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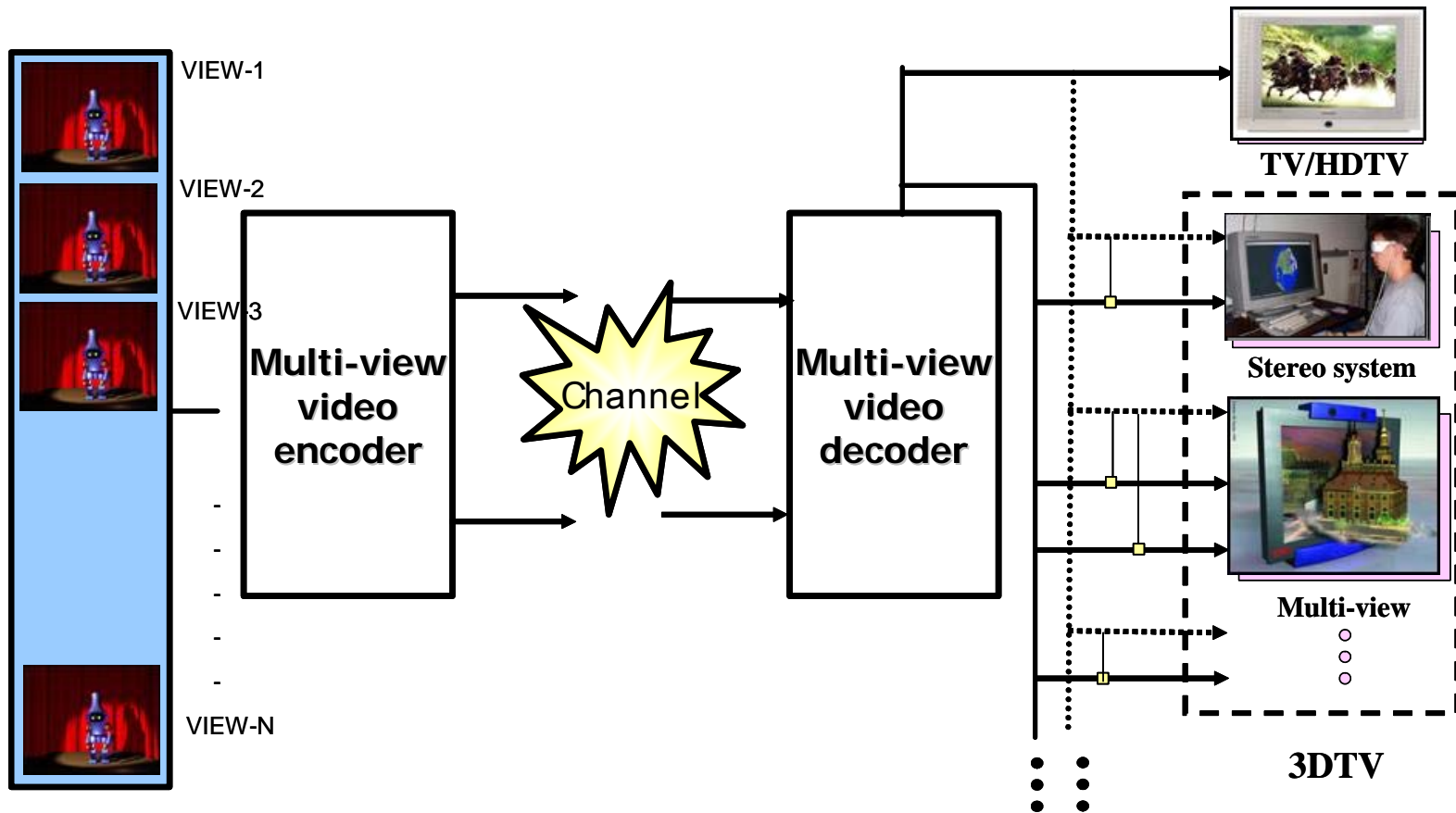


