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Test methods for Score-Based Interactive Music Systems

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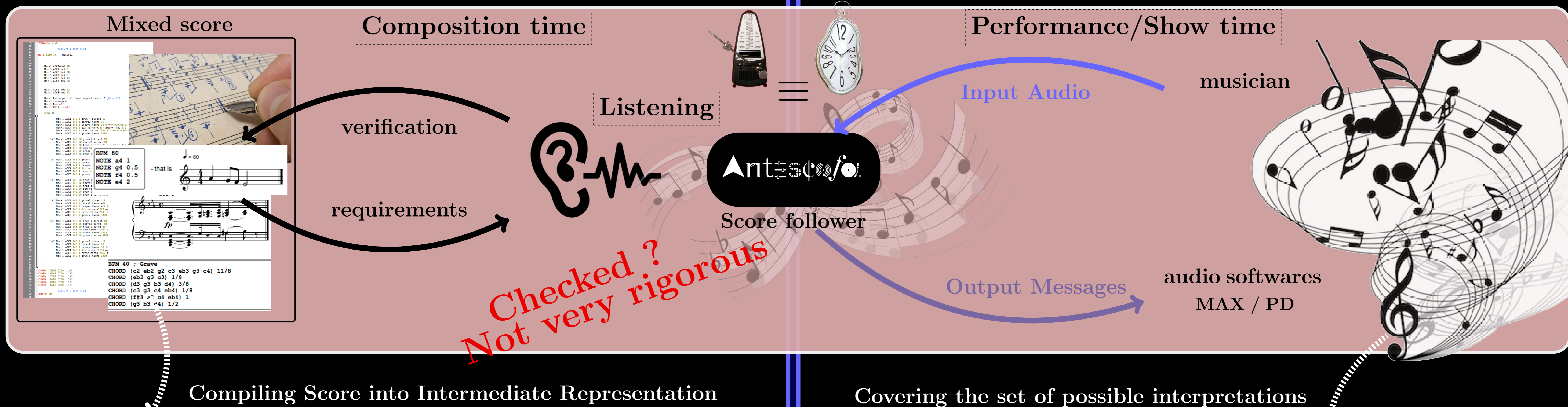
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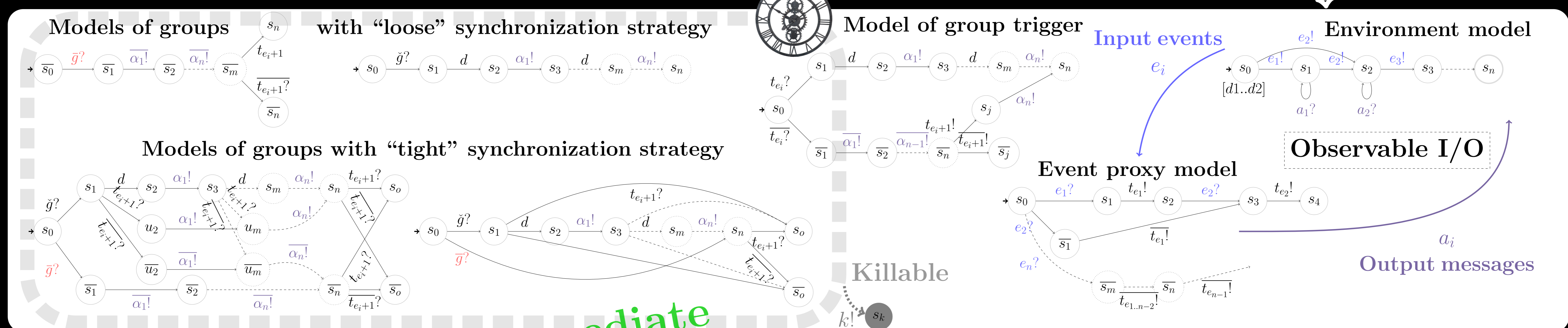
How be sure of a Score-Based Interactive Music System's behavior during shows ?

