UCRL-18546

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AUTOMATIC SCAN

Joan Franz

October 28, 1968

DISCLAIMER

UCRL-18546

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Lawrence Radiation Laboratory
Berkeley, California

AEC Contract No. W-7405-eng-48

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INTRODUCTION

The automatic scan program (516) is a C-level 7094 program which reads a data abstract tape and selects events, assigns event types and edits data onto magnetic tapes in the standard HAZE format. The data abstract tape, which is a result of A and B-level DAPR program operation, contains track coordinates for each view and a list of tracks associated with each spacial vertex. (Reference 1.)

In selecting events, straight-forward programming techniques are applied to impose physics selection criteria upon the data. The program outputs a DAPR scan report which lists the selected events by frame and vertex location. If a manual pre-scan tape is also input, the DAPR scan report will list pre-scan comparisons. This paper will describe the method by which the program selects events from the data abstract tape. In order to discuss the method, we must first consider the nature of the selection criteria.

SCANNING INSTRUCTIONS

The physics selection criteria are scanning instructions which enable the program to recognize events. Therefore, for any given experiment, a set of instructions includes an event descriptor for each event type to be scanned. Each event descriptor is a concise statement which identifies the event type in a unique fashion.

Event type identification is accomplished by defining a chain position block for each chain position in the event. (See Figure 1).

The chain position entries are as follows:

a) Chain position name
b) Downstream chain position list
c) Rank and category bounds
d) Beam track, fiducial volume flags
e) Charged or neutral link

f) Downstream linkage tallies
g) Track ordering procedures
h) Particle assignment

Also included in the event descriptor is an event type assignment block. This information is transmitted to magnetic tape, along with the track abstraction data, after the event has been selected.

The event type assignment entries are:

a) Assignment list
b) Topology
c) Writer
d) Subexperiment number

Hence, after the program has selected an event from criteria entered in the chain position blocks, it assigns a name to the event from the event type assignment block.

PROGRAM PROCEDURE

The automatic scan program operates on one triad of track abstraction data at a time. (See figure 2). The scanning procedure is done in two parts. The first is pre-scan processing, and the second is the event selection.

Pre-scan processing establishes vertex auxiliary table (VAT) entries which correspond to the information in a chain position block. First, the program establishes rank, category, beam track, and fiducial volume for all vertices. Next, it looks at each vertex in VAT and if the vertex has a beam track, the downstream charged linkages are tallied. If the vertex is not a beam track vertex, it is tested for being a neutral V candidate. When a vertex meets the neutral V requirements, the program searches every other vertex in VAT for being within the production cone of this neutral V. When the primary that has been found is a beam track vertex, its downstream neutral linkage is tallied. Thus, at the end of pre-scan processing only beam track vertices have downstream linkages tallied.

After pre-scan processing has been completed for a triad, the program enters the scan routine. This routine searches the VAT for each event type described in the scanning instructions. When the list of event descriptors has been exhausted, control goes back to read in the next triad of track abstraction data.

If the scan routine finds a vertex in the VAT which satisfies the criteria of a primary chain position, it enters the vertex into the hypothesis table. For one-vertex events, the program is now ready to order the tracks and output the event. If a primary chain position block has downstream chain positions listed, and there are downstream vertices for the vertex selected from VAT, then the routine computes downstream linkage tallies for the secondary vertices.

These secondaries are compared to secondary chain position blocks and are entered into the hypothesis table if they match. This process is continued for each chain position block in the event descriptor. During this process, if any vertex fails to match the scan criteria, the process is discontinued and the routine resumes searching VAT.

After the event is selected, the routine orders and labels the tracks for each vertex in the hypothesis table. The data is then ready for being edited into the standard HAZE library format and is output, along with the event type assignment information, onto magnetic tape. The routine continues to search the VAT, using the event descriptor as a mask to be compared to the data as the descriptor is moved through the VAT. When the end of the VAT is reached, the scan process is started for the next event descriptor.

CONCLUSION

The automatic scan program reads a data abstract tape and scans the data for event types described in the physics selection criteria. The program operates on one triad of data at a time, and searches each triad for all of the event types specified by the selection criteria. After an event has been selected, the tracks are ordered and labeled and the data is edited to the HAZE library format.

The automatic scan program is as flexible as manual scanning and any of the criteria used by human scanners can be applied by the program to the abstracted data. However, the program can scan 7200 triads per hour.

Among the event types that have been successfully recognized by the automatic scan program are two prong, four prong, four prong with an associated neutral V, and eight prong events.

REFERENCES

1: D. Hall, "DAPR" Vertex Search and Track Match", to be published in the Proceedings of an International Conference on Advanced Data Processing for Bubble and Spark Chambers, held at Argonne National Laboratory, 28 to 30 October 1968.

FIGURE CAPTIONS

Figure 1: A schematic drawing showing the event descriptor entries.

Figure 2: A block diagram of the automatic scan program.