A Method and Apparatus for Multi-View Video Coding

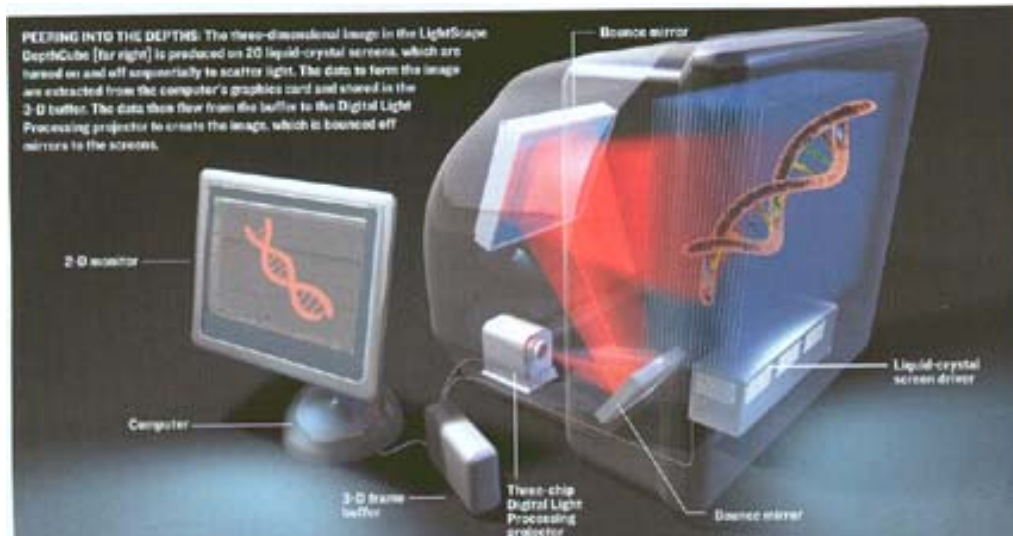
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Multi-View Video Coding System



