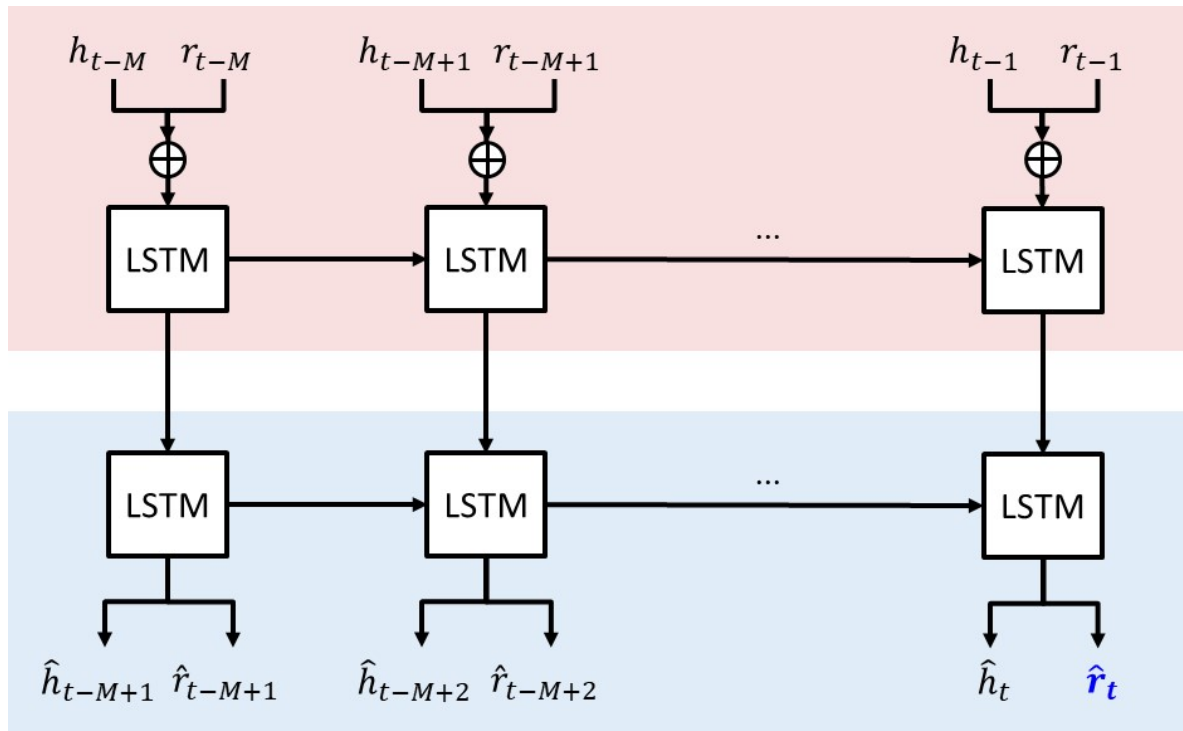


End-to-End Learning-based Interaction Behavior Generation

- Project AIR (Artificial Intelligence for Robots), ETRI, Korea
- Objective: adapt and react quickly to human behaviors
- Used LSTMs (long short-term memory units)
 - trained with NTU action recognition dataset

