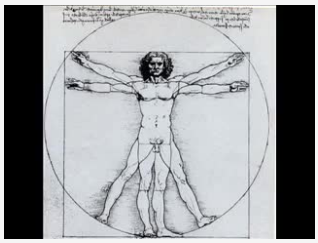
Ariel Dynamics Inc. Media Library - Video

APAS Tutorial



Code	**adi-vid-01162**
Title	APAS Tutorial
Subtitle	APAS System on Flashcard
Subject	APAS;Favorite;Help;Performance Analysis;Tutorials
Duration	00:10:03
URL	https://arielweb.com/videos/play/adi-vid-01162
Date	2010-12-09 00:00:00
Label	Approved
Privacy	Public

Synopsis

The video discusses the evolution of biomechanics and its integration into athletic performance, starting from Leonardo da Vinci's initial concepts to modern day technology. The speaker, an Olympic athlete, shares his dream of integrating science into athletic performance. He talks about the progression from using expensive mainframes and film cameras to digitize and analyze movements, to the use of mini-computers and PCs which made real-time analysis possible.

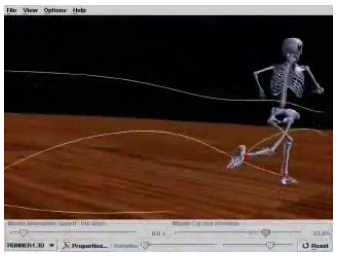
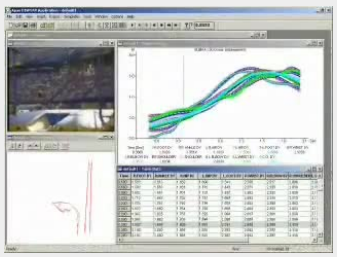
The United States Olympic Committee announces its partnership with Data General to improve the performances of American Olympic contenders. The Ariel performance analysis system, developed by sports scientist and former Israeli Olympic athlete Dr. Gideon Ariel, is introduced. This system uses a computer in conjunction with a video player and monitor to manually digitize body joints from video recordings for analysis.

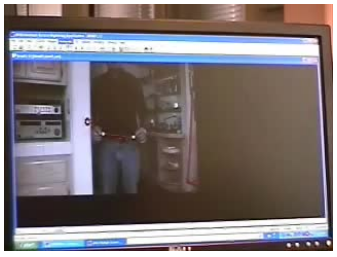
The speaker then discusses the use of this technology at NASA's Johnson Space Center for designing protective space gear for astronauts. He concludes by demonstrating how a simple flash card can now be used to perform a full biomechanical analysis on any computer or even smartphones, revolutionizing the field of biomechanics. This progression in biomechanics technology, from mainframes to flash cards, is described as a 21st-century miracle.

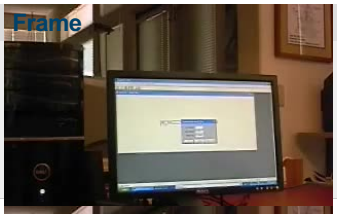
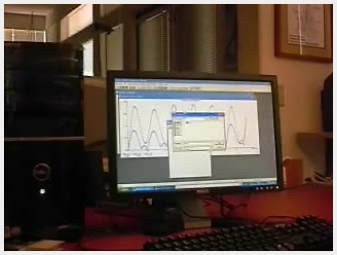
Model Id: gpt-4-0613
Created on: 2023-09-19 02:57:37
Processing time: 00:00:20.9050000
Total tokens: 1685

Audio transcription

Frame	#	Time	Spoken text
	0.	00:00:00	*Leonardo da Vinci was the first one that integrated the human body with all kinds of functions,*
	1.	00:00:11	*mechanical functions, anatomical functions, and integrated them together.*
	2.	00:00:18	*Myself as an Olympic athlete in two Olympic games, I had the chance to have a dream.*
	3.	00:00:27	*The dream was integration of science into athletic performance.*
	4.	00:00:36	*It started all with the mainframe, which was very expensive when using a film camera*
	5.	00:00:43	*to record on the field using digitizing, which I invented the first digitizer for biomechanics,*
	6.	00:00:51	*and we went point by point, all connected to a mainframe.*
	7.	00:00:55	*And then we went to the mini-computer. This was the data-general computer,*
	8.	00:01:00	*which enabled us to do it more in real time, where you could see what you are doing,*

