

A Fuzzy/Probabilistic Approach to Uncertain Interval Algebra

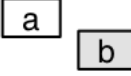
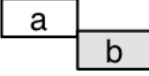
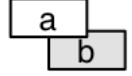
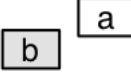
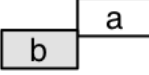
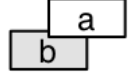
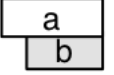


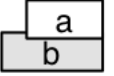


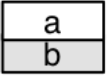
Keyvan Mir Mohammad Sadeghi and Ben Goertzel

Abstract—A novel approach to uncertain temporal inference is presented. Allen’s Interval Algebra is extended to fuzzy time-intervals via representing the latter as trapeziums with distinct beginning, middle and end. An uncertain version of the Interval Algebra composition table is developed via running a computer simulation in which a large number of fuzzy time-intervals are drawn from an assumed probability distribution, and using machine learning to induce uncertain compositional rules that hold approximately across the corpus of simulated intervals.

I. INTRODUCTION

BEN can write a couple intro paragraphs [1]
A. Allen Interval Algebra

Keyvan should give a brief summary of Allen Interval Algebra here, including a table (pasted from elsewhere is OK) illustrating the interval relations; AND a copy of the composition table (again, pasted from elsewhere is OK). Referees like to look at pictures like everybody else does...[2]

Precedes (p)	Meets (m)	Overlaps (o)
		
Preceded By (P)	Met by (M)	Overlapped By (O)
		
Finished By (F)	Contains (D)	Starts (s)
		
Finishes (f)	During (d)	Started By (S)
		
Equals (e)		
		

B. Fuzzy Interval Algebra

Keyvan should summarize prior papers on Allen Interval Algebra, with references

Keyvan should briefly explain why we didn’t just use their work

II. A TRAPEZIUM MODEL OF FUZZY INTERVALS

Keyvan will explain the modeling of events as trapeziums with beginning, middle and end, including a pretty diagram of a trapezium

III. DEFINING FUZZY INTERVAL RELATIONS VIA CONVOLUTION

Keyvan will describe the convolution approach to fuzzy interval relations, preferably using a diagram illustrating one example (could be transitivity of "precedes")

IV. PROBABILISTIC ESTIMATION OF A FUZZY INTERVAL RELATION COMPOSITION TABLE

Keyvan will explain the approach to generating a composition table probabilistically

A graph illustrating the transitivity of precedence rule should be presented, because 3D graphs are pretty and shiny

We can give example results on the precedence rule, and leave full discussion of the composition table till later..

REFERENCES

- [1] B. Goertzel, M. Ikle, I. Goertzel, and A. Heljakka. *Probabilistic Logic Networks*. Springer, 2008.
- [2] S. Schockaert, M. De Cock, and E.E. Kerre. Fuzzifying allen’s temporal interval relations. *Fuzzy Systems, IEEE Transactions on*, 16(2):517–533, 2008.