Ensuring a "guarantee" on the behavior of a complex real-time system is not trivial and requires formal method. **Today**, Antescofo's behavior is "manually" checked by the composer during rehearsals. Since rehearsal performances represent just a few set of all possible interpretations of a score, this method is not rigorous.

Manual piece preparation



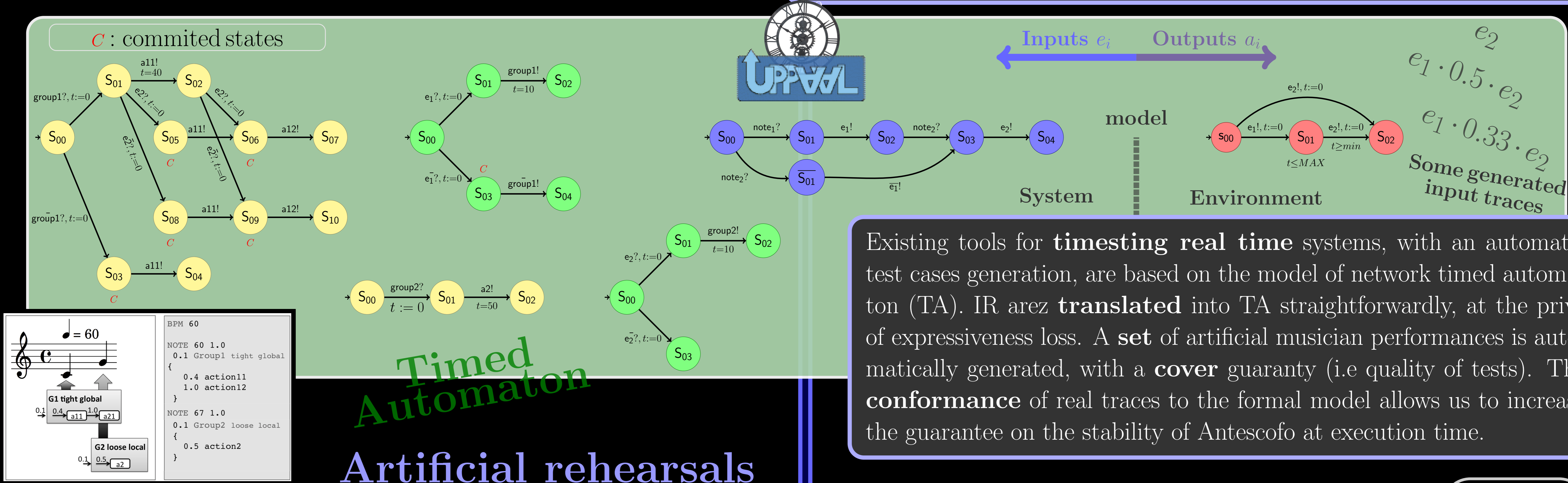
Toward a formal Specification



Translating into standard formal models
(i.e Timed Automaton used by the Uppaal verification suite for realtime systems)

The **Intermediate Representation** is a step toward a formal specification of Antescofo's expected behavior. It is a **model** of *How* Antescofo's reactive engine should compute its timed output for **every inputs** (i.e musician performances). IR can be represented with Extended Timed Input/Output Labelled Systems. Each system starting at its s_0 or \bar{s}_0 state and waits on an edge $\delta?$ for a fire of $\delta!$ of the symbol δ . IR is able to specify multi-clocks, concurrences, dynamic variables...

Model Based Test Generation



Existing tools for **timesting real time systems**, with an automatic test cases generation, are based on the model of network timed automaton (TA). IR arez **translated** into TA straightforwardly, at the prive of expressiveness loss. A **set** of artificial musician performances is automatically generated, with a **cover** guaranty (i.e quality of tests). The **conformance** of real traces to the formal model allows us to increase the guarantee on the stability of Antescofo at execution time.

Artificial rehearsals

Antescofo show!
secured for the

MUTANT website



Check conformance

OK

KO

Generated input trace

Real output trace

Expected output trace

Test cases

Timed Automaton Network

Traces suite generation and translation

coVer

Tempo Curves

Time functions

Fuzzing