Frame	#	Time	Spoken text
	9.	**00:01:06**	*and you could see the stick figure right away. It was a very expensive way.*
	10.	**00:01:10**	*Then we went to the PC, and with the PC we had more capabilities.*
	11.	**00:01:15**	*The United States Olympic Committee is announcing today that it's going to use a computer*
	12.	**00:01:20**	*contributed by a company called Data General to improve the performances of every American Olympic contender.*
	13.	**00:01:26**	*This morning is Colonel Don Miller, he's Executive Director of the Olympic Committee,*
	14.	**00:01:31**	*and Dr. Gideon Ariel, he's a sports scientist, a former Israeli Olympic athlete*
	15.	**00:01:35**	*who has developed the system that we're about to show you.*
	16.	**00:01:38**	*150 meters remaining at the era of the Olympic champion!*
	17.	**00:01:43**	*Fantastic! A world championship gold medal!*
	18.	**00:01:46**	*Is that a smile of a space? He runs the final 100!*
	19.	**00:01:49**	*He was trying to come back John!*
	20.	**00:01:51**	*He's not doing it, I don't think he has a space, but he's trying, very hard to hit me!*
	21.	**00:01:56**	*He's trying to keep me at the end of the year!*
	22.	**00:01:58**	*He's trying to keep me at the end of the year!*
	23.	**00:02:02**	*Stop!*
	24.	**00:02:06**	*Get out of the moment, let them retrain the momentum!*
	25.	**00:02:10**	*On the outside, men in the Jamaica,*
	26.	**00:02:12**	*the pair is coming on strong.*
	27.	**00:02:14**	*They add her, along with the app as they race to the finish line!*
	28.	**00:02:18**	*It's a big win!*
	29.	**00:02:21**	*It's a big win!*
	30.	**00:02:23**	*It's a big win!*
	31.	**00:02:26**	*It's a big win!*
	32.	**00:02:28**	*It's a big win!*
	33.	**00:02:31**	*It's a big win!*
	34.	**00:02:33**	*It's a big win!*
	35.	**00:02:35**	*It's a big win!*
	36.	**00:02:38**	*At the front end, it is Tulu trying to hold off the challenge over there!*
	37.	**00:02:43**	*Adair going to the outside!*
	38.	**00:02:46**	*At NASA's Johnson Space Center, the anthropometry and biomechanics lab*
	39.	**00:02:51**	*investigates many of the biomechanics issues that go into the human factors design*
	40.	**00:02:56**	*of protective space gear for astronauts.*
	41.	**00:02:59**	*One of the more recent additions to the ABL is the Ariel performance analysis system.*
	42.	**00:03:06**	*The Ariel is actually a computer that works in conjunction with a video player and monitor.*
	43.	**00:03:11**	*Through frame-by-frame analysis, body joints are manually digitized from video recordings.*