New 3-D Displays

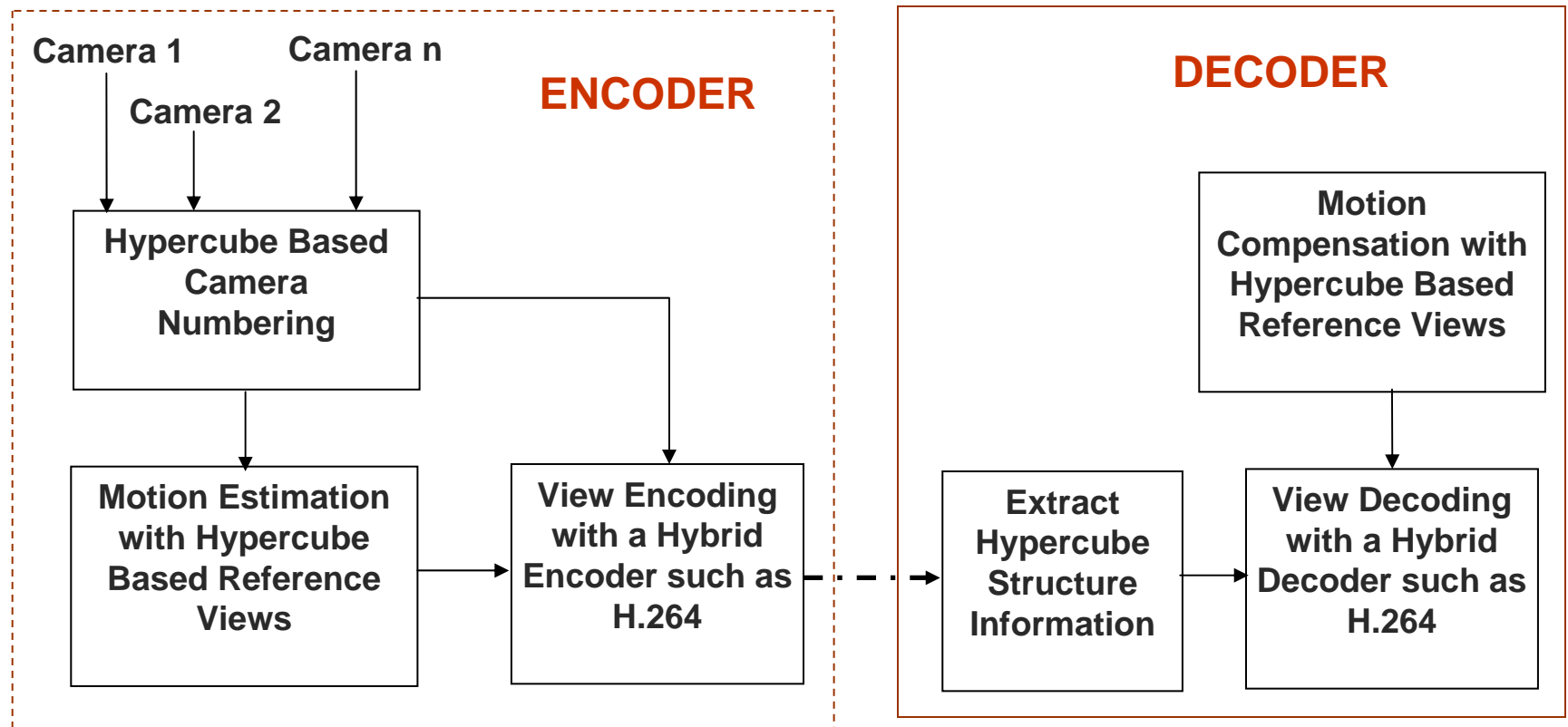


- Volumetric displays render images in 3D space rather than on a flat screen
- Market prediction: \$1B by 2006
- Companies: Felix 3D-Display (Germany), Genex Technologies, Actuality Systems, Light Space (USA)

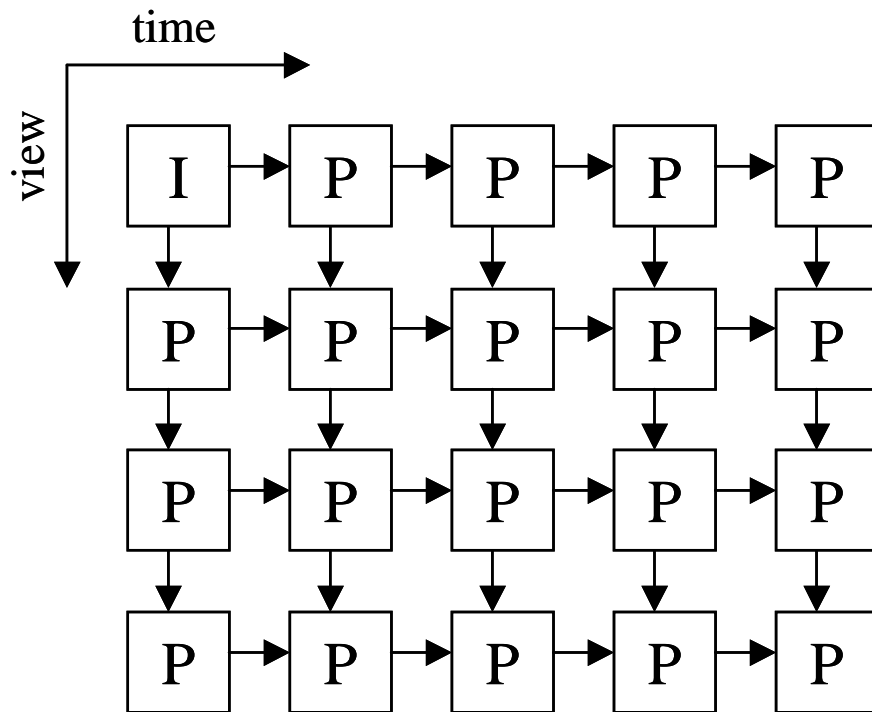
[Multi-View Video Coding Systems]

- Allow coding of multiple camera views
- Provide the base for 3D video and 3D imaging
- The compressed 3D video stream is delivered to a receiver (3D TV or multi-view receiver) over the network

