A Study on Gaze in Passing a Ball

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Abstract

This study investigated the gaze during a game 3 vs 1 which is called "pig in the middle". Since the gaze characteristics of a skilled player and an inexperienced player are significantly different, we will analyze the coordination between movements and gazes in future work.

Soccer is a family of team sports that involve kicking a ball to score a goal. A team consists of 11 players. Since soccer eliminates the use of hands, the most basic movement is passing using legs. When a player moves his body in a soccer game, recognizing the positional relationship between space and a ball using vision is needed. Analyzing a player's gaze enables to elucidate how he feeds back the information obtained from vision to his movement[1].

Humans obtain most of their information about the external environment from the sense of sight during sports activities. External environmental information obtained from vision has a great influence on determining motor commands during reaching movements. Therefore, analyzing the line of sight during passing a ball enables to develop an efficient training methods for soccer. Therefore, in this study, as a first step to analyze the gaze trajectory of players in soccer, we measure their gaze trajectories while passing a ball.

Two healthy adult males participated in the experiment. One is a professional soccer player, and the other is an inexperienced player. Study approval was obtained from the Research Ethical Committee, Kogakuin University. The participants received an explanation of the purpose and requirements of the study and gave their written informed consent to participate. The participants played a game 3 vs 1, which is called "pig in the middle" (Fig. 1). They wore an eye tracking system (EMR-9; nac image technology Co., Ltd.) on their heads. The sampling frequency of the system was 60 Hz.

We determined the two analysis time intervals. One was set from the time the participant kicked the



Fig.1 Schematic of pig in the middle 3vs1



ball until the ball was caught by one of the players. Another was set from the time one of the players kicked the ball until the ball was caught by the participant. Figure 2 shows the time ratio of eye gaze. The professional player never looked at his feet until the ball came to his feet and kept his eyes on the ball only when receiving the ball. While, the inexperienced player looked at the ball and his feet half of the time. In addition, when passing the ball, the professional player switched his viewpoints more often than the inexperienced player.

Reference

[1] K . Ikeda, S . Sakamoto, *Sports performance research*, 164-176 (2022)