

Panoptic Studio: A Massively Multiview System for Social Motion Capture * (Supplementary Material)

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1. Description of Social Games and Procedures

We capture people engaged in various social interactions using our sensing system comprised of 480 views. To evoke natural interactions, we involved participants in various games: *Ultimatum*, *Prisoner’s dilemma*, *Mafia*, *Hagglng*, *007 bang*. No behavioral constraints are instructed to subjects other than the game rules, and, thus, subjects are allowed to do any natural interaction freely, to avoid contrivances in their motion. The duration of each game varies, and, in this paper, we produce vignettes by choosing interesting scenes with rich social signals, among all captured sequences. Here, we briefly describe the games and how we operationalized them for the capture.

Ultimatum. Ultimatum is a bargaining game that was first experimentally studied by Güth et al. [3] and has subsequently become among the most studied games in experimental economics [2]. The game consists of two bargainers who are given a certain amount of money to split (\$10 in our experiment). One bargainer, referred to as the proposer, suggests a split of the money, and the other bargainer, referred to as the responder, either accepts the split (and both receive money accordingly) or rejects the split (and neither receive anything). Unlike researchers in experimental economics and game theory, we are interested in evoking interactions rather than predicting outcomes of the game, and we therefore make several adjustments to the usual set up of the game. First, we organized participants into teams of proposers and responders (e.g., two proposers and two responders, or four proposers and one responder). Second, we introduced a one minute, face-to-face discussion phase where the participants discuss what they should do (including both

inter- and intra-team discussion). One the discussion phase is over, the proposers suggested a split, which the responders either accept or reject without discussion. Third, we did not control for prior acquaintance. Before each experiment, the subjects were introduced to the game informally, with oral instructions explaining the rules. The proposer(s) entered the eventspace first, followed by the responder(s).

Prisoner’s dilemma. Prisoner’s dilemma is a game that was first presented by Merrill Flood and Melvin Dresher, and formalized by Albert Tucker. Two groups are arrested and they are offered a bargain: if both groups co-operate, they receive a smaller penalty, but if one group betrays the other, the betrayed group will be punished harshly, while the betrayers receive the least penalty. Because betraying the other offers the least penalty, the rational conclusion from the cost matrix suggests betraying each other, even if cooperation is the best scenario for both of them. In our capture, we organized participants into two teams with three people for each, with a moderator who shows the reward matrix and announces a final decision from players. Players are given two minutes for intra-group and inter-group discussions, and make a conclusion by passing a selected card to the moderator between two options. The decisions from both teams are displayed by the moderator at the same time, and participants were compensated according to the decision in the reward matrix.

Mafia. Mafia is a game created by Dimitry Davidoff [4] that involves both conflict and cooperation, and produces dynamically changing alliances and rivalries within a group of people. Within the group, two individuals (usually) are secretly assigned the roles of “Mafia” and the rest are assigned roles or ordinary Villagers. The goal of the Villagers is to determine who among them is Mafia via discussion. It is a turn-based game that involves the Villagers choosing to “execute” one player every turn—their best consensus

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guess at who the mafia players are—following by the Mafia secretly choosing to secretly “execute” a Villager of their choice. The game is notable in that it requires some players to engage in outright deception, and requires other players to try to infer this via the interaction alone. In our capture, we involved eight players in the studio. One of them is determined as an operator, and two Mafias and five Villagers are secretly assigned via selecting a lottery. During the game, we gave them approximately a minute to discuss before iterating on each turn. A large number of interesting phenomena were observed, including subtle motion and gestures to suspect or deceive the other group. Participants were compensated \$10 for their participation.

Haggling. We present a new game to simulate a haggling among two sellers and a buyer. Two sellers are promoting their own competitive product, e.g., an apple vs chocolates, for selling, and a buyer makes the decision which product he/she chooses to buy between the two. They are given a minute for the haggling, and the seller who successfully sells his/her product is awarded \$5.

007 Bang. 007-bang game is a party game that originated in Korea. Players are arranged in a circle, and a turn is initiated from a starting person who points at someone in the group saying “0”. The tagged person, then, quickly points at someone else saying “0” again, and the next pointed person does the same while saying “7” (making “007” in turn). The person tagged “7” now points to someone saying “bang”, and the left and the right person of the tagged person raise their hands and shout “ah”. The rapid pace of the game tends to confuse people, because the “shot” person unconsciously tends to raise his/her hands, or the people next to the finally shot person easily forget their required action. The people who make mistake get a punishment by getting a light back slapping from the others. The next turn is then started from the “shot” person.

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