The Apparatus (Multi-View Coder) based on Hypercube Structure Of Cameras



Prior Art: Sequential Prediction Structure

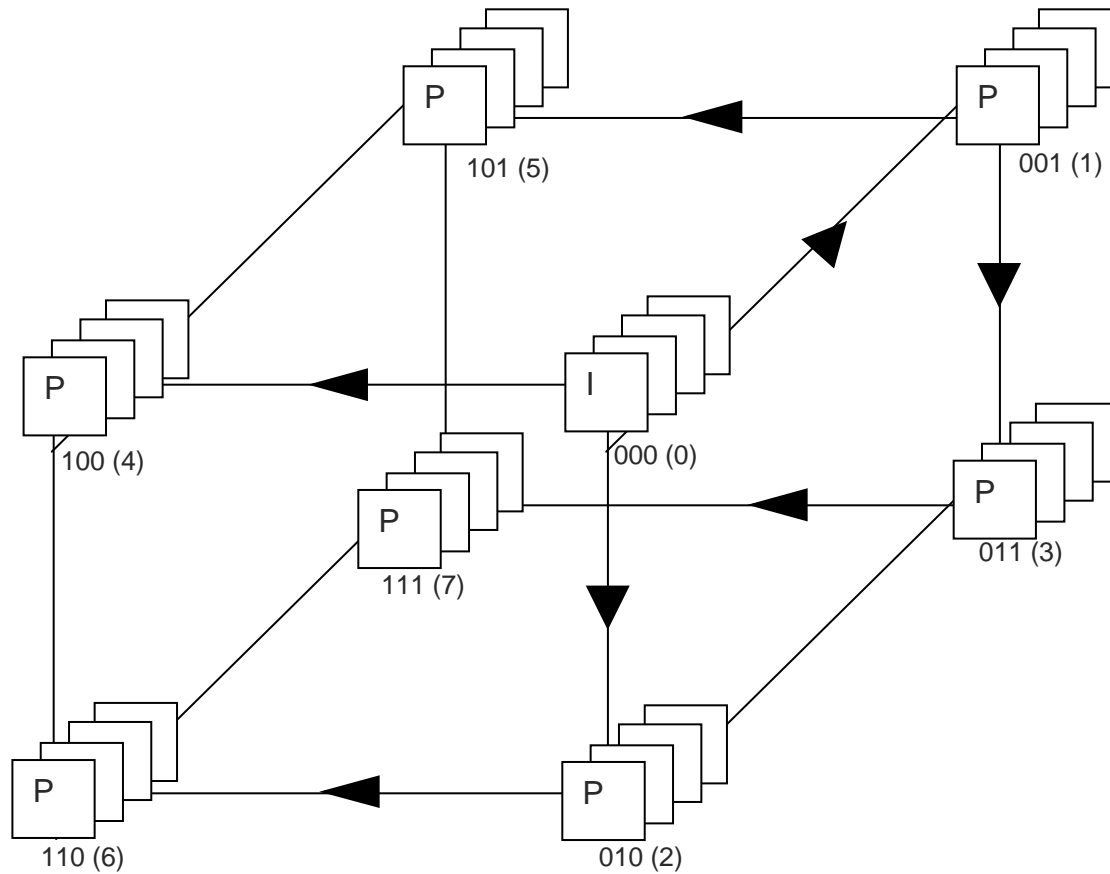


- Disadvantage: sequential dependencies
- N cameras \rightarrow $(N-1)$ views must be decoded

Reference Views for an Eight Camera Array

View No. (V_i)	Reference Views (V_j)
0 (000)	-
1 (001)	0
2 (010)	0,1
3 (011)	0,1,2
4 (100)	0,1,2,3
5 (101)	0,1,2,3,4
6 (110)	0,1,2,3,4,5
7 (111)	0,1,2,3,4,5,6

