

Analiza socijalnih mreža

Network analysis and intra-team activity in attacking phases of professional football

Marko Milićević 3136/2020

13M111ASM

2021/2022.

Uvod

- Cilj autora je da dokaže da se analiza mreža može koristiti za identifikaciju najbitnijih igrača u napadačkim fazama fudbalskih utakmica
- Mreža posmatra inter-tim odnose i to kroz broj uspešnih dodavanja, ali i lokaciju gde su oni ostvareni
- Za mrežu je korišćeno 6 utakmica ligaških NOS utakmica jednog tima

Kreiranje mreže

- Informacije od značaja su: kratka dodavanja i duga dodavanja. Koriste se samo ona koja su bila uspešna, i to samo u napadačkim fazama
- Čvorovi su igrači, obeleženi brojem na dresu
- Grane su uspešna dodavanja između njih
- Graf je težinski i usmeren
- *Relative frequency odds method (Peebles, 2001)*

$$P = \Pr (X, Y) = \frac{\text{number of interactions Player "X" with "Player Y"}}{\text{Total number of interactions Player X}}$$

Kreiranje mreže

○ Matrični prikaz:

To/Of	Players																			Passes and crosses receive
Players	1	4	5	6	7	8	9	10	12	13	14	17	18	19	21	23	25	28	30	
1	-	11	13	1	0	1	0	0	1	3	24	0	0	0	5	1	5	2	3	70
4	30	-	24	5	1	7	1	0	0	1	14	1	0	0	5	0	9	2	0	100
5	32	37	-	9	12	38	7	10	11	0	4	29	0	2	1	4	22	21	8	247
6	2	5	9	-	6	3	1	0	4	2	5	5	0	0	6	0	3	6	0	57
7	1	2	16	5	-	17	11	1	22	17	7	7	0	0	8	1	17	2	6	140
8	0	16	27	7	18	-	17	2	13	15	24	29	0	0	6	1	32	10	4	221
9	0	1	23	6	10	23	-	1	22	5	8	8	1	1	6	0	16	2	2	135
10	0	0	7	2	2	3	1	-	0	1	0	0	0	0	1	0	6	0	0	23
12	1	0	27	8	34	19	18	1	-	30	12	8	0	1	30	2	4	9	3	207
13	11	9	0	0	10	16	3	0	8	-	11	13	3	1	0	2	9	7	0	103
14	14	12	9	5	8	19	2	0	4	13	-	1	0	2	14	4	24	6	11	148
17	1	2	46	2	11	43	14	0	7	21	8	-	0	0	4	2	14	3	4	182
18	0	0	2	0	0	0	0	0	0	3	0	0	-	1	0	1	2	1	0	10
19	0	1	5	0	0	0	2	0	0	2	2	0	0	-	0	0	0	5	0	17
21	4	0	1	2	10	6	4	1	8	0	19	2	0	0	-	3	3	1	1	65
23	0	2	4	0	0	1	1	0	1	5	1	0	0	2	3	-	3	1	0	24
25	1	16	22	5	13	18	11	1	9	12	19	13	3	0	7	2	-	5	9	166
28	1	16	19	0	0	10	8	1	2	11	5	4	0	3	2	0	11	-	1	94
30	8	0	10	0	9	6	0	0	1	1	7	3	0	0	0	2	6	1	-	54
Passes and crosses performed	106	130	264	57	144	230	101	18	113	142	170	123	7	13	98	25	186	84	52	2063
Total of interactions	176	230	511	114	284	451	236	41	320	245	318	305	17	30	163	49	352	178	106	4126

Legend: To – interaction received by player; Of– interaction made by player. The lines display the number of passes and crosses received by each player; The columns display the number of passes or crosses performed by each player.

Kreiranje mreže

- Praćena i pozicija igrača tokom dodavanja:

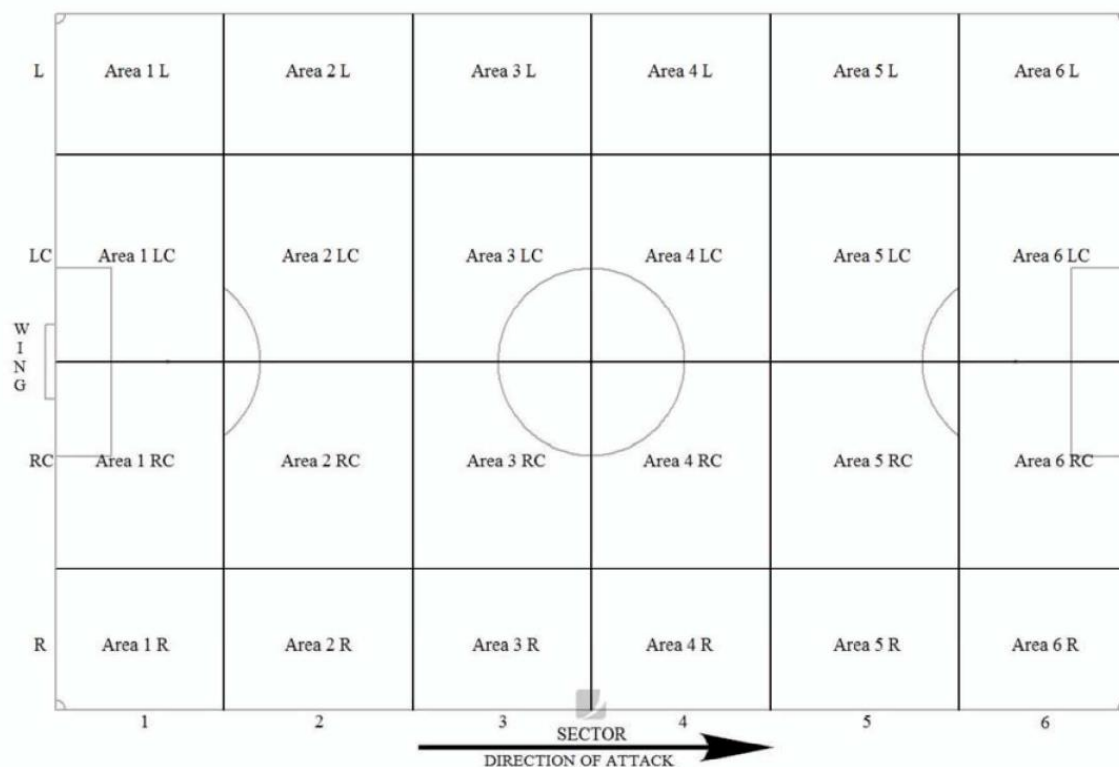


Figure 1. The football field divided into 24 areas (adapted from Amisco).