Frame	#	Time	Spoken text
	44.	00:03:18	*The points can then be graphed and analyzed, or used to create an animated figure.*
	45.	00:03:24	*This helps determine how far the subject can stretch his or her arms.*
	46.	00:03:29	*We call this the Distance Freech envelope.*
	47.	00:03:41	*Music*
	48.	00:04:08	*And all that today*
	49.	00:04:10	*on a very, very small computer with a flash card, it's absolutely amazing!*
	50.	00:04:17	*We were talking about a period of about 35 to 40 years.*
	51.	00:04:26	*We started with the mainframe.*
	52.	00:04:28	*We went to the mini-computer.*
	53.	00:04:31	*We went to the PC.*
	54.	00:04:34	*Today, we are going to an unbelievable thing, which is actually a flash card that can be won.*
	55.	00:04:43	*A full biomechanical analysis on any computer or even smart phones*
	56.	00:04:53	*where you can collect all the data on these 256 megabytes, a $5 cost.*
	57.	00:05:00	*USB, a flash card.*
	58.	00:05:08	*To start the analysis, we will insert the card into the computer,*
	59.	00:05:15	*could be any computer, could be a laptop in this case, it's a desktop.*
	60.	00:05:21	*From here, we can do many things.*
	61.	00:05:25	*The APOS menu appears.*
	62.	00:05:28	*You can capture, trim, digitize, and I will demonstrate now how amazingly this little flash card*
	63.	00:05:39	*is going to revolutionize the whole field of biomechanics because everybody can carry this pocket,*
	64.	00:05:46	*this particular card, just inserted to the computer in one of the USB phones.*
	65.	00:05:56	*The computer will read it, find it, and from there, we can run the full motion analysis.*
	66.	00:06:09	*I'll click on the APOS menu, that's reading it right from the flash card.*
	67.	00:06:15	*I'll go to the digitizing, and here I have a file that I captured before,*
	68.	00:06:26	*I will zoom a little bit closer.*
	69.	00:06:32	*I will digitize the fixed point, the first point, the second point,*
	70.	00:06:40	*I'll go to the automatic, and I'll say stop.*
	71.	00:06:46	*Okay.*
	72.	00:06:53	*The digitizing is complete, now I transform the data, so in order to go to transformation,*
	73.	00:07:00	*we go into the transform modules, it can be done also automatically all these things.*
	74.	00:07:06	*We select the same file that we just digitized, and in this case it's a 2D,*
	75.	00:07:17	*but you can do the same thing with the 3D, and the computer doing all the calculation,*
	76.	00:07:24	*and get you the transform data.*
	77.	00:07:26	*After you transform the data, you want to filter the data, so we'll go to the filter,*
	78.	00:07:33	*we'll select the same file, and here you'll see the filter.*

Frame	#	Time	Spoken text
	79.	**00:07:41**	*So now in order to display, I will display the data that we just did,*
	80.	**00:07:49**	*I'll select the file, and I'll do linear displacement of 0.1 and 0.2*
	81.	**00:08:00**	*from the Z-axis, rotation, any file graphics.*
	82.	**00:08:05**	*Here I see the graph of two points.*
	83.	**00:08:08**	*If I want to see actually the segment itself, if we just did, you lose the segment,*
	84.	**00:08:14**	*and it will correspond to the automatic digitizing that we did.*
	85.	**00:08:21**	*If we want to look on the video at the same time, here we see also the video,*
	86.	**00:08:29**	*I'll tile it, so we see all the data.*
	87.	**00:08:32**	*We want to see the numerical data, we also can have the numerical data here.*
	88.	**00:08:41**	*So now we have the video, the stick figure, the output data, which could be*
	89.	**00:08:48**	*displacement, velocity, acceleration forces, and so on, and also the numerical data.*
	90.	**00:08:54**	*So to summarize the presentation here is that I'll show you a new progression*
	91.	**00:09:03**	*in the field of biomechanics that I started in the 60s.*
	92.	**00:09:09**	*We're using the mainframe, then we went to the mini-computer, the digital equipment,*
	93.	**00:09:14**	*and the data generator using the NASA and other places, and in the Olympic Committee,*
	94.	**00:09:19**	*we started on the Olympic 20th Center in Colorado, spring, and then a general computer.*
	95.	**00:09:24**	*And of course then we went to the PC, working on a PC, and with all the technology that*
	96.	**00:09:32**	*developed today, you can automatically capture the data on video.*
	97.	**00:09:36**	*You can store it on a simple USB flash card, and from there you can go to any Internet*
	98.	**00:09:46**	*cafe, or any laptop, just insert the flash cards, and one, a full analysis, let's show you here.*
	99.	**00:09:57**	*So this is the 21st century miracle and very, very inexpensive.*

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