Ariel Dynamics Inc. Media Library - Video

Baseball Analysis

Code	**adi-vid-01115**	
Title	Baseball Analysis	
Subtitle	Baseball Analysis with the APAS System	
Description	Analysis of Baseball	
Subject	APAS;Baseball;Favorite;Performance Analysis;Sports	
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Ariel Performance Analysis System (APAS) Synopsis

The Ariel Performance Analysis System (APAS) is a highly advanced computerized system for biomechanical analysis and the study of human motion. Developed by Dr. Gideon Ariel, a former Olympic committee chairman, NASA consultant, and world leader in biomechanical research, APAS has been instrumental in the development of lunar and Mars invasion spacesuits.

The system has also been used by top athletes such as Frank Shorter, Al Order, Brian Oldfield, the US women's volleyball team, and Mack Wilkins. APAS can be used to diagnose and rehabilitate patients, breaking down motion into its components.

The system was used to analyze a baseball game, identifying key characteristics of good players. For example, it was found that good power hitters often hyperextend their front leg to generate torque and transfer weight.

APAS can also plot different curves to identify which body segments are speeding up and slowing down. This information can be used to improve performance and correct errors.
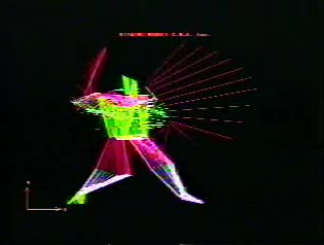
The system was also used to analyze the movements of Nolan Ryan, identifying that he puts a lot of stress on his lower back area.
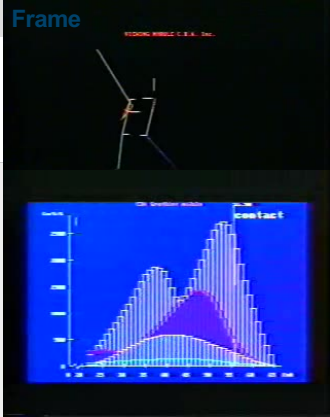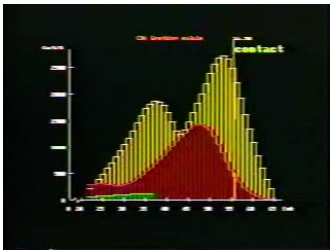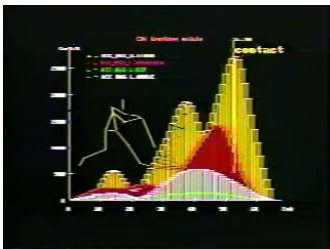
In conclusion, APAS is a sophisticated system that can be used in various fields where physical performance or human movement is important. It uses two cameras to calculate the third dimension, providing a more accurate analysis than the human eye.

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Audio transcription

Frame	#	Time	Spoken text
	0.	**00:00:00**	*The APAS, the Ariel Performance Analysis System, the world's most advanced computerized*
	1.	**00:00:10**	*system for biomechanical analysis and the study of human motion.*
	2.	**00:00:15**	*The Ariel Performance Analysis System, or APAS, was developed by Dr. Gideon Ariel, founder*
	3.	**00:00:21**	*of Ariel Life Systems, former Olympic committee chairman, NASA consultant, and world leader*
	4.	**00:00:27**	*in biomechanical research.*
	5.	**00:00:30**	*The APAS was instrumental in the development of the lunar and Mars invasion spacesuits,*
	6.	**00:00:35**	*and the APAS is the same system that has made Dr. Ariel a consultant to some of the best*
	7.	**00:00:41**	*athletes on the planet.*

