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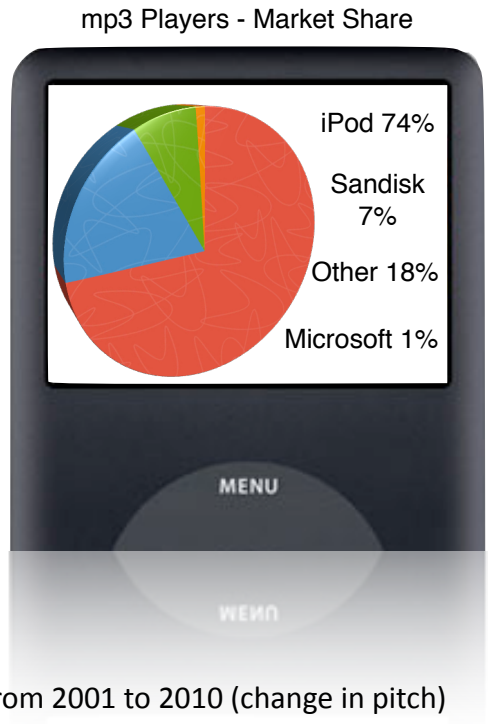
Deco1013: Sound Design & Sonification
Audio Signal Processing for Data Sonification



The purpose and function of the sonification system

Apple Inc. is a multinational corporation that designs and markets consumer electronics. The multibillion dollar company is the found owner and creator of the Mac (Macintosh) computer, the iPod and the iPhone. Their creative innovation as lead them to be one of the leading names in consumer electronics.

The famous portable media player, the iPod was launched in October 2001. Since then, it has taken over the music industry and the term 'iPod integration', can be seen in all speaker systems, cars and alarm clocks. Over 90 percent of new cars sold in the United States have an option for iPod connectivity. As a result, Apple Inc. have sold over 269.5 million iPods up until 2009.

The purpose of this sonification system, is to notify the increase and rapid fluctuations through sales in any business that sometimes can not be seen from the naked eye.

I will be recording 3 items in my sonification system:

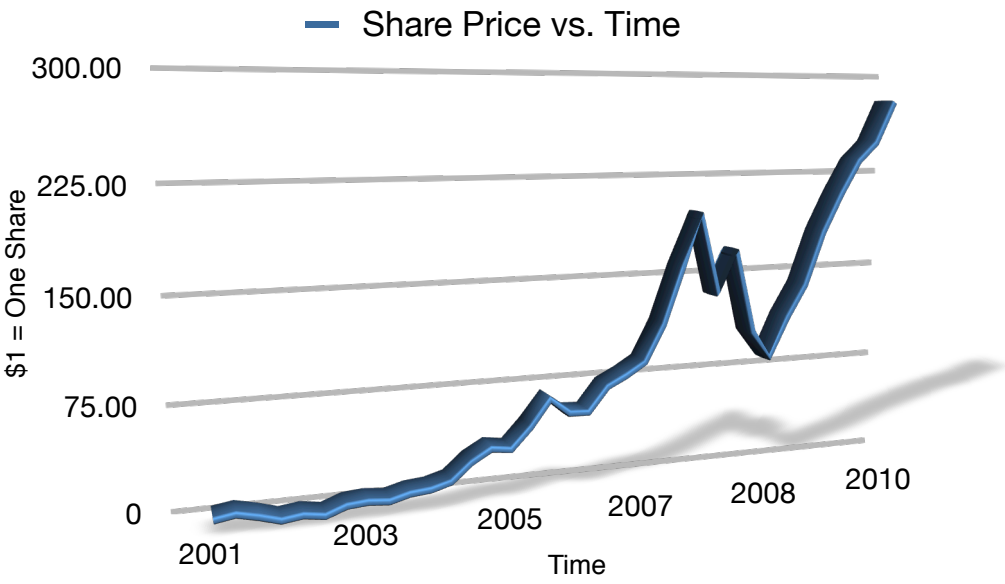
1. The increase in sales of all versions of the iPod, each quarter from 2001 to 2010 (change in pitch)
2. The trading price of one share, at Apple Inc. from 2001 to 2009 (speed of pitch)
3. The overall total sales of iPods from 2001 to 2009 (an additional input in change of pitch)

