Grant Starnes

Dr. Liz Wanless

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Final Project Phase III - Contribution Narrative

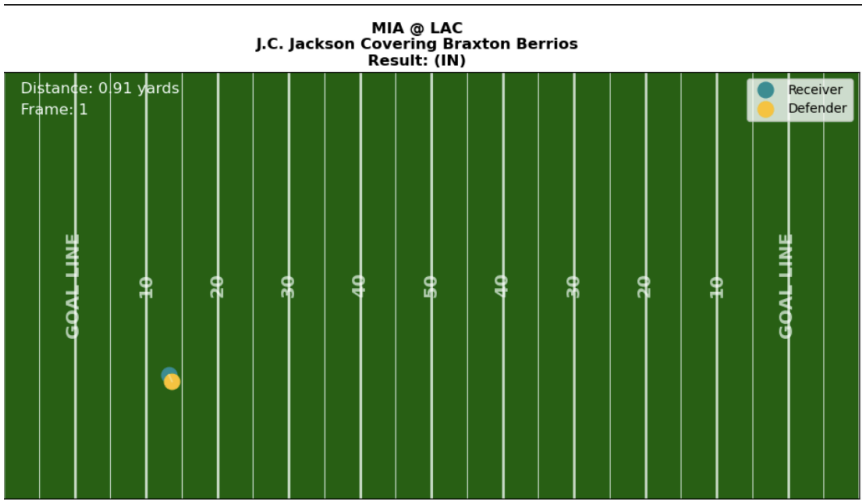
To start, I expanded on my idea from Final Project Phase II, which involved how quickly defenders reacted when the ball was in the air as well as how coverage success affects pass outcomes. For average defensive recovery speed, I segmented it into either zone or man coverage and included complete, incomplete, and intercepted pass outcomes for both in my visual, where recovery speed was far greater overall for zone coverage as they are most likely a bit farther away from a receiver in their zone, so they have to close in faster, whereas in man coverage, the defender is most likely much closer to the receiver, so this makes sense regarding recovery speed. I then looked at average separation by coverage type (man or zone), where man coverage had a 2.76 yards of average separation compared to 3.84 yards for zone coverage, reinforcing my previous point where zone coverage defenders have more space to close in on, thus proving they have to close in faster as opposed to man coverage. Then, I looked at average separation but segmented it by pass result (complete, incomplete, or interception). For completions, the average separation was 4.19 yards, incompletions was 2.53 yards, and interceptions was 2.06 yards, which makes intuitive sense intuitively. This topic of separation is what interested me the most, so I expanded on that in Phase III. I really wanted to focus on the time/percentage of a route that defenders were within 1 yard of the receiver to further prove separation absolutely matters. I first checked to make sure that there were valid plays where a defender was within 1 yard of a receiver using boolean logic, and my output states there are 8,024 plays that are false, or not within 1 yard, and there are 1,036 play that are true, where defenders are within 1 yard of the receiver. After this, I then looked at the average time within 1 yard as a percentage and average seconds within 1 yard and broke it up into complete, incomplete, and interceptions to build on my Phase II submission. My results are the following, and I believe support the different pass results based on the longevity of tighter coverage:

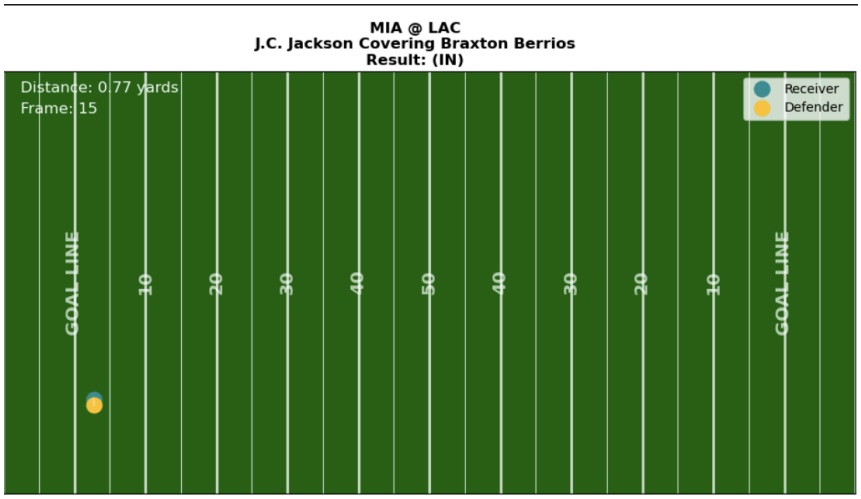
	pass_result	avg_pct_time_within_1_yard	std_pct_time_within_1_yard	avg_seconds_within_1_yard	std_seconds_within_1_yard
0	C	0.034130	0.139396	0.041764	0.192448
1	I	0.196492	0.299305	0.260755	0.404763
2	IN	0.249661	0.336428	0.335714	0.568438

