We consider the problem of packetizing a variable length coded Markov sequence into fixed length packets, while being protected by variable rate channel code. Given the total transmission bit budget, a joint source–channel coding problem is how to partition the input sequence and how to determine the coding rates of individual packets for minimum expected distortion when the sequence is sent over binary symmetric channel. Three methods are proposed to estimate the performance of a sequence when transmitted through the system, based on which we convert the joint source–channel coding problem into a shortest path problem in a weighted directed acyclic graph which can be solved by using dynamic programming. Simulation shows that the overall performance of the system can be improved by 10–30% compared with the performance of the fixed rate packetization scheme.