Rezultati – najbitniji čvorovi

- Scale Free mreža – mali broj igrača zadužen za veliki broj dodavanja

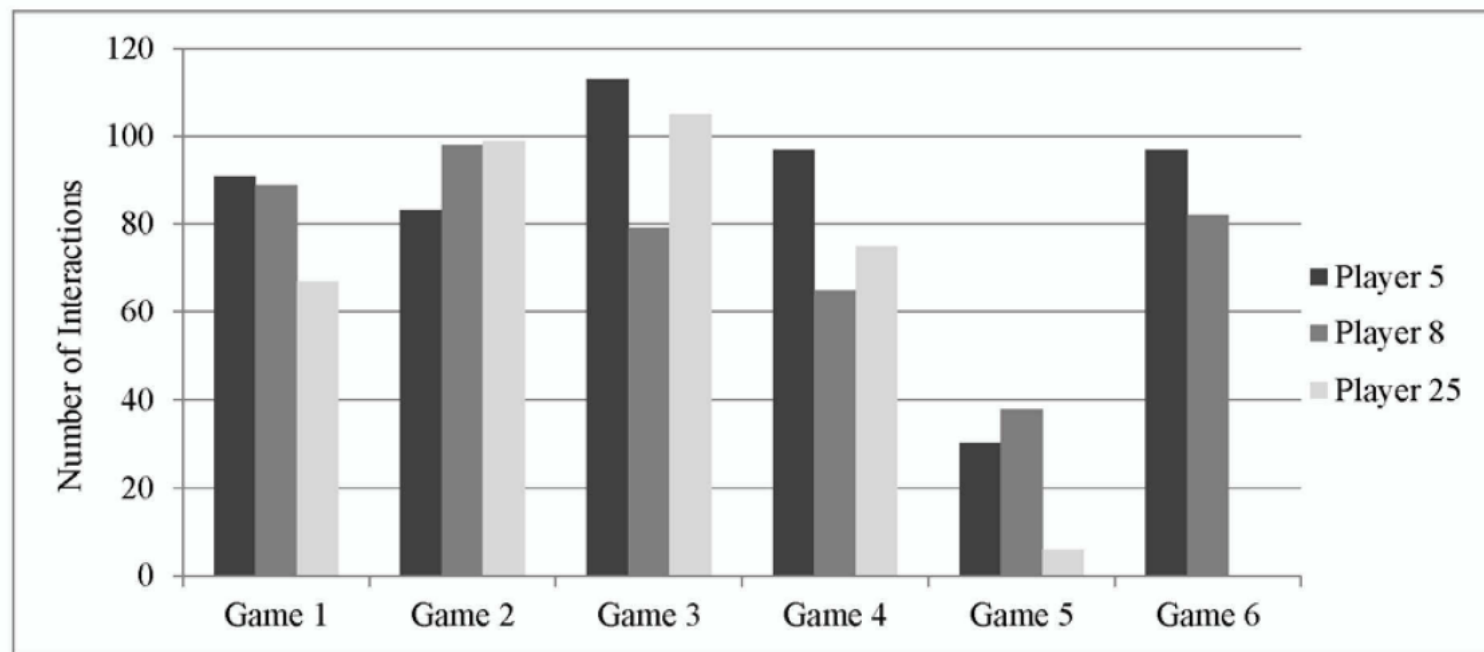


Figure 2. Interactions of key players in the sample of six matches observed.