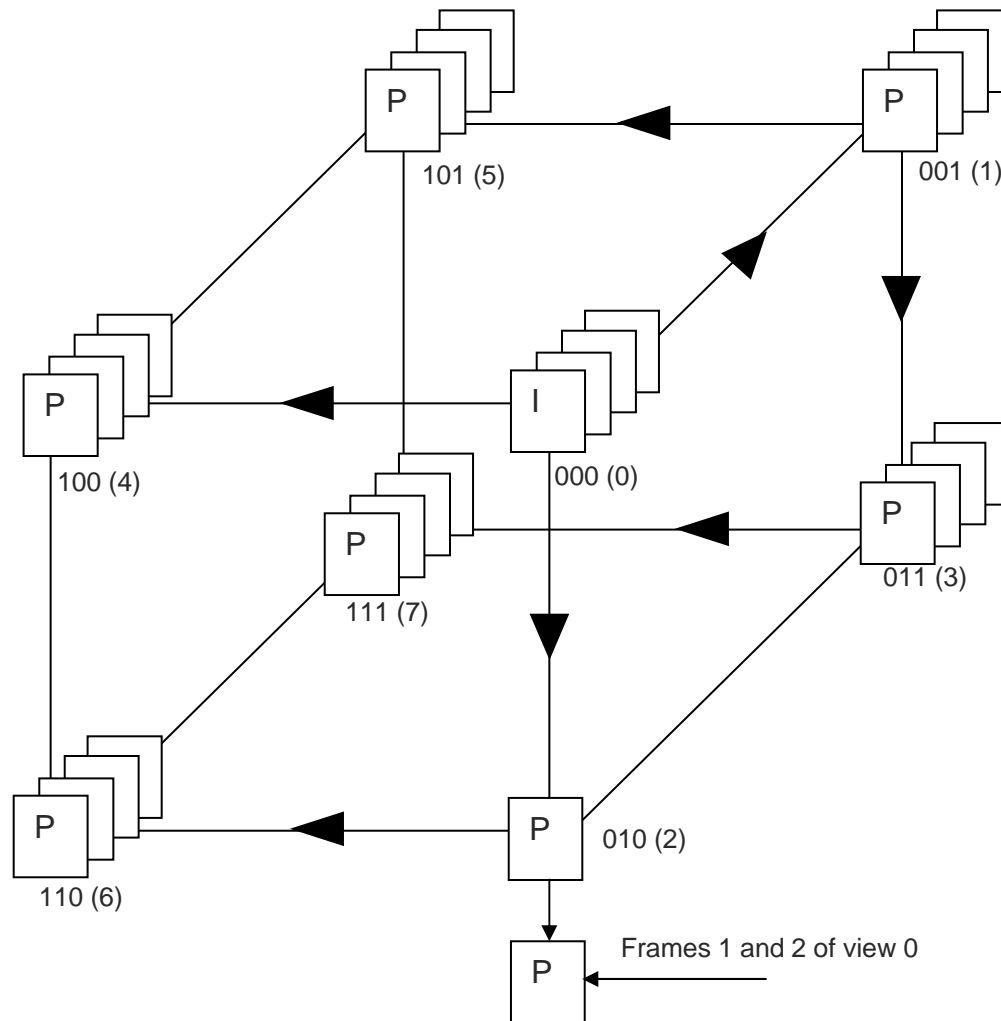
Hypercube with 8 Nodes (Cameras)



