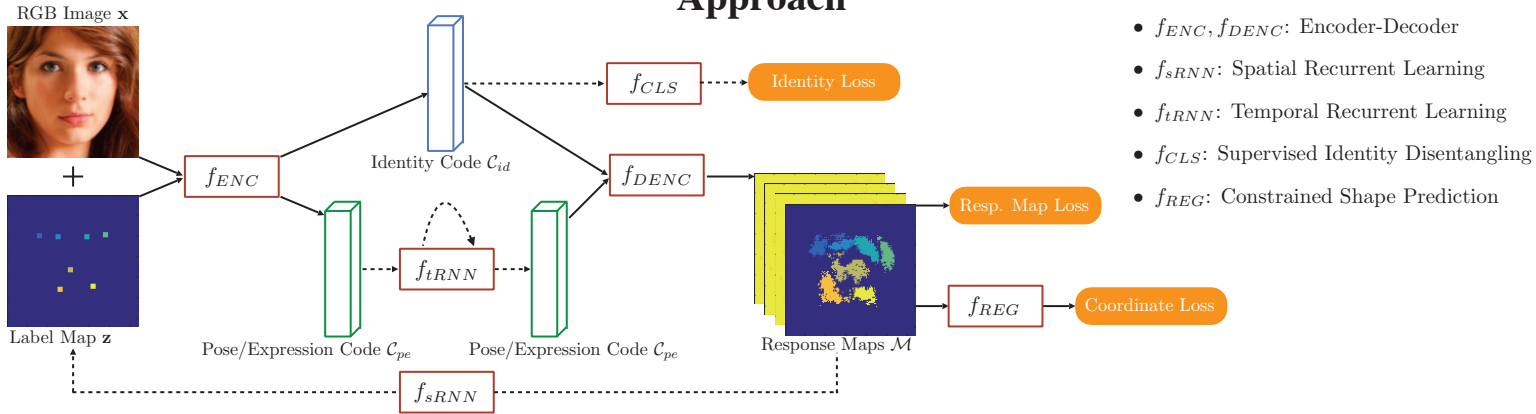


# A Recurrent Encoder-Decoder for Sequential Face Alignment

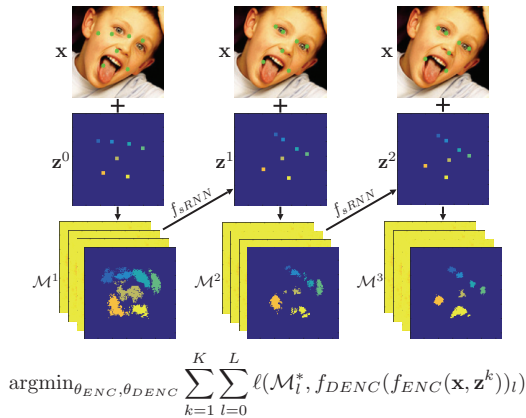
Xi Peng\*, Rogerio S. Feris\*\*, Xiaoyu Wang\*\*\*, Dimitris N. Metaxas\*

