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GENERALIZED NET MODELS IN NEUROLOGY

(COMA)

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The present study is based on the book [1] and our research [2]. It uses the scheme on p. 22 from [1]. We shall construct the Generalized Net (GN; see [3]) NGN11 (see [2]).

In place l_1 enters a token with an initial characteristic "patient in coma". It activates the GN NGN11 which has the following transitions.

$$Z_1 = \langle \{l_1\}, \{l_2, l_3\}, r_1 \rangle,$$

where

$$r_1 = \begin{array}{c|cc} & l_2 & l_3 \\ \hline l_1 & W_{1,2} & W_{1,3} \end{array}$$

where

$W_{1,2}$ = "the is not trauma",

$W_{1,3} = \neg W_{1,2}$.

If the token enters place l_2, then it obtains a characteristic "assesment of the neck flexibility"; if the token enters place l_3 then it obtains a characteristic "CT brain scan, neurosuraical consultation is necessary".

$$Z_2 = \langle \{l_2\}, \{l_4, l_5\}, r_2 \rangle,$$

where

$$r_2 = \begin{array}{c|cc} & l_4 & l_5 \\ \hline l_2 & W_{2,4} & W_{2,5} \end{array}$$

where

$W_{2,4}$ = "the neck is stiff",

$W_{2,5}$ = "the neck is supple".