Frame	#	Time	Spoken text
	8.	00:00:43	Among these athletes are Frank Shorter, gold medalist in the 1972 Olympics, Al Order, former
	9.	00:00:49	Olympian, Brian Oldfield, world champion in the shot put, the US women's volleyball
	10.	00:00:55	team, and Mack Wilkins, winner of the gold medal in the 1976 Olympics, and world record
	11.	00:01:01	holder in the discus.
	12.	00:01:03	The same system can be used by you to diagnose and rehabilitate your patients.
	13.	00:01:10	Our system is the high technology which enable to take any video and break down the motion
	14.	00:01:15	into its components.
	15.	00:01:17	In this case, we're taking the baseball game and try to find out what the characteristics
	16.	00:01:22	that make a good picture or a good battle.
	17.	00:01:25	We took an actual game situation and analyzed it, and now we can present the results.
	18.	00:01:36	So basically you see the characteristics of this particular barrel taking actually from
	19.	00:01:42	the game, and you see them multiple image.
	20.	00:01:46	And John, you can tell some of the results that we found.
	21.	00:01:49	Well, what we found, first of all, were two very interesting factors here.
	22.	00:01:53	Number one, a lot of good power hitters will take their front leg, the left leg here, and
	23.	00:01:58	they'll hyperextend it, or straighten the left leg out to generate torque to transfer
	24.	00:02:02	the weight.
	25.	00:02:04	We found out that Jose Conseco has that ability to do so, and he has that movement and its
	26.	00:02:09	strength right here.
	27.	00:02:10	Also, he thrusts his right leg into the pitch, which means he drives into the ball, and he
	28.	00:02:17	creates a lot of torque with his hips by doing this particular movement right here.
	29.	00:02:21	As you can see, his hips spinning and rotating to create that torque.
	30.	00:02:25	It's probably why he has a little bit of a lower back problem also.
	31.	00:02:29	We found that out that he overswings a lot of times, in other words, his center of gravity
	32.	00:02:34	or his upper torso, swings past the parallel point.
	33.	00:02:38	So this allows Jose Conseco to give a real good backswing or torque on the swing.
	34.	00:02:43	Now we're going to look at Kevin Mitchell getting in and see what we can find out about Kevin.
	35.	00:02:50	Kevin happened to be one of the biggest power hitters in the National League, and there's
	36.	00:02:55	some good indications why.
	37.	00:02:56	He shows a little bit of the characteristics of Jose Conseco, but in a little softer tone,
	38.	00:03:01	it's not as big, but still he has some of the same characteristics.
	39.	00:03:05	Here we see that stiff left leg, but not as hyperextended as Conseco.
	40.	00:03:13	What we're looking at here is a little bit of a hitch, but yet he's got very quick bat
	41.	00:03:17	speed coming through.
	42.	00:03:19	And yet we see that V, or the attorney of the hips, generating the torque to generate
	43.	00:03:25	that bat speed and he gets real good extension out in front.

Frame	#	Time	Spoken text
	44.	**00:03:28**	How do we pull up the graph on Kevin Mitchell and see what type of acceleration and torque
	45.	**00:03:33**	he's generating?
	46.	**00:03:35**	Since velocities are so important, the speed that you move different body segments, I actually
	47.	**00:03:40**	would plot different curves and what you find out that some segments are speeding up and
	48.	**00:03:47**	some slowing down.
	49.	**00:03:49**	You see a segment that's actually speeding up, especially the side that's actually using
	50.	**00:03:55**	the bat, where the other side is actually slowing down in order to transfer energy.
	51.	**00:04:01**	Now there is no way in the world that even a great baseball player or coach can see that,
	52.	**00:04:06**	and we can tell right away what a person is doing right or wrong, and they might concentrate
	53.	**00:04:12**	on the wrong fact, because as we have experienced now, in some cases we change a little thing
	54.	**00:04:19**	and it made a big difference in the bearing of the pitching.
	55.	**00:04:23**	As you see, he was stopping moving the knees just before the impact.
	56.	**00:04:28**	For Luke on the video, it appears like it happened at the impact, but it's really
	57.	**00:04:34**	blocked before, and if you see there is no follow-through with his upper body, in fact
	58.	**00:04:38**	almost it seems like he's going back with that.
	59.	**00:04:41**	And this is a very important characteristic.
	60.	**00:04:43**	We found the same thing in other sports, in golf, in track and field and things like where
	61.	**00:04:48**	you have to transfer forces into the last segment, in this case will be the bat.
	62.	**00:04:54**	So that's when he's locking up, the bat head's whipping around, so all the energy is transferring
	63.	**00:04:58**	to the head of the bat then, basically.
	64.	**00:05:00**	By the timing, the timing is extremely important.
	65.	**00:05:03**	If it's a little bit out of phase, that's where you're losing it.
	66.	**00:05:05**	That's where your slumps come into effect, right, where the player goes into the doldrums
	67.	**00:05:09**	is what we consider it.
	68.	**00:05:10**	And since in baseball, every pitch is a little bit different.
	69.	**00:05:14**	The body has to adjust, and also the question was, when the batter can adjust, when the
	70.	**00:05:19**	ball leaves, the hands of the pitcher, can the bear make adjustment?
	71.	**00:05:23**	Well, amazingly enough, there was some adjustment, but not major adjustment.
	72.	**00:05:28**	So when he makes the commitment, and some physics going bad, the bat is bad.
	73.	**00:05:34**	Sure, exactly, gets pulled by the pitch.

