UNIVERSITYOF BIRMINGHAM

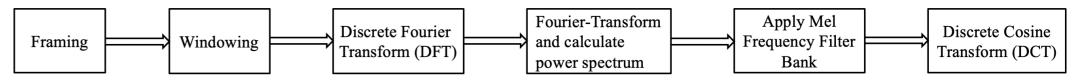
Jingyi Chu

DETECTION OF ONSETS IN STRING INSTRUMENT MUSIC USING CONVOLUTIONAL NEURAL NETWORKS

training data			First take	Second take	Third take (onsets annotat
				Condition 1 violin 1-1	
testing data	[Violin 1-1		Condition 2 violin 1-1	
validation data				Condition 3 violin 1-1	
vanuation uata				Condition 4 violin 1-1	
Beethoven SymphonyNo. 6	Voice type 1 – (violin 1)			Condition 1 violin 1-2	
		Violin 1-2		Condition 2 violin 1-2	
				Condition 3 violin 1-2	
				Condition 4 violin 1-2	
			ـــــــــــــــــــــــــــــــــــــ		
				Condition 1 violin 1-3	
				Condition 2 violin 1-3	
		– Violin 1-3		Condition 3 violin 1-3	
		•		Condition 4 violin 1-3	
]		22		
	Voice type 2 - (violin 2)	(Condition 1 violin 2-1	
		Violin 2-1		Condition 2 violin 2-1	
				Condition 3 violin 2-1	
		-		Condition 4 violin 2-1	
				Condition 1 violin 2-2	
		S	5 a	Condition 2 violin 2-2	
		Violin 2-2		Condition 3 violin 2-2	
		×.		Condition 4 violin 2-2	
	(vioini 2)		\$2		
		/		Condition 1 violin 2-3	
		Vialin 2.2		Condition 2 violin 2-3	
		– Violin 2-3		Condition 3 violin 2-3	
		\sim			

Data Preprocessing

- Import wave files and onsets annotation
- Extract energy feature using MFCC ullet



