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(54) **SYSTEMS AND METHODS FOR CONTENT TYPE CLASSIFICATION**

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H04L 12/26 (2006.01)

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CPC **H04L 43/18** (2013.01)
USPC **370/241**

(58) **Field of Classification Search**
None
See application file for complete search history.

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(57) **ABSTRACT**

Various embodiments illustrated and described herein include systems, methods and software for content type classification. Some such embodiments include determining a potential state of classification for packets associated with a session based at least in part on a packet associated with the session that is a packet other than the first packet of the session.

20 Claims, 7 Drawing Sheets

TIME	SESSION S1	SESSION S1
↓	P11 STATE UNKNOWN (T1, T2, T3)	P21 STATE CLASSIFIED (T2)
	P12 STATE UNKNOWN (T1, T3)	P22 STATE CLASSIFIED (T2)
	P13 STATE CLASSIFIED (T3)	P23 STATE CLASSIFIED (T2)
	P14 STATE CLASSIFIED (T3)	
	P15 STATE CLASSIFIED (T3)	

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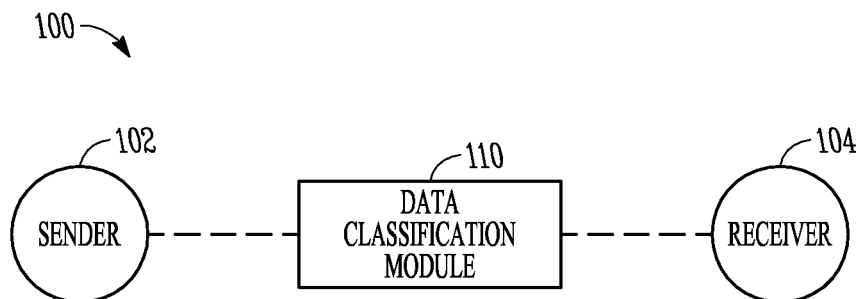
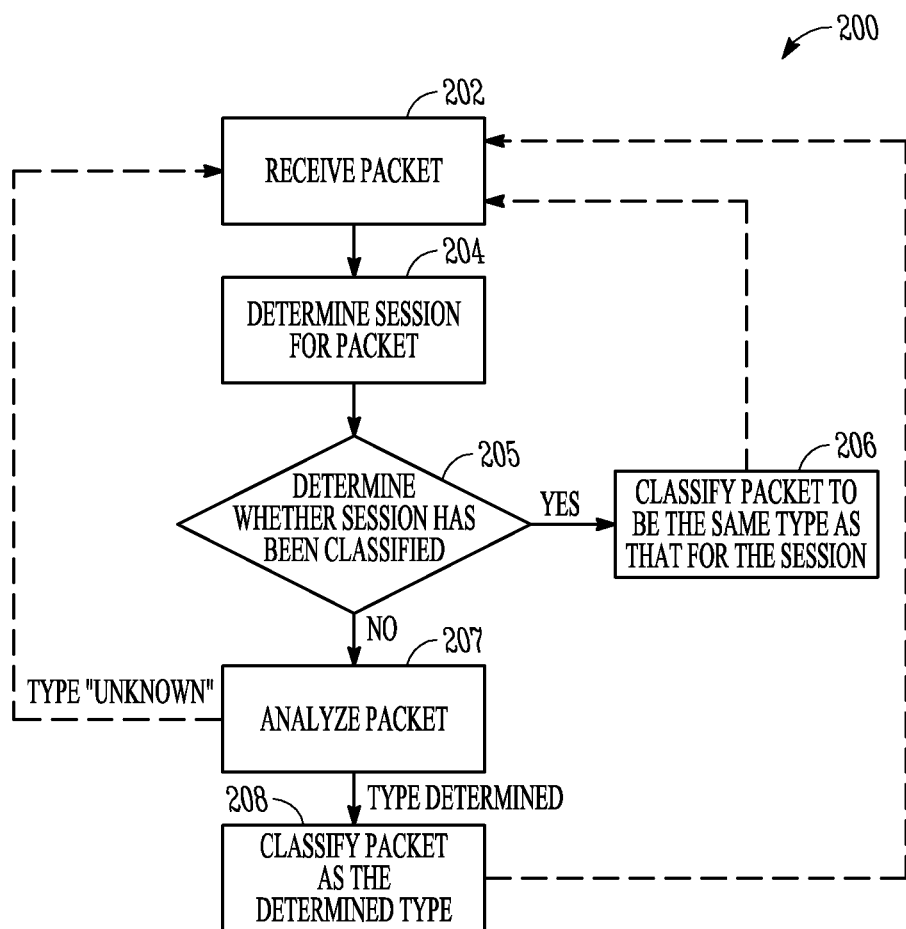
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*FIG. 1**FIG. 2*

Example 1: TCP traffic

#	direction	packet_size	port	using proxy	(p,s) matches skype
1	C --> S	14	!80/!443	no	unknown
2	S --> C	28-36	!80/!443	no	unknown
3	C --> S	14	!80/!443	no	Yes (confirm)

FIG. 3A

Example 2: TCP traffic

#	direction	packet_size	port	using proxy	(p,s) matches skype
1	C --> S	16	80	no	unknown
2	S --> C	14	80	no	unknown
3	C --> S	28-36	80	no	unknown
4	S --> C	14	80	no	Yes

FIG. 3B

Example 3: TCP traffic

#	direction	packet_size	port	using proxy	pattern	(p,s) matches
1	C --> S	72	443	no	80 46 01 03 01 00 2d	unknown
2	S --> C	93	443	no	16 03 01 00 4a 02	unknown
3	C --> S	14	443	no	N/A	yes (confirm)

FIG. 3C

Example 4: UDP traffic:

#	direction	packet_size	port	pattern(3rd byte)	(p,s) matches s
1	C --> S	18/27	>1024	0x02	unknown
2	S --> C	>10	>1024	0x02/0x07	yes

FIG. 3D

Example 5: normal Yahoo login, through port 80

protocol: TCP; client (C): 192.168.5.186:1734; server (S): 216.155.193.1

#	direction	pattern	classifier(p,s, yahoo)
1	C --> S	YMSG + ver_number + pkt_len test	session is Yahoo! candidate However, without server_side packet, the classifier returns "unknown"
2	S --> C	YMSG + ver_num	Confirmed. The content type is marked as Yahoo!

FIG. 3E

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