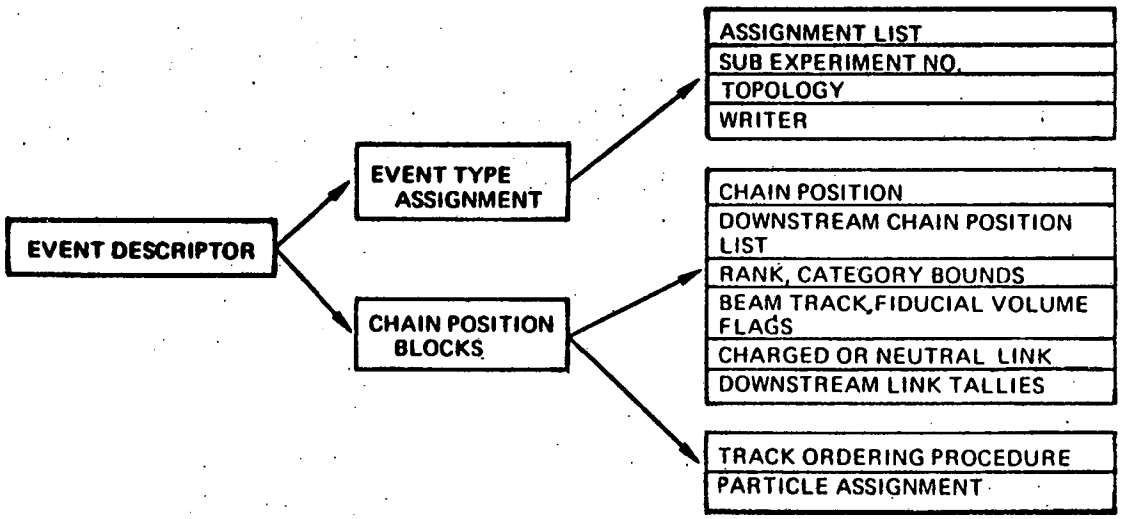

Fig. 1.

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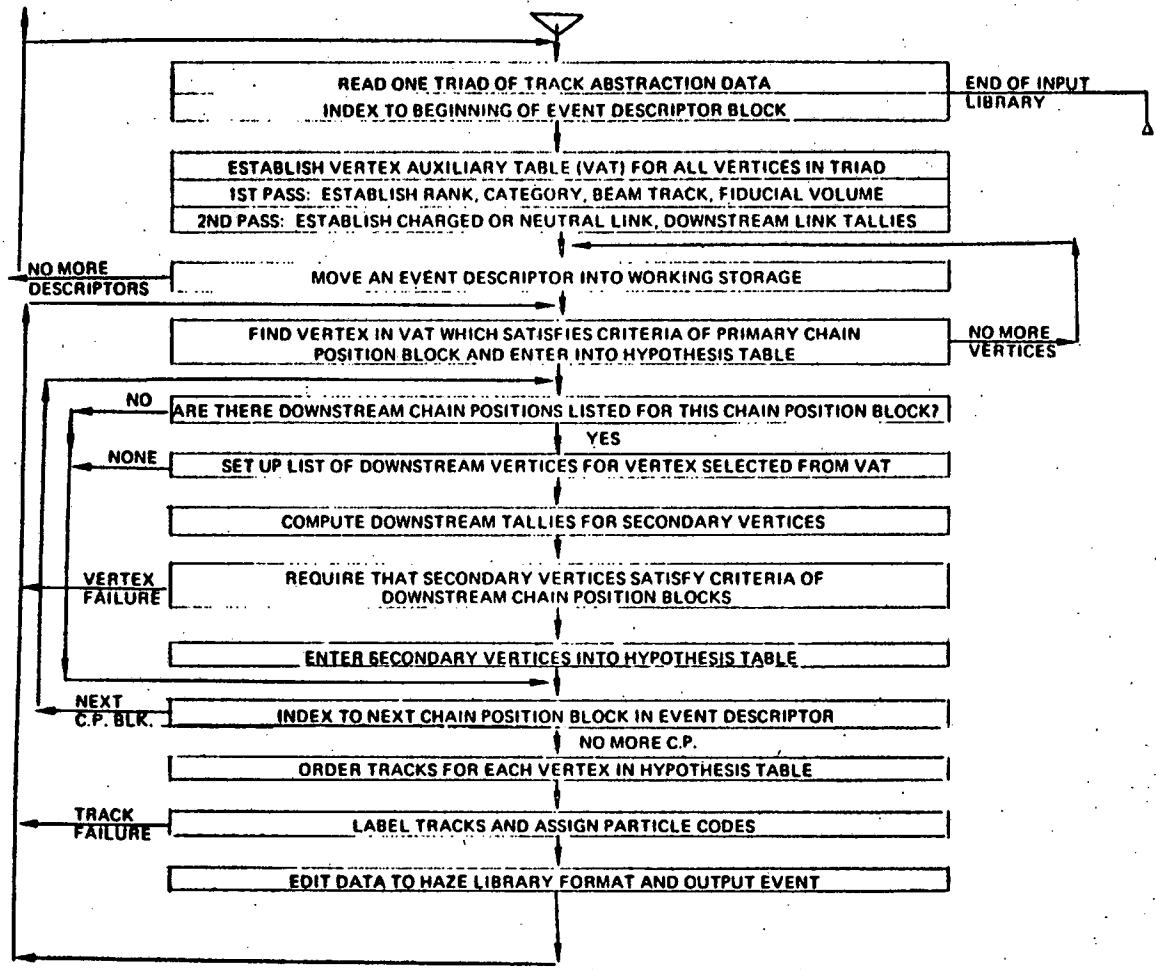

Fig. 2.

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