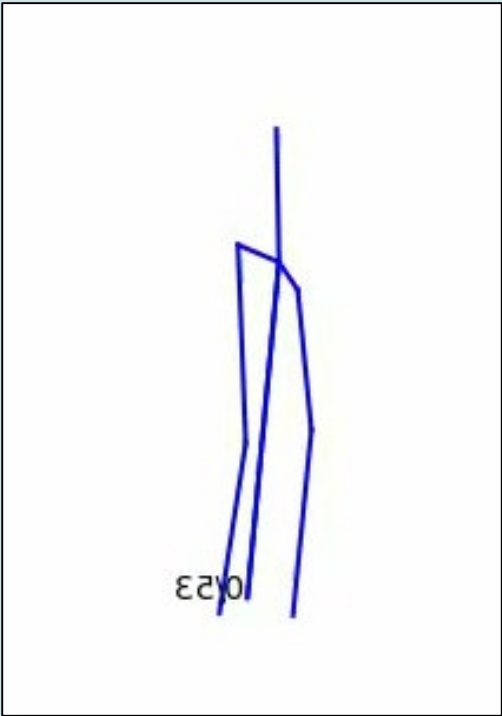
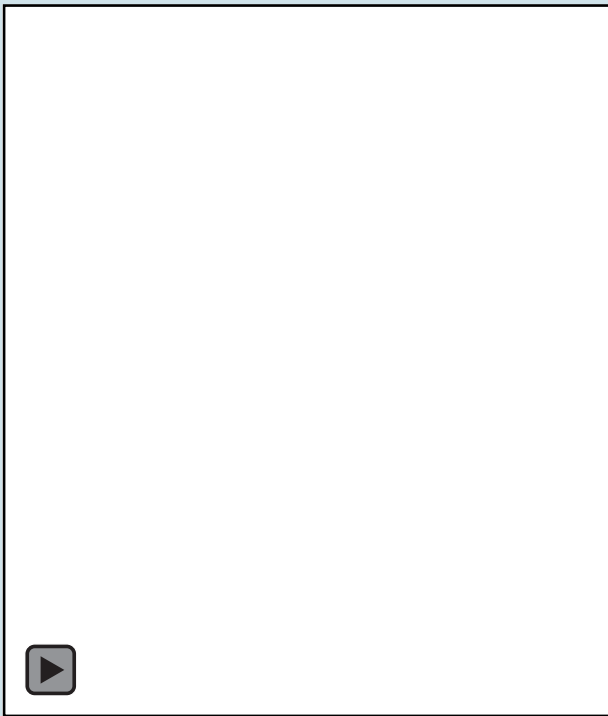
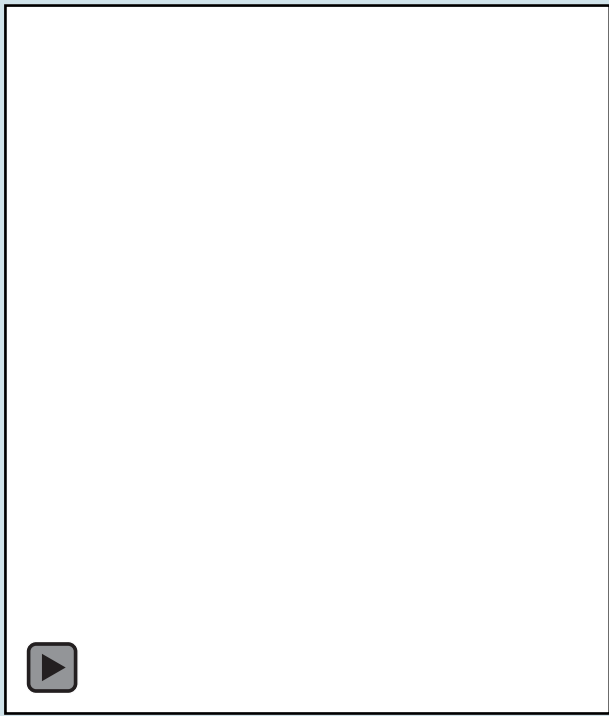


h_t : observed human joint angles
 r_t : observed robot joint angles
 \hat{h}_t : predicted human joint angles
 \hat{r}_t : predicted robot joint angles

