

# Ictus<sup>1</sup>: A User-Centered System of Score Study for Semi-Novice Conductors

Amy Mitchell, Stephen A. Voida, Jessica Paradise, Chris C. Martin & Elizabeth D. Mynatt

Georgia Institute of Technology, GVU Center

801 Atlantic Drive

Atlanta, GA 30332, USA

+1 404 894 6710

{yawp, svoida, paradise, chmartin, mynatt}@cc.gatech.edu

## ABSTRACT

Ictus supports the study and preparation of musical scores by semi-novice conductors. It does so by representing the complex analytical processes in which professional conductors routinely engage. Through iterative design and prototyping and with feedback from expert conductors, we have developed a prototyped system for use as a learning tool. This paper presents a brief overview of the complexities of the conductor's task, including the difficulties inherent in externalizing it; a description of the Ictus system; and a discussion of some of the feedback and forward-looking issues that have been raised.

## Keywords

Iconification, musical scores, conductors, perspective wall, user-centered design

## THE ART OF CONDUCTING

The conductor is the master musician. He or she is responsible for maintaining thorough knowledge of the musical parts of each instrument in the ensemble, the technical demands of each of those instruments, the intricacies and interplay between all of the musical parts, the high level structure and form of each piece, the historical context surrounding each piece, as well as his or her own interpretation of the piece [2].

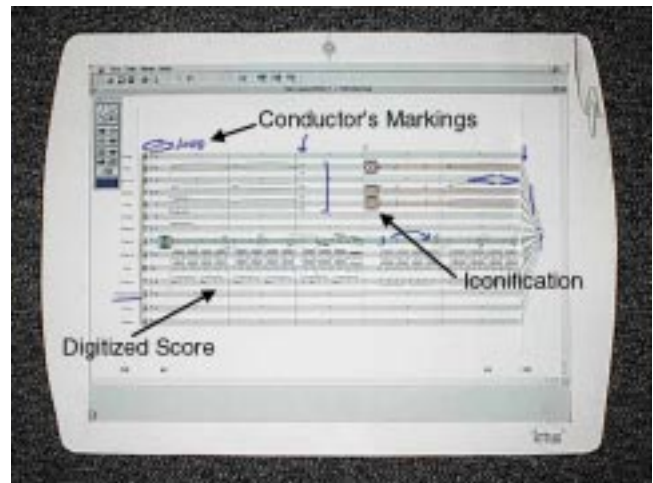
Before a conductor steps in front of a rehearsal ensemble, he or she must perform extensive research and analysis on each piece of music. In some cases, this preparation may be done over a year in advance.

## DESIGN GOALS

The conductor's task of studying a musical score is complex, requiring high-level cognitive analysis and

abstraction. Beyond the task's inherent complexity, there are several confounding factors that make score study difficult to learn: (1) the cognitive process is internalized in expert conductors, (2) expert conductors, as evidenced in interviews, often have difficulty articulating this process, and (3) the only artifact produced by expert conductors captures the cues needed to lead a rehearsal instead of a representation of musical interpretation and understanding.

Our goal over the last few months has been to develop a method by which the internalized study processes of expert conductors could be represented for the benefit of those learning the art of conducting. While the system is designed to support many related tasks as well, one feature in particular – the iconification component – is designed specifically to satisfy this goal.



**Figure 1:** General form factor and three study components illustrated in a paper prototype

## THE ICTUS SYSTEM

The Ictus system (Fig. 1) is a software application designed to run on a specialized laptop computer. The laptop features a touch-sensitive screen and stylus, similar to commercially available Mutoh<sup>TM</sup> or Wacom<sup>TM</sup> tablets, with an enlarged display size and increased resolution.

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<sup>1</sup> The moment of impetus for a musical beat, denoted by the point at which the conductor's hands change directions

The monitor is detachable so that it can be set on a music stand.

In support of score study, we have included three key study components in our interface – the digitized score, a marking tool, and a customizable iconification component.

The score component is displayed as a perspective wall [3]. The perspective wall is suited to this domain [1] and usage, in large part due to its flexibility in dynamic visualization. This manner of display also eliminates the artificial page separations in current paper scores.

The digitized marking component allows conductors to make the same sort of self-cueing marks on their digital score as they currently do on paper scores, with the added benefit of color enhancement. In addition, this capability alleviates the need for sharing scores (and thus markings) within an institution. It also eliminates the need for erasing markings made on rented scores.

The central feature in the Ictus system, however, is the iconification component (Fig. 2). This feature gets to the crux of the conductor's internalized analytical processes. Here, the semi-novice conductor can replace or augment semantically significant sections of music (i.e. melody, rhythmic counterpoint, exposition, recapitulation, etc...) with icons. This feature allows the conductor to artfully whittle down a score to its elemental form, discovering overall structure and patterns and reducing the cognitive load needed to identify the salient musical features of the score at a glance.

While iconic representations of a score may facilitate learning, an absence of the musical notes will often be less than ideal in a rehearsal setting. The Ictus system begins to address these multi-contextual implications by allowing the conductor to view any of the three components – the musical score, the marking augmentation, and the iconifications – at any time, both for the piece as a whole and for specific sections of the score.



**Figure 2:** Iconification in (a) an original, uniconified score (b) a partially iconified score, and (c) a wholly iconified score, illustrating the compression of all measures in the absence of musical notes

## EVALUATING AND EXTENDING THE SYSTEM

Expert conductors and music educators have reviewed the Ictus system throughout its development. The various conductors with whom we spoke indicated that our iconification component captured the essence of their study task. One conductor, also a professor of conducting, identified this component of our system as an additionally useful tool for explaining and demonstrating the score study process to students.

These conductors also raised a point of concern that we will need to address – the concern that the iconified music is losing its shape. They pointed out that many conductors visually identify passages in music by their distinct shape.

Beyond that concern, there are many potential areas of future work for Ictus:

- Accounting for nuances of use in multiple contexts – the teaching space, study space, the rehearsal space, and the performance space
- Performing user studies and assessing the effect of the system on learning the score study process
- Analyzing implications in networking and communication throughout a musical ensemble
- Compiling marked and iconified scores from expert conductors for use as study references
- Integrating captured audio and visual content during rehearsal as annotations in the score, for use by the conductors in reflection and self-evaluation

## CONCLUSION

The Ictus system demonstrates an externalization of the high-level analytical process utilized by expert conductors in score study and represents this process as a learning tool for semi-novice conductors.

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