Boost Human-Machine Teams performance through Tempo-Relational World Representation

Vincenzo Marco De Luca, Giovanna Varni, Andrea Passerini

University of Trento

Human-Centered AI

AI paradigm that priorites:

1)thrustworthiness

2) ethics

3) human well-being

Theory of Mind AI

Socially Intelligent Agent:

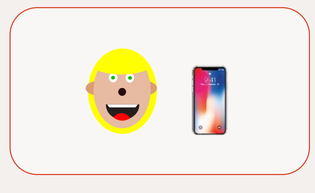
1)comprehend human needs

2)adapt to teams

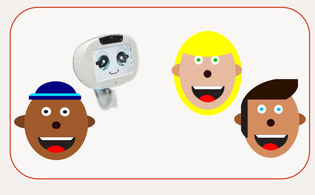
3)Team Decision Making

Social AI

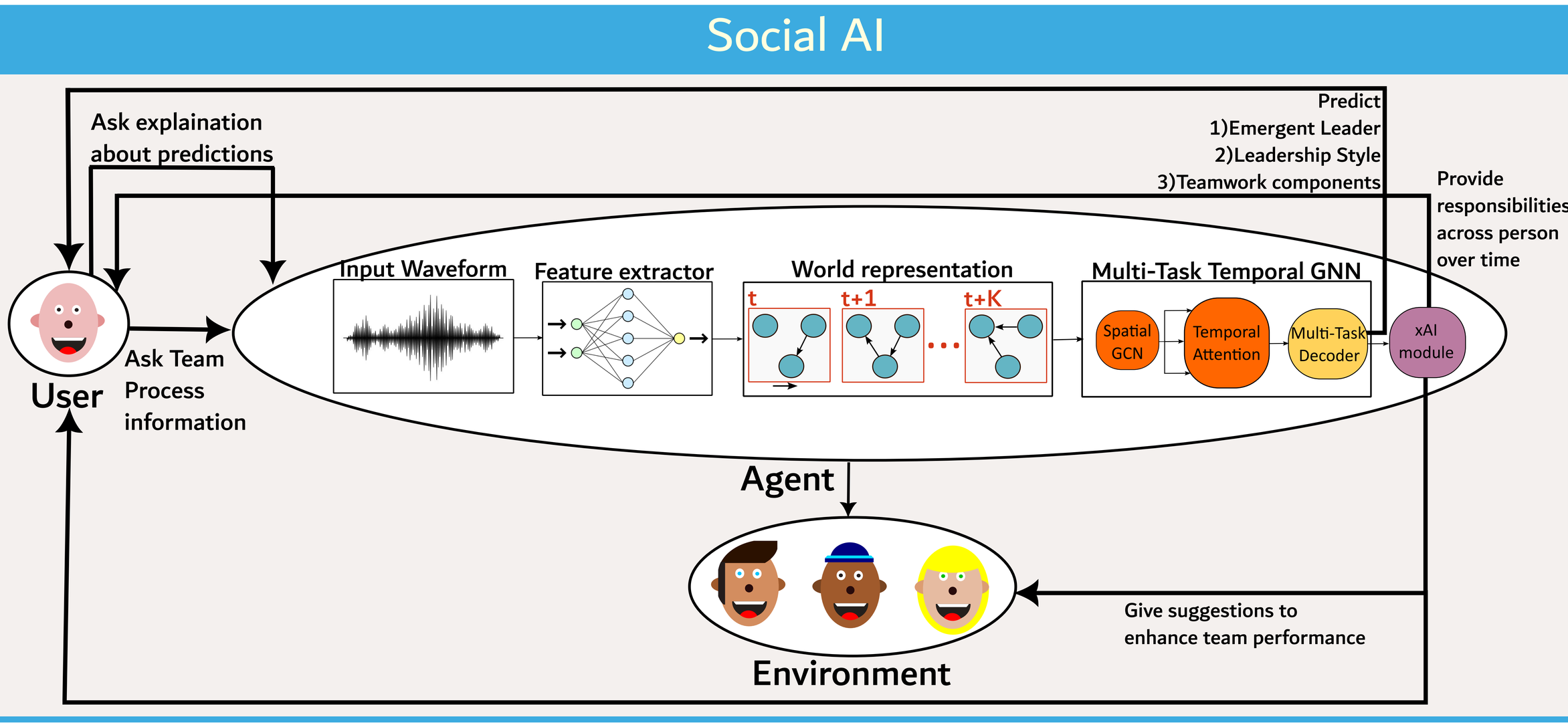
Traditional HCI



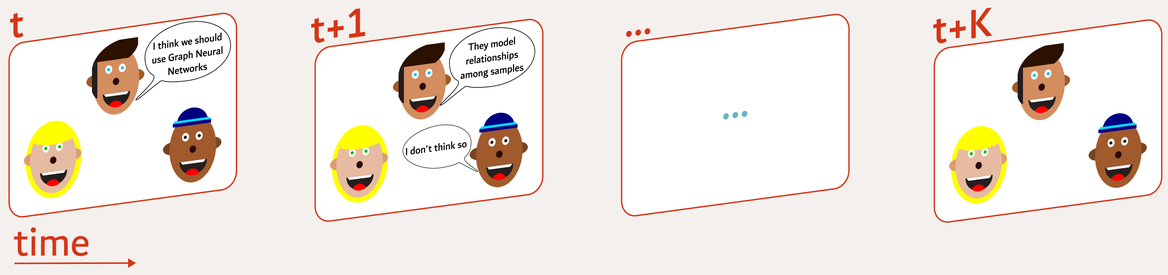
HMT



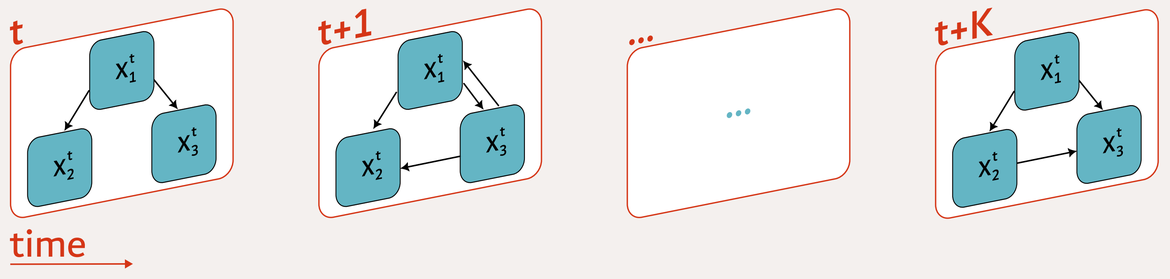
Social AI



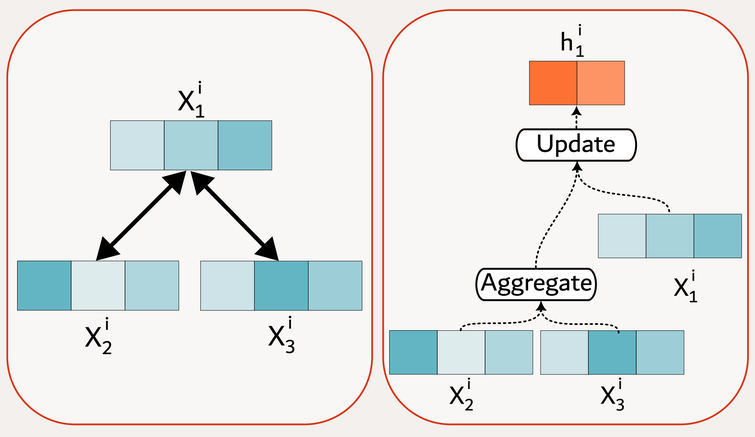
Teams in Real World



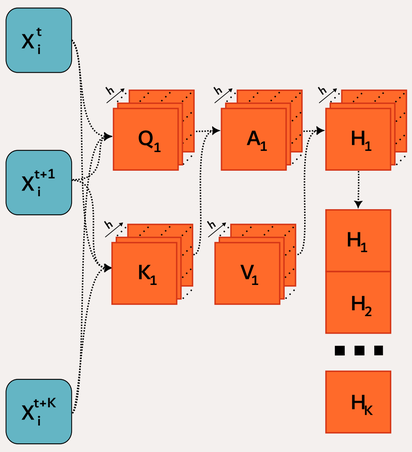
How Machine see Teams



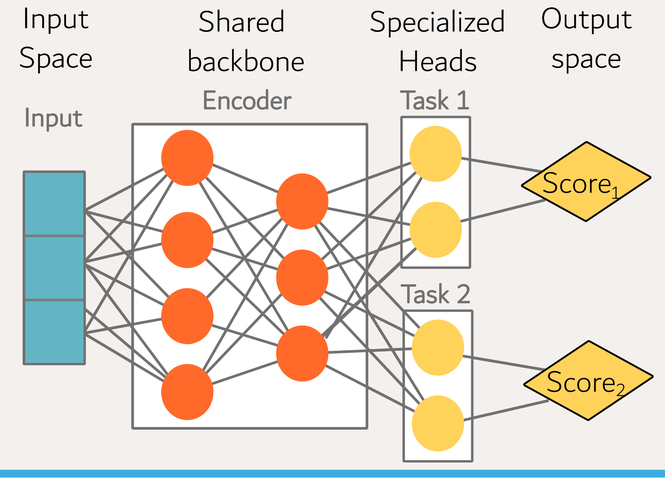
Spatial GCN



Temporal Attention



Multi-Task decoder



Time and Space complexity

Model	PAVIS Emer.Leader (↑)	PAVIS Lead.Style (↓)	PAVIS Teamwork (↓)	ELEA Emer.Leader (↑)	ELEA Lead.Style (↓)	ELEA Teamwork (↓)
RF	79.54±0.18	0.763	1.223	70.28±0.0	0.763	0.987
FFNN	77.05±0.54	0.878	1.039	67.68±0.94	0.824	1.002
LSTM	80.69±0.72	0.649	0.817	71.39±0.72	0.763	0.854
GNN	83.96±0.64	0.596	0.800	73.18±0.76	0.716	0.857
TGNN	85.95±0.48	0.551	0.768	74.55±0.76	0.648	0.779
MT-TGNN	**85.98**±0.52	**0.549**	**0.535**	**75.05**±0.68	**0.608**	**0.764**

Table 6. Comparison of the Multi-task and Single-task learning approaches. Emergent Leadership is measured in terms of accuracy (the higher the better), while Leadership Style and Teamwork are measured in terms of mean squared error (the lower the better).

Time and Space complexity