant Paltiwale, NE/604/279 DISCIPLINE :Computer Science

GUIDE's NAME : Dr. Ratnesh S Sengar DIVISION : DRHR

TITLE OF THE PROJECT : AI based microscopic image stitching algorithm for characterization of reactor core components

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| **1. GUIDE’S ASSESSMENT**  a) PROJECT WORK / REPORT (Maximum Marks: **125**) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  b) ATTENDANCE & DISCIPLINE (Maximum marks : **25**) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

Date : Signature of the Guide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date : Signature of Head of Div \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**To**

**Dr. Ajay K. Singh**

**Head, OCES PI Section, HRDD**

**CC: Chairman, Miniproject Viva Committee**

**Bhabha Atomic Research Centre**

# Human Resource Development Division

## OCES-2023

## PROJECT SYNOPSIS

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| Discipline | **Computer Science** | Date |  |

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| Name of TSO | **Rinkesh Hemant Paltiwale** | CC No. | **NE/604/279** |

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| Name of Guide | **Dr. Ratnesh S Sengar** | Division | **DRHR** | Designation | **SO/H** |

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| --- | --- | --- | --- |
| Email ID | **rssengar@barc.gov.in** | Telephone No. | 022-25592139 / 022-69292139 |

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| Aim and Objective of Project | **Study and implementation of exisiting stitching algorithms and development of a fast and accurate microscopic stitching algorithm for “In-cell video microscopic imaging system”** |

Project Highlights

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| **DRHR has developed an automated in-Cell video microscopic imaging system for defect detection and dimensional measurement of reactor core components using microscopic imaging and stitching. Due to the presence of low texture in micron-sized details, traditional methods and available open-source libraries fail to provide satisfactory results due to the following challenges**   1. **Spatial mismatch, mechanical uncertainties and sparsity of image features in adjacent image tiles.** 2. **Computational complexity and memory requirements of available solutions.**   **The project is focused on understanding of microscopic imaging challenges, image registration and image blending, Image acquisition from “In-cell video microscopic imaging system”, Development of stitching algorithm and stitching images to compare results with existing stitching solutions.** |

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| Actual Contribution of TSO | **Calculation of optimum overlap to compute homography, Using linear regression to calculate pixel overlap in case homography is erroneous, Performance improvement in stitching by reducing complexity of perspective transformation to euclidean transformation implemented with only translation, Dataset generation for improving linear regression model.** |

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| Language and Tools used for Project | **Python3, OpenCV, scikit-learn, Proprietary DRHR imaging software** |

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| Current Status of the Project |  | Completed |  |  | Partially Completed |  |  | To be Completed |  |

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| Guide’s Remarks |  |

#### Signature of Guide

**To**

**Dr. Ajay K. Singh**

**Head, OCES PI Section, HRDD**

**CC: Chairman, Miniproject Viva Committee**