

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELGAUM – 590 014



A PROJECT REPORT ON

“CONSISTANCY MAINTAINANCE IN REAL-TIME GROUP EDITORS”

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BACHELOR OF ENGINEERING

In

INFORMATION SCIENCE & ENGINEERING

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ABSTRACT

Group editors allow a group of distributed human users to edit a shared multimedia document at the same time over a computer network. Consistency control in this environment must not only guarantee convergence of replicated data, but also attempt to preserve intentions of operations. Operational transformation (OT) is a well-established method for optimistic consistency control in this context and has drawn continuing research attention since 1989. However, counterexamples to previous works have often been identified despite the significant progress made on this topic over the past 15 years. This paper analyzes the root of correctness problems in OT and establishes a novel operational transformation framework for developing OT algorithms and proving their correctness.

Real-time group editors allow a group of users to view and edit the same document at the same time from geographically dispersed sites connected by communication networks. Consistency maintenance is one of the most significant challenges in the design and implementation of these types of systems. Research on real-time group editors in the past decade has invented an innovative technique for consistency maintenance, called operational transformation.

Operational Transformation (OT) is a consistency maintenance technique for collaborative editing systems—a special class of distributed applications for supporting human-computer-human interaction and collaboration over communication networks. The theory of causality has been the foundation of all prior OT systems, but it is inadequate to meet essential OT requirements in functionality and correctness. In this paper, we analyze the limitation of the causality theory, propose a novel theory of operation context as the new foundation for OT systems, and present a new OT algorithm—Context-based OT (COT)—which provides uniform and efficient solutions to both consistency maintenance and undo problems. The COT algorithm has been implemented and used for supporting a range of novel collaborative applications. The context theory and context vectors are potentially applicable to other distributed computing applications.