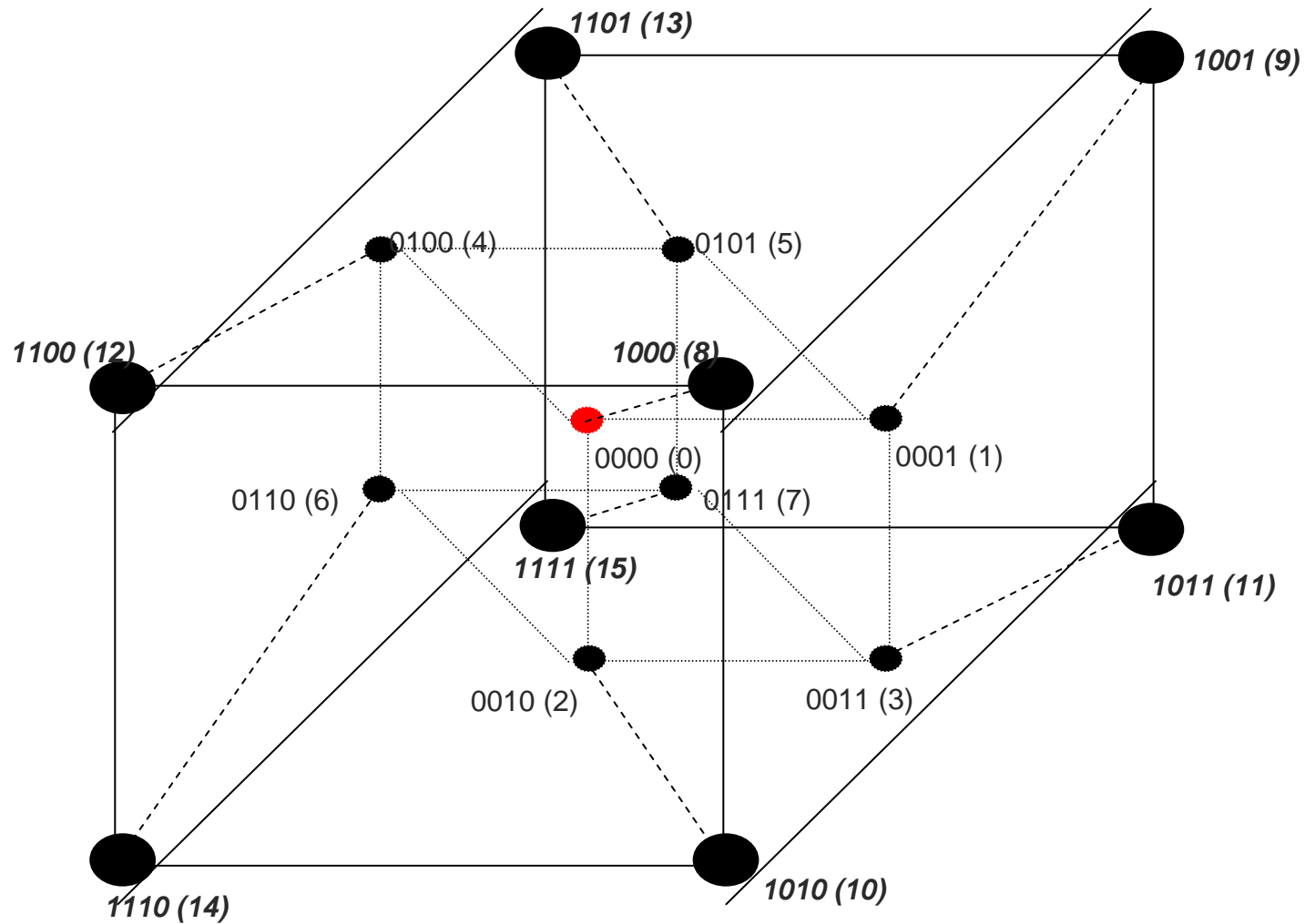
Reference Views for an Eight Camera Array in Hypercube

View No. (V_i)	Reference Views (V_j)
0 (000)	-
1 (001)	0
2 (010)	0
3 (011)	0,1
4 (100)	0
5 (101)	0,1
6 (110)	0,2
7 (111)	0,1,3

Encoding Subsequent P-Frames in Hypercube Structure



Hypercube with 16 Nodes (Cameras)



Summary

- The proposed apparatus for coding multiple-views video sequences consists of a video encoder and decoder
- When the number of cameras increases, existing solutions create a very large dependency chains resulting in huge computational cost for extracting the corresponding views at the receiver side.
- The proposed prediction structure based on hypercube minimizes these dependencies and scales well with the number of cameras
- Due to reduced number of dependencies, the proposed solution allows extracting specific camera views much easier and faster than existing solutions.