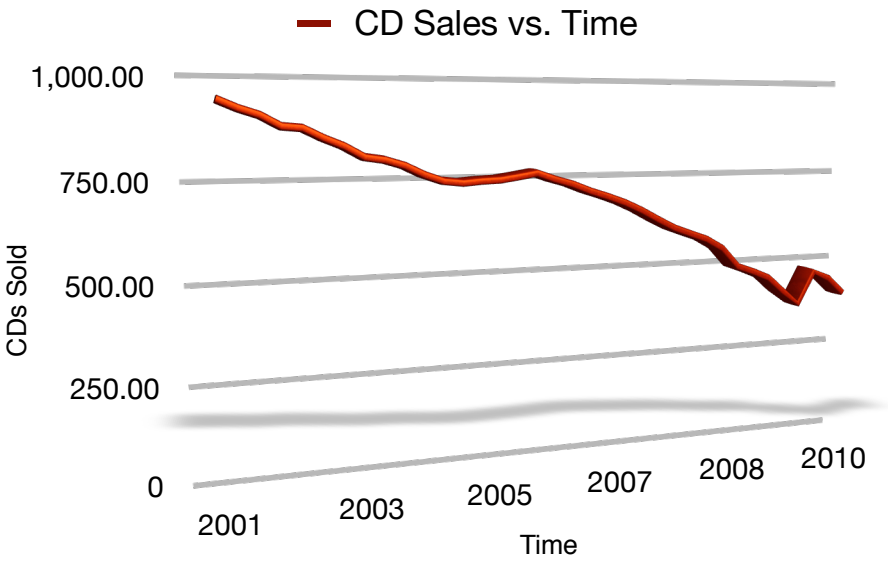
Description and evaluation of results

Below I have produced a graphical representations of the statics I am implementing into my system. Studying theses graphs, will help me compare the trends seen in the data, to the sound that I will produce in my sonification system rather than looking at raw data.

Share Prices

The tutorials in class have helped me develop my patch, using it as a template in a previous class. As you can see over time, the increase in shares gradually rises from 2001 to 2007. In saying this, the speed of the pitch will go faster when the share price increases with the sound of pitch when more iPods are sold. I am interested in seeing what will be produced in the sudden dropoff and followed by a dramatic increase from 2008 to 2010 after having a gradual increase in iPods sold.



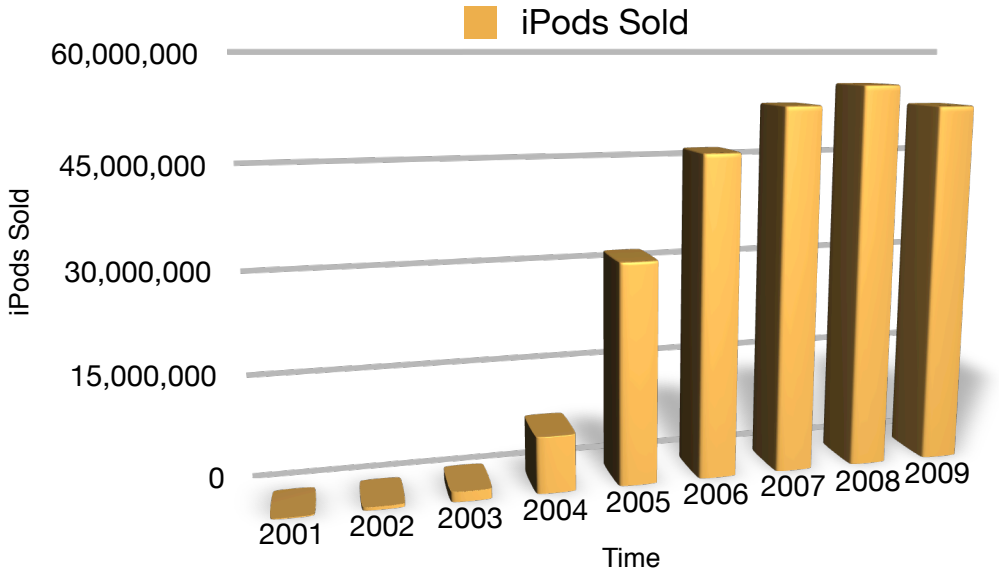


CD Sales

CD sales are additional data I implemented into my MaxPatch, along the right hand side. This is a separate pitch that drops in tone, in relation to the number of CD sales decreasing. It is interesting to listen to when the increase in pitch of iPods sales, while having another tone drop in pitch when the CD sales decrease. There is a slight increase in 2009 that can be easily heard when implemented into the MAX patch.

