

2.2冗余系统

冗余功能，能够有效地减少数据丢失的可能，增加了系统的可靠性，方便了系统维护。

2.2.1双设备冗余

双设备冗余，是指设备对设备的冗余，即两台相同的设备之间的相互冗余。对于用户比较重要的数据采集系统，用户可以用两个完全一样的设备同时采集数据，并与上位机通讯。系统结构示意图如图2.2.1：

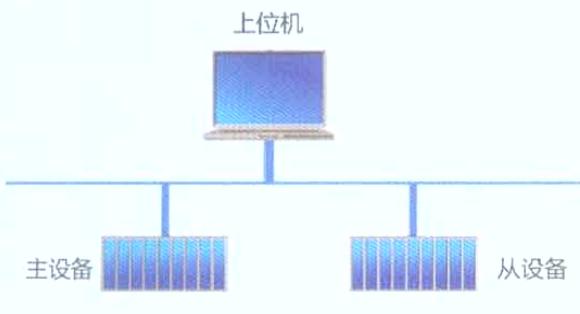


图2.2.1

正常情况下，主设备与从设备同时采集数据，但上位机只与主设备通讯，若主设备通讯出现故障，上位机将自动断开与主设备的连接，与从设备建立连接，从设备由热备状态转入运行状态。

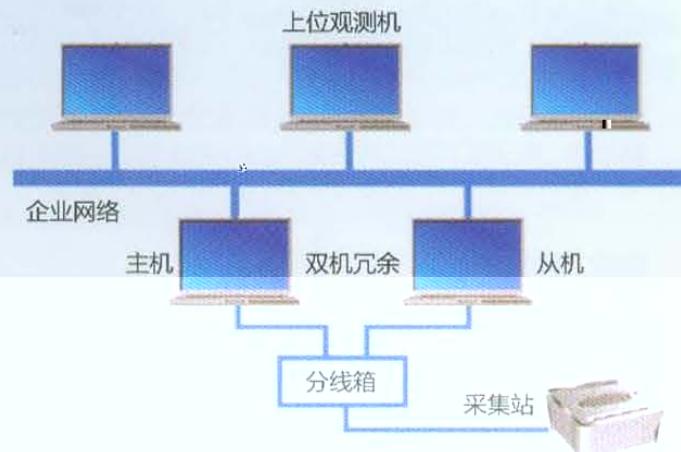


图2.2.2 双机热备的系统结构

双机热备实现的原理

如图2.2.2所示，为双机热备的系统结构图。双机热备主要是实时数据、报警信息和变量历史记录的热备。主从机都正常工作时，主机从设备采集数据，并产生报警和事件信息。从机通过网络从主机获取实时数据和报警信息，而不会从设备读取或自己产生报警信息。



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当主机正常运行，从机后启动时，主机先将实时数据和当前报警缓冲区中的报警和事件信息送到从机上。主

Figure 10. A 1000x1000 pixel grayscale image showing a highly noisy pattern of black and white pixels.

For more information about the study, please contact Dr. Michael J. Hwang at (310) 206-6500 or via email at mhwang@ucla.edu.

For more information about the study, please contact Dr. Michael J. Koenig at (314) 747-2146 or via email at koenig@dfci.harvard.edu.

For more information about the study, please contact Dr. Michael J. Hwang at (310) 794-3111 or via email at mhwang@ucla.edu.

For more information about the study, please contact Dr. Michael J. Hwang at (310) 206-6500 or via email at mhwang@ucla.edu.

For more information about the study, please contact Dr. John D. Cawley at (609) 258-4626 or via email at jdcawley@princeton.edu.

For more information about the study, please contact Dr. Michael J. Hwang at (319) 356-4000 or via email at mjhwang@uiowa.edu.

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W.M. WILSON, JR., *Journal of the American Statistical Association*, Vol. 35, No. 201, March 1940, pp. 1-12.

For more information about the study, please contact Dr. Michael J. Hwang at (310) 794-3000 or via email at mhwang@ucla.edu.

2020年1月6日，中国科学院植物研究所植物多样性与生物地理学国家重点实验室的科研人员在《自然》杂志上发表文章，展示了他们对青藏高原植被变化的研究成果。

Figure 1. The effect of the number of hidden neurons on the performance of the proposed model.

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Figure 1. A schematic diagram of the experimental setup for the measurement of the absorption coefficient of the sample.

8.3 8.0 7.7 7.4 7.1 6.8 6.5 6.2 5.9 5.6 5.3 5.0 4.7 4.4 4.1 3.8 3.5 3.2 2.9 2.6 2.3 2.0 1.7 1.4 1.1 0.8 0.5 0.2

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