< Deep neural network of interaction behavior generator >

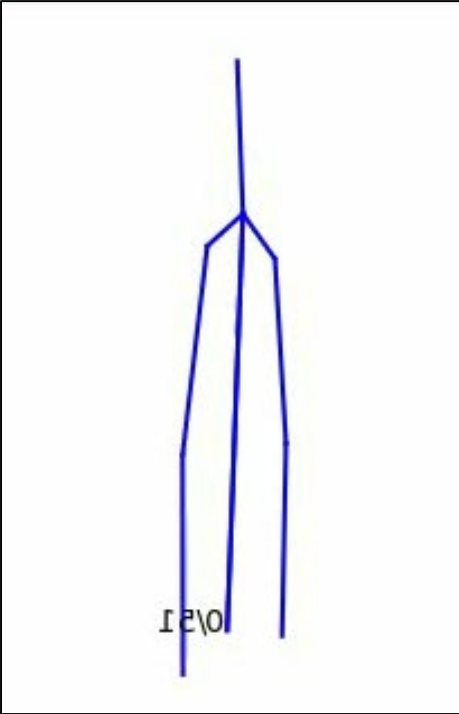
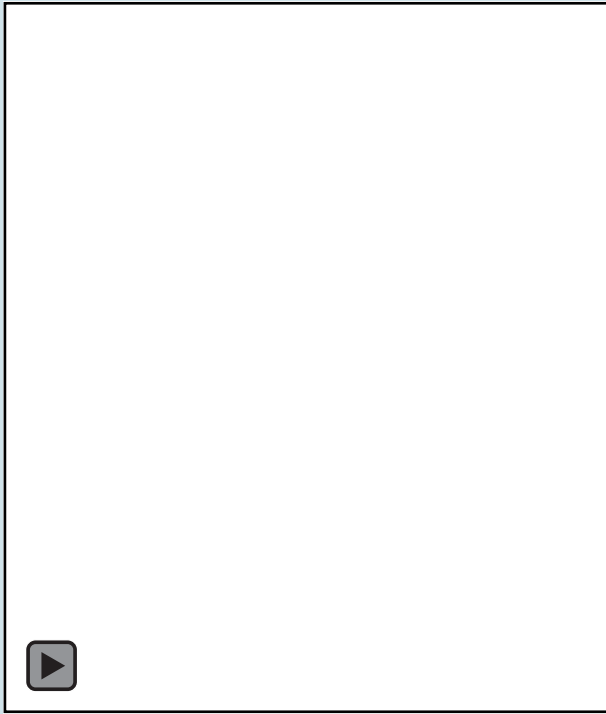
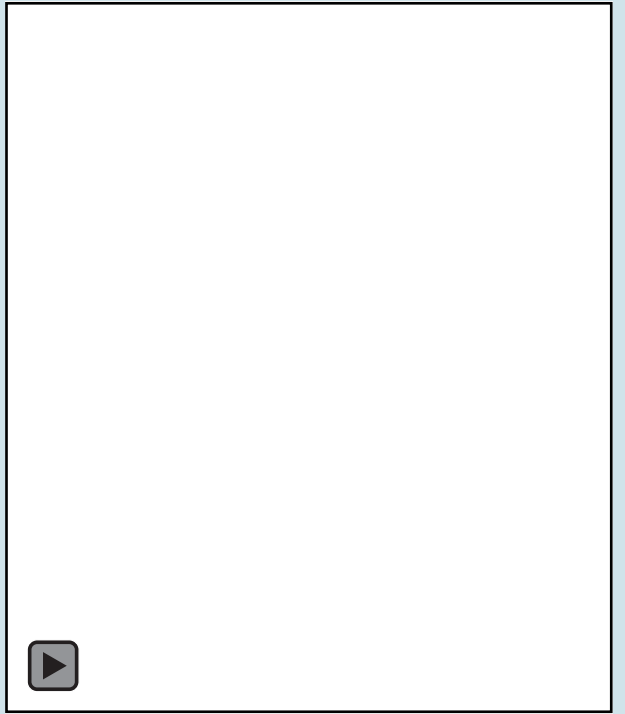
End-to-End Learning-based Interaction Behavior Generation

- Experiment 1) when a human reaches out to the robot

Ground Truth		Generation
 <p>A blue line plot showing a human's movement trajectory. The trajectory starts at the bottom left, moves upwards, and then branches into two paths that converge towards the top center. The text '0.23' is visible in the bottom left corner of the plot area.</p>	 <p>An empty white plot area with a play button icon in the bottom left corner, indicating that the robot's behavior is to be generated or compared against the ground truth.</p>	 <p>An empty white plot area with a play button icon in the bottom left corner, indicating that the robot's behavior is to be generated or compared against the ground truth.</p>
Human behavior	Robot behavior	Robot behavior

End-to-End Learning-based Interaction Behavior Generation

- Experiment 2) when a human points to the robot

Ground Truth		Generation
		
Human behavior	Robot behavior	Robot behavior