\*Rutgers University \*\*IBM T. J. Watson \*\*\*Snapchat Research

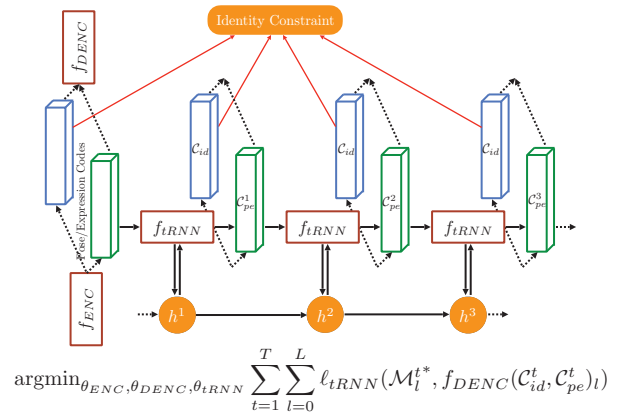
## Approach



Spatial Recurrent Learning

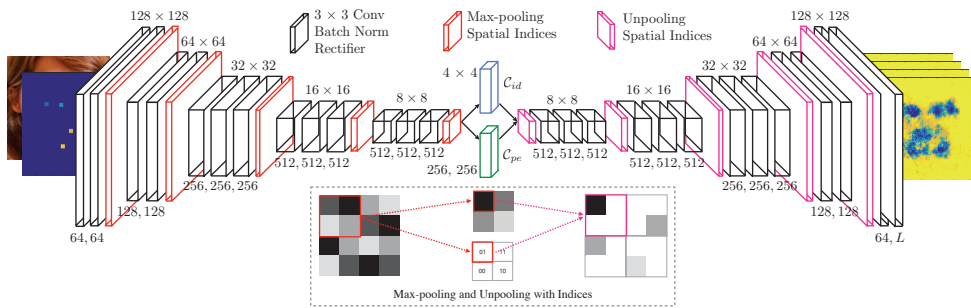


Temporal Recurrent Learning

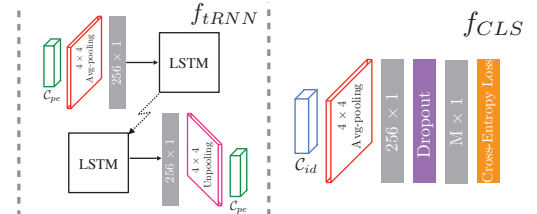


## Architecture

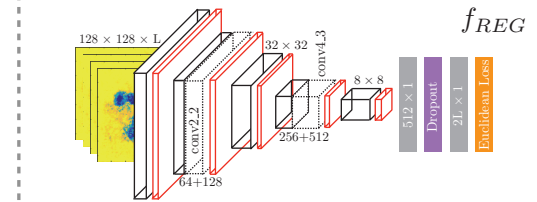
$f_{ENC}$



$f_{DENC}$



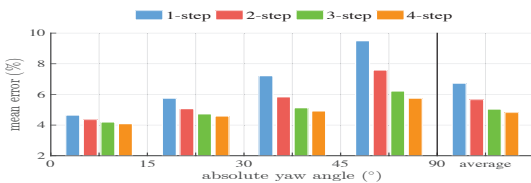
$f_{CLS}$



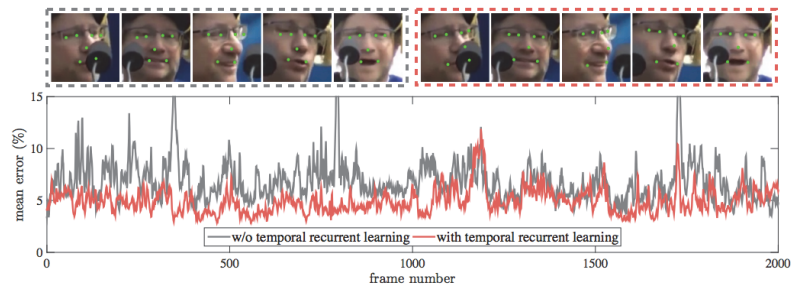
$f_{REG}$

## Experiment

Validation of  $f_{sRNN}$

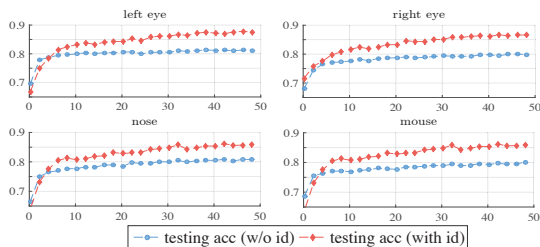


	Mean %	Std %	Failure %	Time ms	Memory MB
Cascade	8.07	6.36	25.5	31.7	88.9
Recurrent	7.33	3.94	17.3	28.5	29.6



Validation of  $f_{tRNN}$

Benefit of  $f_{CLS}$



	7 landmarks			68 landmarks			
	TF %	FM %	300-VW Challenging	TF %	FM %	300VW Challenging	
DRMF	4.43	8.53	9.16	ESR	3.49	6.74	7.09
ESR	3.81	7.58	7.83	SDM	3.80	7.38	7.25
SDM	4.01	7.49	7.65	CFAN	3.31	6.47	6.64
IFA	3.45	6.39	6.78	TCDCN	3.45	6.92	7.59
DCNC	3.67	6.16	6.43	PIEFA	3.24	<b>6.07</b>	6.37
<b>OURS</b>	<b>3.32</b>	<b>5.43</b>	<b>5.64</b>	<b>OURS</b>	<b>3.17</b>	6.18	<b>6.25</b>

General comparison