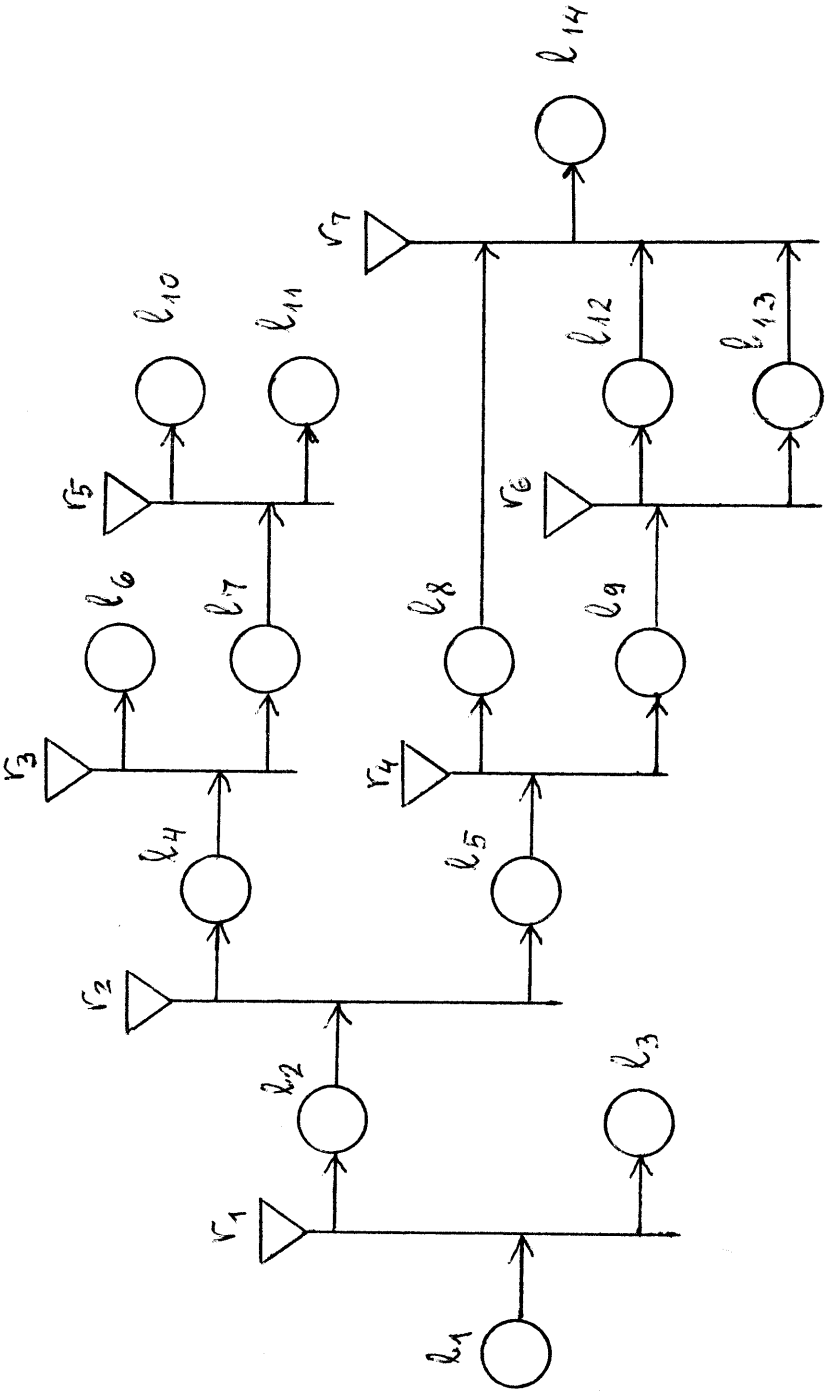

Fig. 1.

If the token enters place l_4, then it obtains a characteristic "CT scan is necessary"; if the token enters place l_5, then it obtains a characteristic "neurological examination is necessary".

$$Z_3 = \langle \{l_4\}, \{l_6, l_7\}, r_3 \rangle,$$

where

r_3	l_4	l_6: $W_{4,6}$	l_7: $W_{4,7}$

where

$W_{4,6}$ = "there is subarachnoid hemorrhage or intracerebral hematoma",

$W_{4,7}$ = "the CT-scan is normal".

If the token enters place l_6, then it obtains a characteristic "the diagnosis is subarachnoid hemorrhage or intracerebral hematoma"; if the token enters place l_7, then it obtains a characteristic "lumbal puncture is necessary".

$$Z_4 = \langle \{l_5\}, \{l_8, l_9\}, r_4 \rangle,$$

where

r_4	l_5	l_8: $W_{5,8}$	l_9: $W_{5,9}$

where

$W_{5,8}$ = "the neurological status is normal",

$W_{5,9}$ = "the neurological status is abnormal (asymetric or brain stem signs)".

If the token enters place l_8, then it obtains a characteristic "probable toxic or metabolic cause"; if the token enters place l_9 then it obtains a characteristic "CT brain scan is necessary".

$$Z_5 = \langle \{l_7\}, \{l_{10}, l_{11}\}, r_5 \rangle,$$

where

r_5	l_7	l_{10}: $W_{7,10}$	l_{11}: $W_{7,11}$

where

$W_{7,10}$ = "there is blood in the CSF",

$W_{7,11}$ = "there are elevated protein and sells in the CSF".

If the token enters place l_{10} then it obtains a characteristic "subarachnoid hemorrhage"; if it enters place l_{11}, it obtains a

characteristic "meningits".

$$Z_6 = \langle \{l_9\}, \{l_{12}, l_{13}\}, r_6 \rangle,$$

where

r_6	l_{12}	l_{13}
l_9	$W_{9,12}$	$W_{9,13}$

where

$W_{9,12}$ = "the CT brain scan is normal",

$W_{9,13} = \neg W_{9,12}$.

If the token enters place l_{12} then it obtains a characteristic "possible early brain infarct" if it enters place l_{13}, it obtains a characteristic "possible infarct, turor, hemorrhage, etc.".

$$Z_7 = \langle \{l_8, l_{12}, l_{13}\}, \{l_{14}\}, r_7 \rangle,$$

where

r_7	l_{14}
l_8	"true"
l_{12}	"true"
l_{13}	"true"

The token in place l_{14} obtains a characteristic "it is necessary complete medical evaluation".

This GN is a sub-GN of the GNs discussed in [4-6].

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