- Combine frames to include context
- Match the input with labels ●

kernel = 32, 16

kernel = 32, 64

🛨 kernel = 32, 8

---- kernel = 32, 16

🕂 kernel = 32, 32

▲ kernel = 32, 64

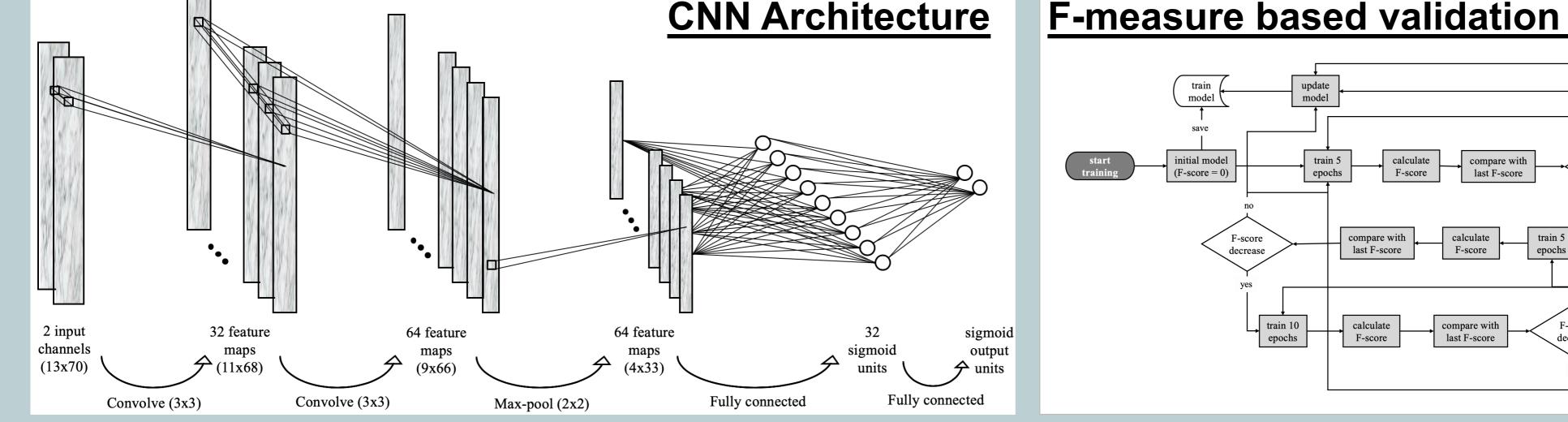
60

epoch

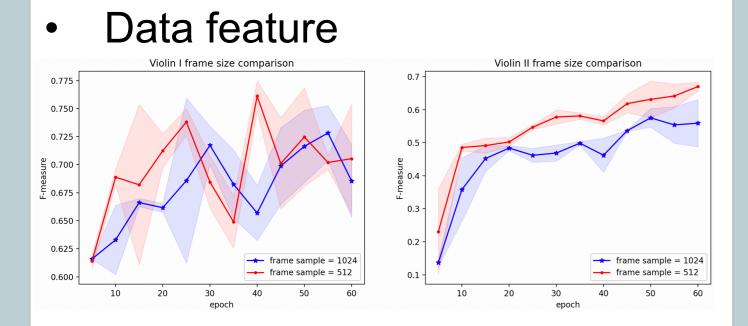
epoch

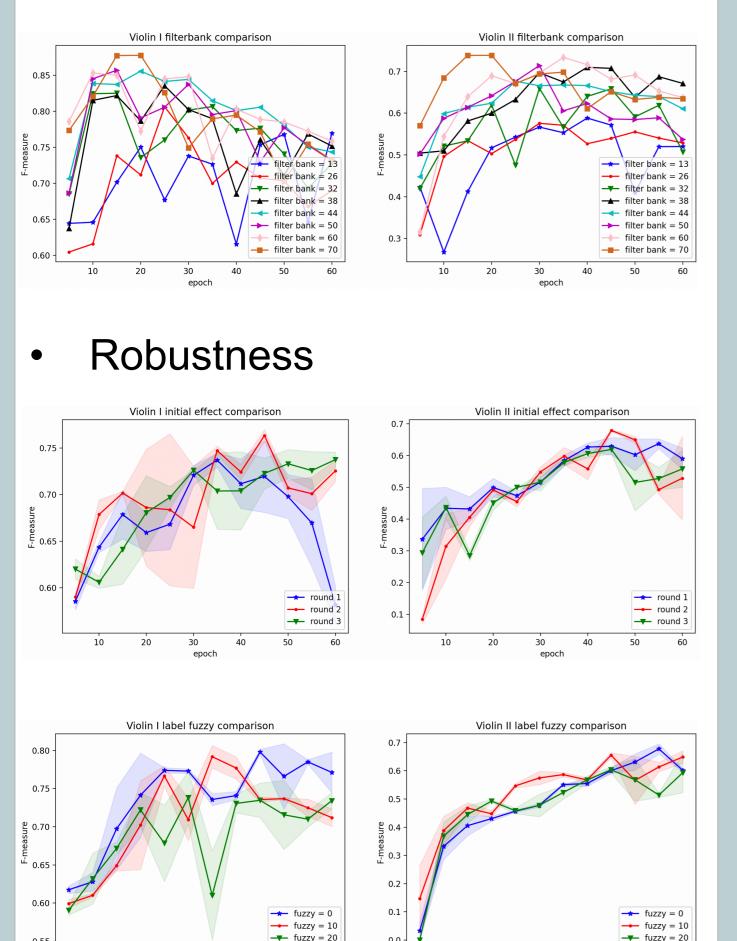
60

F-measure based validation design



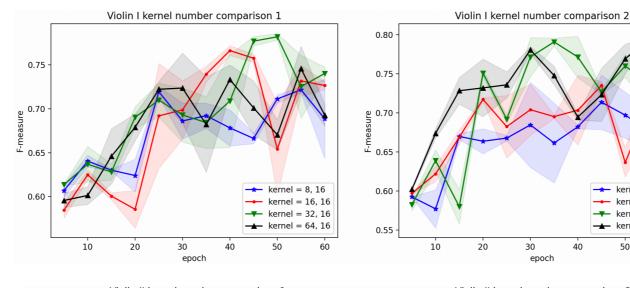
Network explore