Rezultati - lokacija

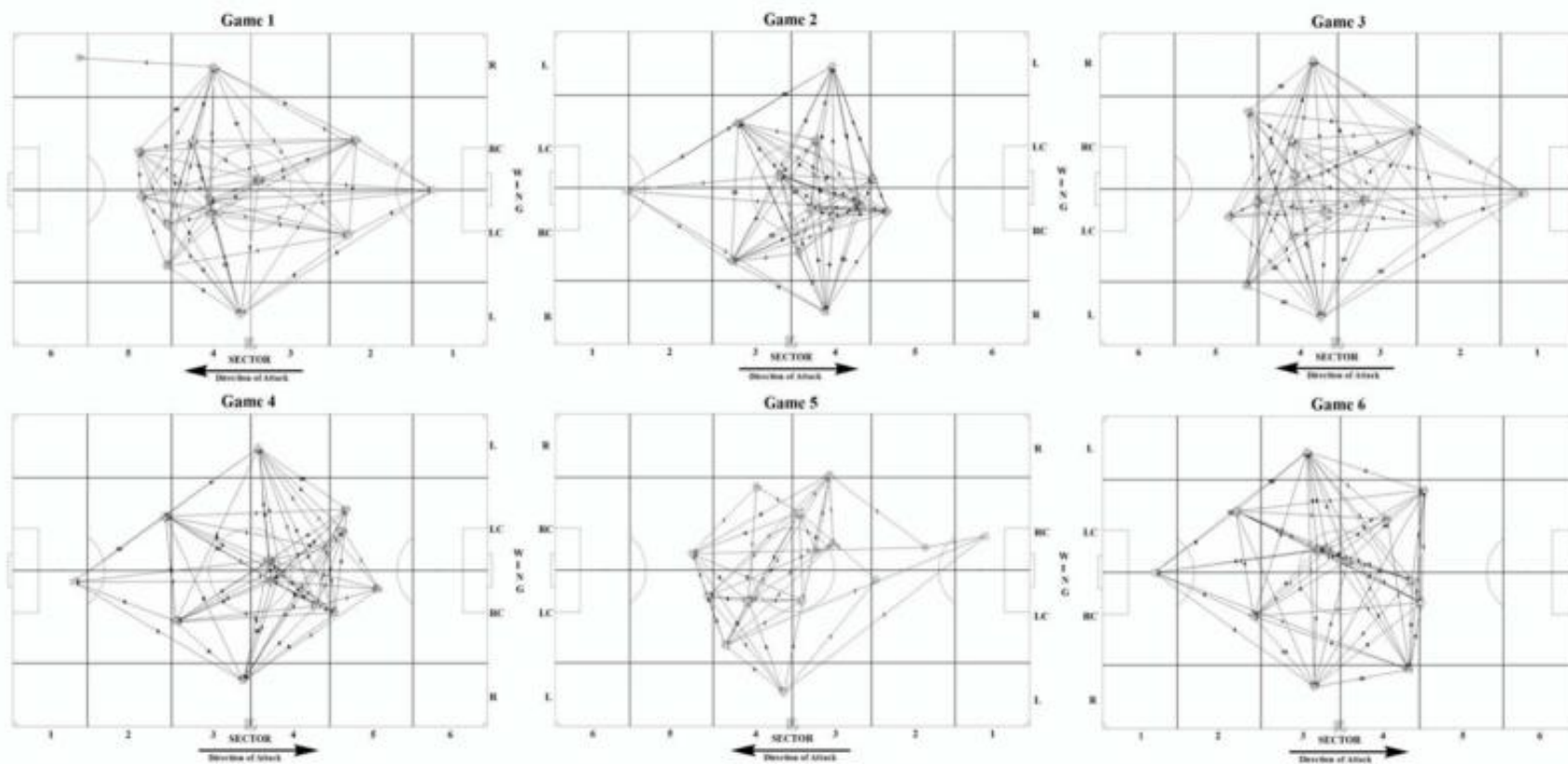


Figure 5. Networks of interactions obtained in each of the game observed.

Rezultati – šansa dobacivanja

To/Of	Players																		
Players	1	4	5	6	7	8	9	10	12	13	14	17	18	19	21	23	25	28	30
1	-	0.08	0.05	0.02					0.01	0.02	0.14				0.05	0.04	0.03	0.02	0.06
4	0.28	-	0.09	0.09	0.01	0.03	0.01			0.01	0.08	0.01			0.05		0.05	0.02	
5	0.30	0.28	-	0.16	0.08	0.17	0.07	0.56	0.10		0.02	0.24		0.15	0.01	0.16	0.12	0.25	0.15
6	0.02	0.04	0.03	-	0.04	0.01	0.01		0.04	0.01	0.03	0.04			0.06		0.02	0.07	
7	0.01	0.02	0.06	0.09	-	0.07	0.11	0.06	0.19	0.12	0.04	0.06			0.08	0.04	0.09	0.02	0.12
8		0.12	0.10	0.12	0.13	-	0.17	0.11	0.12	0.11	0.14	0.24			0.06	0.04	0.17	0.12	0.08
9		0.01	0.09	0.11	0.07	0.10	-	0.06	0.19	0.04	0.05	0.07	0.14	0.08	0.06		0.09	0.02	0.04
10			0.03	0.04	0.01	0.01	0.01	-		0.01					0.01		0.03		
12	0.01		0.10	0.14	0.24	0.08	0.18	0.06	-	0.21	0.07	0.07		0.08	0.31	0.08	0.02	0.11	0.06
13	0.10	0.07			0.07	0.07	0.03		0.07	-	0.06	0.11	0.43	0.08		0.08	0.05	0.08	
14	0.13	0.09	0.03	0.09	0.06	0.08	0.02		0.04	0.09	-	0.01		0.15	0.14	0.16	0.13	0.07	0.21
17	0.01	0.02	0.17	0.04	0.08	0.19	0.14		0.06	0.15	0.05	-			0.04	0.08	0.08	0.04	0.08
18			0.01							0.02			-	0.08		0.04	0.01	0.01	
19		0.01	0.02				0.02			0.01	0.01			-					0.06
21	0.04			0.04	0.07	0.03	0.04	0.06	0.07		0.11	0.02			-	0.12	0.02	0.01	0.02
23		0.02	0.02				0.01		0.01	0.04	0.01			0.15	0.03	-	0.02	0.01	
25	0.01	0.12	0.08	0.09	0.09	0.08	0.11	0.06	0.08	0.08	0.11	0.11	0.43		0.07	0.08	-	0.06	0.17
28	0.01	0.12	0.07			0.04	0.08	0.06	0.02	0.08	0.03	0.03		0.23	0.02		0.06	-	0.02
30	0.08		0.04		0.06	0.03			0.01	0.01	0.04	0.02				0.08	0.03	0.01	-

Legend: *To* – interaction received by player; *Of*– interaction performed by player.

Zaključak

- Bez poznavanja timova, možemo da zaključimo taktiku trenera
- Bez poznavanja timova, možemo da zaključimo na kojim pozicijama igraju igrači
- Nemamo uvid u to da razlikujemo šta su željena odstupanja, a šta utrenirane taktike, ali imamo uvid u preference igrača
- Dodatni atributi za povezanost

Literatura

- Network analysis and intra-team activity in attacking phases of professional football by Jose Gama, Pedro Passos, Keith Davids, Gugo Relvas, Joao Ribeiro, Vasco Vaz and Goncalo Dias,
- International Journal of Performance Analysis in Sport 2014, 14,692-708