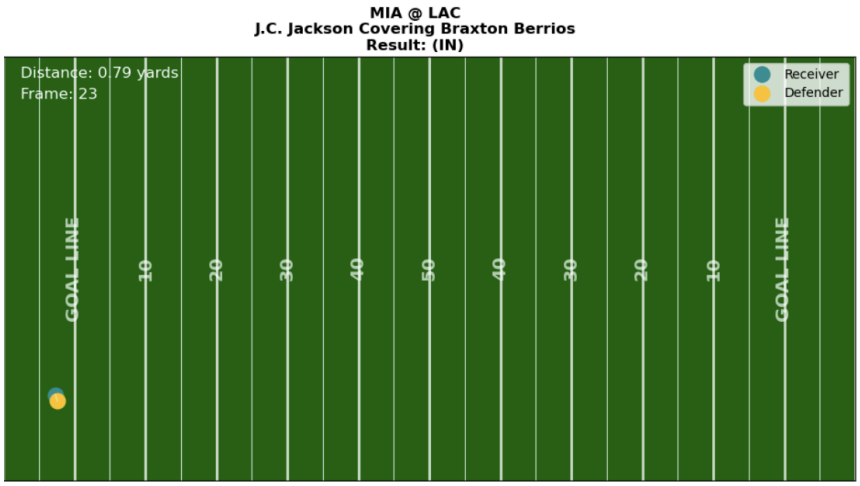
I also looked at a sample of 5 plays that defenders were within 1 yard sometime during the play, and looked at things like frames within 1 yard and total frames, the percentage within 1 yard, seconds within 1 yard, and the pass result, and I believe supports tighter coverage matters once more:

	game_id	play_id	def_nfl_id	frames_within_1_yard	total_frames	pct_time_within_1_yard	seconds_within_1_yard	pass_result
640	2023091010	3064	46775.0	23	23	1.000000	2.3	IN
883	2023091100	3167	54650.0	20	33	0.606061	2.0	C
189	2023091002	3812	54533.0	17	21	0.809524	1.7	I
350	2023091005	2440	46168.0	17	26	0.653846	1.7	IN
572	2023091009	2430	53438.0	17	21	0.809524	1.7	I

I then created a series of visuals to support my findings, but as I'm going over a bit already, I really want to highlight an animated visual I created, which utilizes and shows the exact outcome of the first tuple from the output just above this text. I used the game_id, play_id, and pass_result and pulled receiver and defender names to make the animation visual have context, rather than just including the id numbers and providing no context. It labels the receiver, Braxton Berrios, of the Miami Dolphins, and the defender, J.C. Jackson, of the Los Angeles Chargers and shows that the result is an interception, as that is what the outcome truly was. It also tracks the separation distance between the two frame by frame, as well as counts the frame as the animation goes on. This is by far the best visual I've made and really wanted to highlight it here! (I'll just include a series of screenshots here, but the live one will be in the notebook file!)


MIA @ LAC
J.C. Jackson Covering Braxton Berrios
Result: (IN)
Distance: 0.91 yards
Frame: 1
Receiver
Defender
GOAL LINE
10
20
30
40
50
40
30
20
10
GOAL LINE


MIA @ LAC
J.C. Jackson Covering Braxton Berrios
Result: (IN)
Distance: 0.77 yards
Frame: 15
Receiver
Defender
GOAL LINE
10
20
30
40
50
40
30
20
10
GOAL LINE


MIA @ LAC
J.C. Jackson Covering Braxton Berrios
Result: (IN)
Distance: 0.79 yards
Frame: 23
Receiver
Defender
GOAL LINE
10
20
30
40
50
40
30
20
10
GOAL LINE