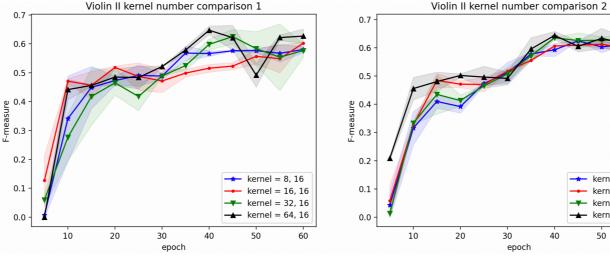


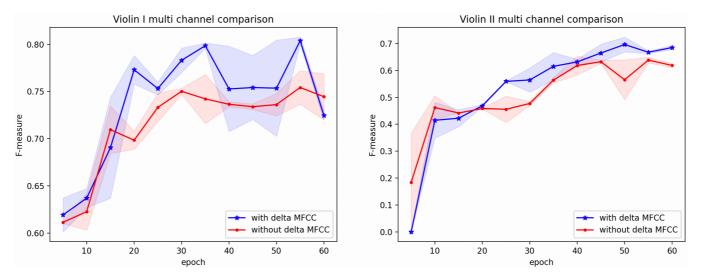


0.55

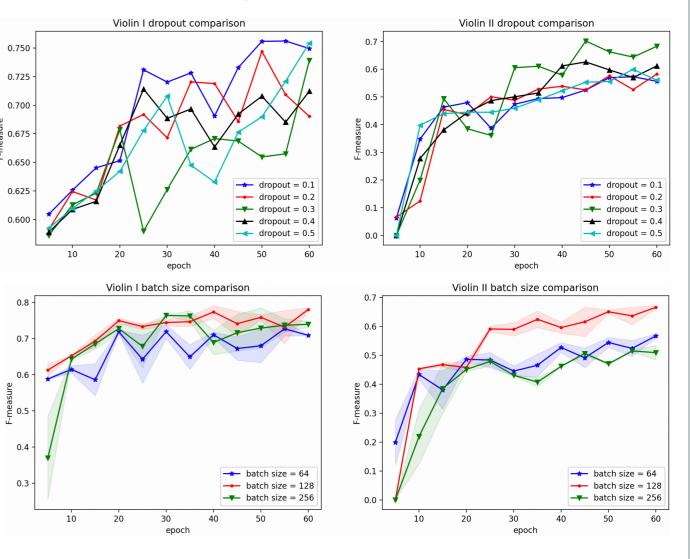
Network architecture \bullet







Training setup \bullet



F-score

decrease

F-score

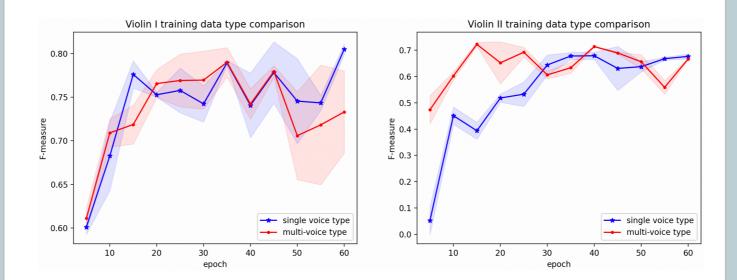
decrease

Validation

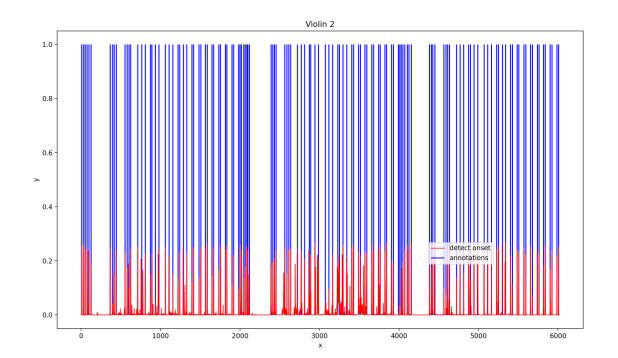
model

trainin

Training data distribution







- Violin 1 F-measure 0.861
- Violin 2 F-measure 0.820

www.bham.ac.uk