VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

A PROJECT REPORT ON

"DESIGN AND DEVELOPMENT OF SOFTWARE TOOL FOR DIFFERENTIAL INTERFEROMETRIC SAR-DINSAR PROCESSING FOR DEFORMATION STUDIES"

Submitted in partial fulfillment for the award of Degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE &ENGINEERING

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CERTIFICATE

This is to certify that the project entitled **"DESIGN AND DEVELOPMENT OF SOFTWARE TOOL FOR DIFFERENTIAL INTERFEROMETRIC SAR-DINSAR PROCESSING FOR DEFORMATION STUDIES"** has been successfully completed by

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the bonafide students of **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2020–2021. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

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ABSTRACT

Dam monitoring represents a crucial issue in order to avoid catastrophic failures due to infrastructure aging or earthquake damages. Differential SAR Interferometry (DInSAR) is a technique suitable for critical infrastructure monitoring, also for the availability of free data and tools that can be used by experts in SAR remote sensing and also by geologists and civil engineers, after having acquired the right confidence and experience in these data processing and tool use. Differential Interferometric Synthetic Aperture Radar (DInSAR), like any other remote-sensing technique, has captured considerable attention in the field of subsidence monitoring by providing measurements of ground deformation. However, InSAR is a 1D measurement technique which measures deformation between satellite and object in the line of sight (LOS). In order to retrieve 3D deformation components, it is required to integrate SAR with other techniques, such as GNNS or levelling. In order to apply the DInSAR technique, in its basic and simple version, to critical infrastructure monitoring, it is very important to assess its performance. Nevertheless, validation results are not largely available in literature, because heterogeneous technical competencies are required to this aim and in situ measurements must be collected and made available. In this report, we propose a highly reproducible DInSAR workflow that can be effectively used for dam monitoring, by validating its results with in situ measurements on some significant case studies in Japan.