Frame	#	Time	Spoken text
	74.	**00:05:38**	*Okay, this is Nolan Ryan's movement.*
	75.	**00:05:45**	*And what we're seeing here are the best mechanics in baseball by a pitcher, bar none.*
	76.	**00:05:51**	*And what we found here is a couple of things that when Nolan picks his leg up very high,*
	77.	**00:05:57**	*in his windup, he's really putting a lot of stress on his lower back area.*
	78.	**00:06:02**	*And as we know earlier in the season, he added some lower back problems.*
	79.	**00:06:06**	*This is one of the indicators that we've seen.*
	80.	**00:06:08**	*But other than that, that's how he gathers himself to throw the pitch properly.*
	81.	**00:06:12**	*As you can see, his elbow is up just fine and perfect, and his extension is very good,*
	82.	**00:06:19**	*and his drive is tremendous.*
	83.	**00:06:20**	*He has tremendous drive from his back leg, and also his plant.*
	84.	**00:06:25**	*You can see where he plants on his left side here to create that transfer of weight.*
	85.	**00:06:31**	*And what we find here is that this is a sound, body mechanic, a pitcher right here.*
	86.	**00:06:37**	*The amazing thing, John, that many people think that there is a follow-through in a baseball*
	87.	**00:06:42**	*as far as releasing the ball, and they will think that they release the ball here.*
	88.	**00:06:45**	*But we found with Nolan Ryan that really the ball leave when it's almost parallel with*
	89.	**00:06:50**	*the shoulder.*
	90.	**00:06:51**	*Right.*
	91.	**00:06:52**	*So all this motion is really a result of a tremendous strength of the fuel, but really*
	92.	**00:06:55**	*the ball left the hand almost at the shoulder level.*
	93.	**00:06:58**	*Now how he got this kind of speed, again, we have to emphasize that it's all relating*
	94.	**00:07:03**	*to the low body, and he relatively relax with the upper body.*
	95.	**00:07:07**	*We found some of the really big baseball players and some of the university players that try*
	96.	**00:07:13**	*to overemphasize with their arms, and they're really killing the whole pitch.*
	97.	**00:07:18**	*See, we've noticed some things about Ricky Henderson that were really interesting about*
	98.	**00:07:22**	*his quickness, and his start.*
	99.	**00:07:24**	*So what we did was we analyzed his start, how he takes off.*
	100.	**00:07:28**	*It's amazing that when he starts, his speed, it's almost like starting in a 100m sprint.*
	101.	**00:07:34**	*Because when he drives with his leg, I mean, we didn't see too many baseball players can*
	102.	**00:07:38**	*do that.*
	103.	**00:07:39**	*No.*
	104.	**00:07:40**	*And the acceleration is amazing, though, he's basically a sprinter that happened to be*
	105.	**00:07:44**	*a baseball player.*
	106.	**00:07:45**	*Exactly.*
	107.	**00:07:46**	*I mean, the acceleration factor was one step, and he's at full speed, and I think this is*
	108.	**00:07:50**	*a key factor for Ricky Henderson when he steals bases.*

Frame	#	Time	Spoken text
	109.	**00:07:53**	*He gets that good jump.*
	110.	**00:07:54**	*And you also watch him when he concentrates on the pitcher.*
	111.	**00:07:59**	*And how he looks at him, he studies him, and he knows when to make his break.*
	112.	**00:08:03**	*I think those are two of the key factors.*
	113.	**00:08:04**	*The amazing thing also that when you plot the acceleration of Ricky here against Carl*
	114.	**00:08:10**	*Lewis, you find that they're not much different.*
	115.	**00:08:12**	*Right.*
	116.	**00:08:13**	*I agree.*
	117.	**00:08:14**	*The question is, why would you need a sophisticated system like this?*
	118.	**00:08:20**	*Well, today, in a modern world, whether you are a physical therapist, or whether you*
	119.	**00:08:26**	*are an insurance person, whether you are a coach, trainer, any place where we need physical*
	120.	**00:08:33**	*performance or human movement, the question is, how you quantify the results.*
	121.	**00:08:41**	*What we can do with our system, instead of using two eyes, we're using two cameras.*
	122.	**00:08:45**	*And from there, we can do what the brain does to the human body and actually calculate*
	123.	**00:08:52**	*the third dimension.*

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