How do the results relate to what you think you already knew about the data?

I could easily predict some outcomes in parts of the data. The expected a gradual decrease in pitch that was easily picked up when producing the sonification (especially in the decrease in CD sales). The increase in share prices was tricky for me, because I didn't know how fast it was going to be played by only looking at the raw data in my table. Although, I had some idea that it was going to have a huge difference in the sound over time.



Have you discovered something new about the data from your sonification?

I never noticed the massive increase (iPods Sold) in pitch when reading the data around 2004 mark. Although when listening to the data being implemented, I can hear the change in speed significantly rather than reading the data from the table. I didn't really notice it until I matched the data to the max patch and could easily hear the share price dramatically increasing over time (including 2008 - 2010).

Final Evaluation

I have developed a realtime audio signal processing system that implements data and produces interesting results. Taking advantage of tutorials done in class, I can now source data to develop data sonification that can be useful to recognise trends that sometimes can not be seen in graphs or tables.

iPOD & CD SOLD

Quarter	iPods Sold (Quarterly)	Ipods Sold (Yearly)	iPod Sold (Total)	CDs SOLD (Millions)	Share Price
2001	125,000	125,000	125,000	942.5	10.53
Q1 2002	57,000	475,000	182,000	922.4	12.90
Q2 2002	54,000		236,000	907.3	9.63
Q3 2002	145,000		381,000	881.9	5.48
Q4 2002	219,000		600,000	878	7.45
Q1 2003	80,000	1,453,000	680,000	855	5.34
Q2 2003	304,000		984,000	836	10.73
Q3 2003	336,000		1,320,000	810	11.91
Q4 2003	733,000		2,053,000	803.3	10.64
Q1 2004	807,000	8,183,000	2,860,000	789.4	14.5
Q2 2004	860,000		3,720,000	767	15.8
Q3 2004	2,016,000		5,736,000	751	19.87
Q4 2004	4,500,000		10,236,000	746.0	32.24
Q1 2005	5,311,000	31,960,000	15,547,000	750	40.41
Q2 2005	6,155,000		21,702,000	752	38.66
Q3 2005	6,451,000		28,153,000	759	53.55
Q4 2005	14,043,000		42,196,000	767	71.89
Q1 2006	8,526,000	46,432,000	50,722,000	751	61.01
Q2 2006	8,111,000		58,833,000	738	60.52
Q3 2006	8,729,000		67,562,000	720	78.00
Q4 2006	21,066,000		88,628,000	705.4	85.05
Q1 2007	10,549,000	52,685,000	99,177,000	689	93.78
Q2 2007	9,815,000		108,992,000	668	120.60
Q3 2007	10,200,000		119,192,000	643	160.82
Q4 2007	22,121,000		141,313,000	619.7	198.08
Q1 2008	10,644,000	55,434,000	151,957,000	603	140.75
Q2 2008	11,011,000		162,068,000	587	170.543
Q3 2008	11,052,000		173,120,000	561	110.63
Q4 2008	22,727,000		184,172,000	511.1	90.75
Q1 2009	11,013,000	52,375,000	195,185,000	495	120.08
Q2 2009	10,215,000		205,400,000	476	143.67
Q3 2009	10,177,000		215,577,000	436	182.91
Q4 2009	20,970,000		236,547,000	400.2	211.01
Q1 2010	10,885,000	So far 28,505,000	247,432,000	486	235.29
Q2 2010	9,410,000		256,842,000	466	248.63
Q3 2010	8,210,000		265,052,000	424	278.75